CoBaTrICE SYLLABUS

(Presented by Competence & Domain)

[VERSION 2.0 (2021)]

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PREFACE

(This is the preface to version 1.0)

This syllabus is the aggregate of all the knowledge, skills, behaviours and attitudes required for each of the 102 CoBaTrICE competencies. It is divided into 13 sections: 12 domains plus basic sciences. Within each section the syllabus for each competence is presented following which the aggregate syllabus for the section is displayed. This format inevitably results in repetition with the same topic appearing in more than one domain and linked to multiple competencies. Similarly, there is some cross-over between the knowledge and basic sciences, and knowledge and skills lists. An alternative (shorter) format which only displays the aggregate syllabus for each section is available to download from the CoBaTrICE website (www.cobatrice.org/syllabus).

The CoBaTrICE syllabus can be used by trainees and trainers to aid reflective learning, formal teaching and to guide some aspects of assessment. It could also be modified to audit the content of training received in different centres. The syllabus is presented in tables to allow trainees to track the progression of their learning if they wish. It is **not** intended that these tables be used as checklists for the assessment of competence. No trainee can be expected to have a comprehensive knowledge of every single aspect of the syllabus.

Much of this material has been 'gracefully borrowed' from international guidelines and national training documents, and we acknowledge with thanks the prior work done by colleagues in many countries. Additional material also came from the CoBaTrICE Delphi. The sum total of knowledge required to become a specialist intensivist is impressive and would be even larger if individual elements were presented in greater detail. The breadth of knowledge demonstrates that intensivists have an important role as the general practitioners of acute hospital medicine.

CoBaTrICE Domains

1: Resuscitation and initial management of the acutely ill patient

2: Diagnosis: assessment, investigation, monitoring and data interpretation

3: Disease management

- Acute disease
- Co-morbid disease
- Organ system failure

4: Therapeutic interventions / organ system support in single or multiple organ failure

5: Practical procedures

- Respiratory system
- Cardiovascular system
- Central nervous system
- Gastrointestinal system
- Genitourinary system

6: Peri-operative care

7: Comfort and recovery

8: End of life care

9: Paediatric care

10: Transport

11: Patient safety and health systems management

12: Professionalism

- Communication skills
- Professional relationships with patients and relatives
- Professional relationships with members f the health care team
- Self-governance

CoBaTrICE Competencies

Domain	Competency statement	
1. RESUSCITATION AND INITIAL MANAGEMENT OF THE ACUTELY ILL PATIENT	1.1	Adopts a structured and timely approach to the recognition, assessment, and stabilisation of the acutely ill patient with disordered physiology
	1.2	Manages cardiopulmonary resuscitation
	1.3	Manages the patient post-resuscitation
	1.4	Triages and prioritises patients appropriately, including timely admission to ICU
	1.5	Assesses and provides initial management of the trauma patient
	1.6	Assesses and provides initial management of the patient with burns
	1.7	Describes the management of mass casualties
2. DIAGNOSIS: ASSESSMENT, INVESTIGATION, MONITORING AND DATA INTERPRETATION	2.1	Obtains a history and performs an accurate clinical examination
	2.2	Undertakes timely and appropriate investigations
	~~2.3~~	~~Describes indications for echocardiography (transthoracic / transoesophageal)~~
	2.3[a]	Performs and interprets transthoracic cardiac ultrasound for the recognition and assessment of left ventricular and right systolic failure, contraction pattern and dilation and pericardial tamponade
	2.3b	Performs and interprets ultrasonographic assessment of the lungs and pleura for the recognition and assessment of consolidation, pleural effusion and pneumothorax.
	2.3c	Performs and interprets ultrasonographic assessment of the abdomen to assess intraperitoneal free fluid, hydronephrosis and bladder volume.
	2.3d	Performs and interprets venous ultrasound examination to assess for deep venous thrombosis and to aid vascular access (arterial and venous)
	2.4	Performs electrocardiography and interprets the results
	2.5	Obtains appropriate microbiological samples and interprets results
	2.6	Obtains and interprets the results from blood gas samples
	2.7	Interprets chest x-rays
	2.8	Liaises with radiologists to organise and interpret clinical imaging
	2.9	Monitors and responds to trends in physiological variables
	2.10	Integrates clinical findings with laboratory investigations to form a differential diagnosis
3.DISEASE MANAGEMENT	**Acute disease**	
	3.1	Manages the care of the critically ill patient with specific acute medical conditions
	Chronic disease	
	3.2	Identifies the implications of chronic and co-morbid disease in the acutely ill patient
	Organ System Failure	
	3.3	Recognises and manages the patient with circulatory failure
	3.4	Recognises and manages the patient with, or at risk of, acute renal failure
	3.5	Recognises and manages the patient with, or at risk of, acute liver failure
	3.6	Recognises and manages the patient with neurological impairment
	3.7	Recognises and manages the patient with acute gastrointestinal failure
	3.8	Recognises and manages the patient with acute respiratory failure and Acute respiratory distress syndrome (ARDS)
	3.9	Recognises and manages the septic patient
	3.10	Recognises and manages the patient following intoxication with drugs or environmental toxins
	3.11	Recognises life-threatening maternal peripartum complications and manages care
4. THERAPEUTIC INTERVENTIONS / ORGAN SYSTEM	4.1	Prescribes drugs and therapies safely
	4.2	Manages antimicrobial drug therapy
	4.3	Administers blood and blood products safely

SUPPORT IN SINGLE OR MULTIPLE ORGAN FAILURE	4.4	Uses fluids and vasoactive / inotropic drugs to support the circulation
	4.5	Describes the indication and use of mechanical assist devices for circulatory or respiratory assist
	4.6	Initiates, manages, and weans patients from invasive and non-invasive ventilatory support
	4.7	Initiates, manages, and weans patients from renal replacement therapy
	4.8	Recognises and manages electrolyte, glucose, and acid-base disturbances
	4.9	Provides nutritional assessment and support
5.PRACTICAL PROCEDURES	**RESPIRATORY SYSTEM**	
	5.1	Administers oxygen using a variety of administration devices
	5.2	Performs fibreoptic laryngoscopy
	5.3	Performs emergency airway management
	5.4	Performs difficult and failed airway management according to evidence-based protocols
	5.5	Performs endotracheal suction
	5.6	Performs fibreoptic bronchoscopy and BAL in the intubated patient
	5.7	Performs percutaneous tracheostomy
	5.8	Performs thoracocentesis via a chest drain
	CARDIOVASCULAR SYSTEM	
	5.9	Performs peripheral venous cannulation
	5.10	Performs arterial cannulation
	5.11	Describes a method for surgical isolation of vein / artery
	5.12	Performs ultrasound techniques for vascular localisation
	5.13	Performs central venous canulation
	5.14	Performs defibrillation and cardioversion
	5.15	Performs cardiac pacing (transvenous or transthoracic)
	5.16	Describes how to perform pericardiocentesis
	5.17	Demonstrates a method for measuring cardiac output and derived haemodynamic variables
	CENTRAL NERVOUS SYSTEM	
	5.18	Performs diagnostic lumbar puncture
	5.19	Manages the administration of analgesia via an epidural or peripheral catheter
	GASTROINTESTINAL SYSTEM	
	5.20	Performs gastric tube placement
	5.21	Performs abdominal paracentesis
	5.22	Describes the indicaton and use of Sengstaken tube (or equivalent) placement
	5.23	Describes indications for, and safe conduct of gastroscopy
	GENITOURINARY	
	5.24	Performs urinary catheterisation
6. PERI-OPERATIVE CARE	6.1	Manages the pre- and post-operative care of the high-risk surgical patient
	6.2	Manages the care of the patient following cardiac surgery
	6.3	Manages the care of the patient following craniotomy
	6.4	Manages the care of the patient following solid organ transplantation
	6.5	Manages the pre- and post-operative care of the trauma patient
7. COMFORT AND RECOVERY	7.1	Identifies and attempts to minimise the physical and psychosocial consequences of critical illness for patients and families
	7.2	Manages the assessment, prevention, and treatment of pain, delirium, and other distress
	7.3	Manages sedation and neuromuscular blockade
	7.4	Communicates the continuing care requirements of patients at ICU discharge to health care professionals, patients, and relatives
	7.5	Manages the safe and timely discharge of patients from the ICU
8. END OF LIFE CARE	8.1	Manages end of life care and the process of withdrawing and withholding treatment with the multidisciplinary team
	8.2	Discusses end of life care with patients and their families / surrogates
	8.3	Manages palliative care of the critically ill patient

	8.4	Recognizes criteria of brain-death and performs medical investigations accordingly
	8.5	Manages the physiological support of the organ donor
9. PAEDIATRIC CARE	9.1	Recognizes and initiates management of the acutely ill child and initial management of paediatric emergencies
	9.2	Knows about national legislation and guidelines relating to child protection and their relevance to critical care
10.TRANSPORT	10.1	Undertakes transport of critically ill patient outside the ICU
11.PATIENT SAFETY AND HEALTH SYSTEMS MANAGEMENT	11.1	Leads a daily multidisciplinary ward round
	11.2	Complies with local infection control measures
	11.3	Identifies environmental hazards and promotes safety for patients and staff
	11.4	Identifies and minimises risk of critical incidents and adverse events, and complications
	11.5	Organises a case conference
	11.6	Critically appraises and applies guidelines, protocols, and care bundles
	11.7	Describes commonly used scoring systems for assessment of severity of illness, case mix and workload
	11.8	Demonstrates an understanding of the managerial and administrative responsibilities of the ICM specialist
12. PROFESSIONALISM	**COMMUNICATION SKILLS.**	
	12.1	Communicates effectively with patients and relatives
	12.2	Communicates effectively with members of the health care team
	12.3	Maintains accurate and legible records / documentation
	PROFESSIONAL RELATIONSHIPS WITH PATIENTS AND RELATIVES.	
	12.4	Involves patients (or their surrogates if applicable) in decisions about care and treatment
	12.5	Demonstrates respect of cultural and religious beliefs and an awareness of their impact on decision making
	12.6	Respects privacy, dignity, confidentiality, and legal constraints on the use of patient data
	PROFESSIONAL RELATIONSHIPS WITH MEMBERS OF THE HEALTH CARE TEAM	
	12.7	Collaborates and consults; promotes team-working
	12.8	Ensures continuity of care through effective hand-over of clinical information
	12.9	Supports clinical staff outside the ICU to enable the delivery of effective care
	12.10	Appropriately supervises, and delegates to others, the delivery of patient care
	SELF GOVERNANCE	
	12.11	Takes responsibility for safe patient care
	12.12	Formulates clinical decisions with respect for ethical and legal principles
	12.13	Seeks learning opportunities and integrates new knowledge into clinical practice
	12.14	Participates in multidisciplinary teaching
	12.15	Participates in research or audit

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

1.1 ADOPTS A STRUCTURED AND TIMELY APPROACH TO THE RECOGNITION, ASSESSMENT AND STABILISATION OF THE ACUTELY ILL PATIENT WITH DISORDERED PHYSIOLOGY

KNOWLEDGE

Early warning signs of impending critical illness
Causes of cardio-respiratory arrest, identification of patients at risk and corrective treatment of reversible causes
Clinical signs associated with critical illness, their relative importance and interpretation
Clinical severity of illness and indications when organ dysfunctions or failure are an immediate threat to life
Recognition of life-threatening changes in physiological parameters
Measures of adequacy of tissue oxygenation
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 / convulsions
- Oliguria & anuria
- Acute disturbances in thermoregulation
- Acute abdominal pain

Treatment algorithms for common medical emergencies
Immediate management of acute coronary syndromes
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
Treatment strategies for abnormalities of fluid, electrolyte, acid-base and glucose balance
Indications for and methods of ventilatory support
Basic and complex cardiac arrhythmias - recognition and management (pharmacological and electrical)
Peri-arrest arrhythmias and the principles of their management (bradycardia, broad complex tachycardia, atrial fibrillation, narrow complex tachycardia)
Indications for not starting resuscitation or ceasing an initiated attempt
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))
Indications for and basic interpretation of chest radiographs: range of normal features on a chest x-ray; collapse, consolidation, infiltrates (including ALI/ARDS), pneumothorax, pleural effusion, pericardial effusion, position of cannula, tubes or foreign bodies, airway compression, cardiac silhouette, mediastinal masses
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)
Principles of emergency airway management (see 5.3)

SKILLS & BEHAVIOURS

Considers legal and ethical issues: patient autonomy, appropriateness of resuscitation and ICU admission.
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
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
Initiate emergency cardiac pacing
Respond to an emergency in a positive, organised and effective manner; able to direct the resuscitation team
Participate in timely discussion and regular review of 'do not resuscitate' orders and treatment limitation decisions
Professional and reassuring approach - generates confidence and trust in patients and their relatives
Examine and plan care for the confused patient
Perform a comprehensive secondary survey; integrate history with clinical examination to form a differential diagnosis
Assess, predict and manage circulatory shock
Prescribe appropriate sedation and analgesia
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

Rapid response and resuscitation

Appreciates the importance of timely institution of organ-system support
Recognises the need for supportive care for all organ systems whether failing / injured or not
Clear in explanations to patient, relatives and staff
Consult and take into account the views of referring clinicians; promote their participation in decision making where appropriate
Establishes trusting relationships with and demonstrates compassionate care of patients and their relatives
Patient safety is paramount
Determination to provide best and most appropriate care possible regardless of environment
Appreciate the importance of ensuring physiological safety as a primary aim
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

1.2 MANAGES CARDIOPULMONARY RESUSCITATION

KNOWLEDGE

Causes of cardio-respiratory arrest, identification of patients at risk and corrective treatment of reversible causes
Recognition of life-threatening changes in physiological parameters
Causes and recognition of acute airway obstruction
Methods for securing vascular access rapidly
Cardiopulmonary resuscitation
The modification of resuscitation techniques in the special circumstances of hypothermia, immersion and submersion, poisoning, pregnancy, electrocution, anaphylaxis, acute severe asthma and trauma
Risks to the rescuer during resuscitation & methods to minimise these
Basic and complex cardiac arrhythmias - recognition and management (pharmacological and electrical)
Treatment (algorithm) of patients in ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT)
Treatment (algorithm) of patients with non-VT/VF rhythms (asystole / PEA)
Indications, doses and actions of primary drugs used in the management of a cardiac arrest (inc. special precautions and contraindications)
Tracheal route for drug administration: indications, contraindications, dosage
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))
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.
Indications and methods of cardiac pacing in the peri-arrest setting
Effect of cardiorespiratory arrest on body systems
Audit of outcome after cardiac arrest
Indications for not starting resuscitation or ceasing an initiated attempt
Legal and ethical issues relating to the use of the recently dead for practical skills training, research and organ donation
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)
Principles of emergency airway management (see 5.3)

SKILLS & BEHAVIOURS

Considers legal and ethical issues: patient autonomy, appropriateness of resuscitation and ICU admission
Conduct a primary survey: obtain relevant information rapidly and accurately
Recognise signs and symptoms of impending cardiac arrest
Use emergency monitoring equipment
Monitor vital physiological functions as indicated
Check & assemble resuscitation equipment
Demonstrate advanced life support skills (ALS 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
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
Protect a potentially unstable cervical spine
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 1 - Please refer to competence 1.1 or the aggregate syllabus at the end of this section.

1.3 MANAGES THE PATIENT POST-RESUSCITATION

KNOWLEDGE

Causes of cardio-respiratory arrest, identification of patients at risk and corrective treatment of reversible causes
Recognition of life-threatening changes in physiological parameters
Measures of adequacy of tissue oxygenation
Causes, recognition and management of:

- Anaphylactic and anaphylactoid reactions
- Hypertensive emergencies
- Acute confusional states and altered consciousness
- Acute seizures / convulsions
- Oliguria & anuria
- Acute disturbances in thermoregulation
- Acute abdominal pain
- Acute chest pain
- Tachypnoea & dyspnoea
- Upper and lower airway obstruction
- Pulmonary oedema
- Pneumothorax (simple & tension)
- Hypoxaemia
- Hypotension
- Shock states

Techniques for effective fluid resuscitation
Treatment strategies for abnormalities of fluid, electrolyte, acid-base and glucose balance
Indications for and methods of ventilatory support
Basic and complex cardiac arrhythmias - recognition and management (pharmacological and electrical)
Peri-arrest arrhythmias and the principles of their management (bradycardia, broad complex tachycardia, atrial fibrillation, narrow complex tachycardia)
Indications, dosages and actions of drugs used in the peri-arrest period
Indications and methods of cardiac pacing in the peri-arrest setting
Effect of cardio-respiratory arrest on body systems
Principles and application of therapeutic hypothermia
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 oxygen therapy and use of oxygen administration devices (see 5.1)

SKILLS & BEHAVIOURS

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
Obtain vascular access sufficient to manage acute haemorrhage, rapid fluid infusion and monitor cardiovascular variables
Implement emergency airway management, oxygen therapy and ventilation as indicated
Demonstrate emergency relief of tension pneumothorax
Respond to an emergency in a positive, organised and effective manner; able to direct the resuscitation team
Participate in timely discussion and regular review of 'do not resuscitate' orders and treatment limitation decisions
Consider the need for stabilisation before transfer
Professional and reassuring approach - generates confidence and trust in patients and their relatives
Assess, predict and manage circulatory shock
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 1 - Please refer to competence 1.1 or the aggregate syllabus at the end of this section.

1.4 TRIAGES AND PRIORITISES PATIENTS APPROPRIATELY, INCLUDING TIMELY ADMISSION TO ICU

KNOWLEDGE

Early warning signs of impending critical illness
Causes of cardio-respiratory arrest, identification of patients at risk and corrective treatment of reversible causes
Clinical signs associated with critical illness, their relative importance and interpretation
Clinical severity of illness and indications when organ dysfunctions or failure are an immediate threat to life
Recognition of life-threatening changes in physiological parameters
Indications for not starting resuscitation or ceasing an initiated attempt
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))

SKILLS & BEHAVIOURS

Considers legal and ethical issues: patient autonomy, appropriateness of resuscitation and ICU admission.
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
Recognise and rapidly respond to adverse trends in monitored parameters
Respond to an emergency in a positive, organised and effective manner; able to direct the resuscitation team
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
Determine when the patient's needs exceed local resources or specialist expertise (requirement 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
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 1 - Please refer to competence 1.1 or the aggregate syllabus at the end of this section.

1.5 ASSESSES AND PROVIDES INITIAL MANAGEMENT OF THE TRAUMA PATIENT

KNOWLEDGE

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
Effects and acute complications of severe trauma on organs and organ systems:
Respiratory - thoracic trauma; acute lung injury; tension pneumothorax
Cardiovascular - hypovolaemic shock; cardiac tamponade
Renal - acute renal failure; rhabdomyolysis
Neurological - altered consciousness; traumatic brain injury; post-anoxic brain injury; coup and contra- coup injuries; intracranial haemorrhage and infarction; spinal cord injury
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
Relevance of mechanism of injury to clinical presentation
Secondary insults that potentiate the primary injury
Immediate specific treatment of life-threatening injury
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
Intraosseous cannulation
Causes, recognition and management of shock states
Techniques for effective fluid resuscitation
Principles of blood and blood component therapy; principles of massive transfusion
Indications for and methods of ventilatory support
Recognition of life-threatening changes in physiological parameters
Triage and management of competing priorities
Management of cervical spine injuries
Management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies
Methods for assessing neurological function e.g. Glasgow Coma Scale
Principles of management of closed head injury; coup and contra-coup injuries; methods of preventing 'secondary insult' to the brain; recognition and immediate management of raised intracranial pressure
Principles, including indications, limitations and therapeutic modalities of basic radiological methods, CT scanning, MRI, ultrasound, angiography and radionucleotide studies in the critically ill patient
Indications for and basic interpretation of chest radiographs: range of normal features on a chest x-ray; collapse, consolidation, infiltrates (including ALI/ARDS), pneumothorax, pleural effusion, pericardial effusion, position of cannulae, tubes or foreign bodies, airway compression, cardiac silhouette, mediastinal masses
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)
Principles of emergency airway management (see 5.3)
Surgical techniques to obtain vascular access (see 5.11)

SKILLS & BEHAVIOURS

Conduct a primary survey: obtain relevant information rapidly and accurately
Assess and document Glasgow Coma Scale (GCS)
Recognise signs and symptoms of impending cardiac arrest
Obtain vascular access sufficient to manage acute haemorrhage, rapid fluid infusion and monitor cardiovascular variables
Implement emergency airway management, oxygen therapy and ventilation as indicated
Perform a comprehensive secondary survey; integrate history with clinical examination to form a differential diagnosis
Assess conscious level, status of airway and cervical spine, and conduct careful systems review
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
Monitor vital physiological functions as indicated
Demonstrate emergency relief of tension pneumothorax
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)
Prescribe appropriate analgesia
Professional and reassuring approach - generates confidence and trust in patients and their relatives
Lead, delegate and supervise others appropriately according to experience and role

Recognise and manage emergencies; seek assistance appropriately

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 1 - Please refer to competence 1.1 or the aggregate syllabus at the end of this section

1.6 ASSESSES AND PROVIDES INITIAL MANAGEMENT OF THE PATIENT WITH BURNS

KNOWLEDGE
Triage and management of competing priorities
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
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
Treatment strategies for abnormalities of fluid, electrolyte, acid-base and glucose balance
Causes, recognition and management of shock states
Methods for securing vascular access rapidly
Surgical techniques to obtain vascular access (see 5.11)
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
Signs, symptoms and causes of renal failure (acute / chronic / acute on chronic) and indications for intervention
Respiratory complications of burn injuries (smoke inhalation, airway burns) - detection and management
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)
Causes and recognition of acute airway obstruction
Management of difficult or failed airway management (see 5.4)
Indications for and methods of ventilatory support
Recognition and management of acute disturbances in thermoregulation
The environmental control necessary for optimal care of the burned patient
Prevention of infection in the burned patient
Burn-related compartment syndrome and escharotomy
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome

SKILLS & BEHAVIOURS
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
Monitor vital physiological functions as indicated
Implement emergency airway management, oxygen therapy and ventilation as indicated
Obtain vascular access sufficient to manage acute haemorrhage, rapid fluid infusion and monitor cardiovascular variables
Assess, predict and manage circulatory shock
Assess burn severity and prescribe initial fluid resuscitation
Estimate burn wound mortality from published data tables
Prescribe appropriate analgesia
Describe the endpoints of burn resuscitation and preferred fluids
Identify or describe risk factors for airway compromise in the burned patient
Identification and management of carbon monoxide poisoning
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)
Professional and reassuring approach - generates confidence and trust in patients and their relatives
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 1 - Please refer to competence 1.1 or the aggregate syllabus at the end of this section.

1.7 DESCRIBES THE MANAGEMENT OF MASS CASUALTIES

KNOWLEDGE
Organisational principles for the coordination and management of mass casualties
Local major incident plan - the role of the ICU in hospital/community disaster plans
Communication tasks and personal role in major incident / accident plan
Triage and management of competing priorities
Triage methods in use locally
Characteristics and clinical presentations associated with major incidents caused by natural or civilian disasters, infection epidemics or terrorist attack
Relevance of mechanism of injury to clinical presentation
Environmental hazards & injuries: hypo- and hyperthermia, near-drowning, electrocution, radiations, chemical injuries, electrical safety/micro shock
Decontamination procedures

Principles of crisis management, conflict resolution, negotiation and debriefing
Psychological support for patients and relatives
Management of public relations and information
Principles of internal hospital communication
Alternative forms of external communication

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 1 - Please refer to competence 1.1 or the aggregate syllabus at the end of this section.

AGGREGATE SYLLABUS

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

KNOWLEDGE

Early warning signs of impending critical illness
Causes of cardio-respiratory arrest, identification of patients at risk and corrective treatment of reversible causes
Clinical signs associated with critical illness, their relative importance and interpretation
Clinical severity of illness and indications when organ dysfunctions or failure are an immediate threat to life
Recognition of life-threatening changes in physiological parameters
Measures of adequacy of tissue oxygenation 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 / convulsions
- Oliguria & anuria
- Acute disturbances in thermoregulation
- Acute abdominal pain

Treatment algorithms for common medical emergencies
Immediate management of acute coronary syndromes
Methods for assessing neurological function e.g. Glasgow Coma Scale
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
Intraosseous cannulation
Techniques for effective fluid resuscitation
Principles of blood and blood component therapy; principles of massive transfusion
Treatment strategies for abnormalities of fluid, electrolyte, acid-base and glucose balance
Cardiopulmonary resuscitation
The modification of resuscitation techniques in the special circumstances of hypothermia, immersion and submersion, poisoning, pregnancy, electrocution, anaphylaxis, acute severe asthma and trauma
Risks to the rescuer during resuscitation & methods to minimise these Indications for and methods of ventilatory support
Basic and complex cardiac arrhythmias - recognition and management (pharmacological and electrical) Indications, doses and actions of primary drugs used in the management of a cardiac arrest (inc. special precautions and contraindications)
Tracheal route for drug administration: indications, contraindications, dosage Indications, dosages and actions of drugs used in the peri-arrest period
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 pulse-less ventricular tachycardia (VT); Non-VF / VT rhythms (asystole / PEA) Defibrillation: principles of monophasic & biphasic defibrillators; mechanism, indications, complications, modes and methods (manual and automated external defibrillators (AED))
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.
Indications and methods of cardiac pacing in the peri-arrest setting Effect of cardio-respiratory arrest on body systems
Principles and application of therapeutic hypothermia
Audit of outcome after cardiac arrest
Indications for not starting resuscitation or ceasing an initiated attempt
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))
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:
Respiratory - thoracic trauma; acute lung injury; tension pneumothorax
Cardiovascular - hypovolaemic shock; cardiac tamponade
Renal - acute renal failure; rhabdomyolysis
Neurological - altered consciousness; traumatic brain injury; post-anoxic brain injury; coup and contra- coup injuries; intracranial haemorrhage and infarction; spinal cord injury
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
Principles of management of closed head injury; coup and contra-coup injuries; methods of preventing 'secondary insult' to the brain; recognition and immediate management of raised intracranial pressure
Management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies
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
Indications for and basic interpretation of chest radiographs: range of normal features on a chest x-ray; collapse, consolidation, infiltrates (including ALI/ARDS), pneumothorax, pleural effusion, pericardial effusion, position of cannulae, tubes or foreign bodies, airway compression, cardiac silhouette, mediastinal masses
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
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
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
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
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)
Principles of emergency airway management (see 5.3)
Management of difficult or failed airway management (see 5.4)
Surgical techniques to obtain vascular access (see 5.11)

SKILLS & BEHAVIOURS

Consider legal and ethical issues: patient autonomy, appropriateness of resuscitation and ICU admission
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 (ALS 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
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 (requirement 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; seek assistance appropriately

ATTITUDES

Rapid response to resuscitation
Appreciates the importance of timely institution of organ-system support
Recognises the need for supportive care for all organ systems whether failing / injured or not
Clear in explanations to patient, relatives and staff
Consult and take into account the views of referring clinicians; promote their participation in decision making where appropriate
Establishes trusting relationships with and demonstrates compassionate care of patients and their relatives
Patient safety is paramount
Determination to provide best and most appropriate care possible regardless of environment
Appreciate the importance of ensuring physiological safety as a primary aim
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

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

2.1 OBTAINS A HISTORY AND PERFORMS AN ACCURATE CLINICAL EXAMINATION

KNOWLEDGE

Clinical signs associated with critical illness, their relative importance and interpretation
Importance and principles of obtaining an accurate history of the current condition, comorbidities and previous health status using appropriate sources of information
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

SKILLS & BEHAVIOURS

Professional and reassuring approach - generates confidence and trust in patients and their relatives
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
Listen effectively
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
Integrate history with clinical examination to create a diagnostic and therapeutic plan
Document investigations undertaken, results and action taken
Recognise changes in intracranial and cerebral perfusion pressure which are life threatening
Interpret data from scoring or scaling systems to assess pain and sedation
Assess and document Glasgow Coma Scale (GCS)
Interpret chest x-rays in a variety of clinical contexts

ATTITUDES

Consults, communicates and collaborates effectively with patients, relatives and the health care team
Promotes respect for patient privacy, dignity and confidentiality
Avoids extensive invasive procedures or monitoring which cannot be adequately interpreted at the bedside
Minimises patient discomfort in relation to monitoring devices
Responds rapidly to acute changes in monitored variables
Ensures safe and appropriate use of equipment
Supports other staff in the correct use of devices
Considers patient comfort during procedures / investigations
Avoids unnecessary tests
Demonstrates compassionate care of patients and relatives
Desire to minimise patient distress
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

2.2 UNDERTAKES TIMELY AND APPROPRIATE INVESTIGATIONS

KNOWLEDGE

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
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

Principles, indications, limitations and basic interpretation of:
- Intrathoracic pressure (oesophageal pressure) measurements
- Fluid input-output monitoring
- Basic principles of ultrasound and the Doppler effect
- Respiratory function tests - Diagnostic bronchoscopy
- Diagnostic ECG (EKG) - Echocardiography
- Electroencephalogram (EEG) and evoked potentials
- Intra-abdominal 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

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

SKILLS & BEHAVIOURS

Recognise impending organ system dysfunction
Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
Develop a working, and limited differential diagnosis based on presenting clinical features
Order and prioritise appropriate investigations
Evaluate benefits and risks related to specific investigations
Interpret laboratory results in the context of the patient's condition
Identify abnormalities requiring urgent intervention
Recognise significant changes and the need for repeated testing (ie. 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
Undertake further consultation / investigation when indicated
Obtain and interpret data from ECG (3- and 12-lead)
Lead, delegate and supervise others appropriately according to experience and role

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 2 - Please refer to competence 2.1 or the aggregate syllabus at the end of this section.

2.3 Describes indications for echocardiography (transthoracic / transoesophageal)

KNOWLEDGE

Anatomy and physiology of the heart and cardiovascular system
Clinical signs associated with critical illness, their relative importance and interpretation
Basic principles of ultrasound and the Doppler effect
Principles, indications and limitations of echocardiography
Sensitivity and specificity of the investigation as related to a specific disease
Basic interpretation of echocardiography - ventricular function, filling status, valve abnormality, size of the heart, any akinetic or dyskinetic segments, pericardial effusion with or without evidence of tamponade
Anatomy and physiology of the lungs and respiratory system
Basic interpretation of lung sliding, A lines and B lines and visualization of diaphragm movement,
Emphasis on respiratory disorders in the hypoxemic patient such as pleural effusion, alveolar interstitial disease, as well as pneumothorax
Anatomy of the abdomen and organs involved to assess intraperitoneal free fluid, hydronephrosis and bladder volume.

SKILLS & BEHAVIOURS

Performs and interprets transthoracic cardiac ultrasound for the recognition and assessment of left ventricular and right systolic failure, contraction pattern and dilation and pericardial tamponade
Performs and interprets ultrasonographic assessment of the lungs and pleura for the recognition and assessment of consolidation, pleural effusion and pneumothorax.
Performs and interprets ultrasonographic assessment of the abdomen to assess intraperitoneal free fluid, hydronephrosis and bladder volume.
Performs and interprets venous ultrasound examination to assess for deep venous thrombosis and to aid vascular access (arterial and venous)

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 2 - Please refer to competence 2.1 or the aggregate syllabus at the end of this section.

2.4 Performs electrocardiography (ECG / EKG) and interprets the results

KNOWLEDGE

Anatomy and physiology of the heart and cardiovascular system
Principles of ECG monitoring (heart rate, rhythm, conduction, ST segment change & QT interval) - indications, limitations and techniques.
Advantages and disadvantages of different lead configurations
Indications and limitations of diagnostic ECG
Sensitivity and specificity of the investigation as related to a specific disease
Importance of clinical history and signs in making diagnosis

SKILLS & BEHAVIOURS

Obtain and interpret data from ECG (3- and 12-lead)
Identify deviations from normal range and interpret these in the context of the clinical circumstances
Identify abnormalities requiring urgent intervention
Differentiate real change from artefact & respond appropriately
Document investigations undertaken, results and action taken

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 2 - Please refer to competence 2.1 or the aggregate syllabus at the end of this section

2.5 Obtains appropriate microbiological samples and interprets results

KNOWLEDGE
Epidemiology and prevention of infection in the ICU
Types of organisms - emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between colonisation & infection
Requirements for microbiological surveillance and clinical sampling
Indications for microbiological sampling and interpretation of microbiological test results
Sensitivity and specificity of the investigation as related to a specific disease
Methods and routes of obtaining samples - associated indications and complications
Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)
Local patterns of bacterial resistance and antibiotic policy; difference between contamination, colonisation and infection
Appropriate use of laboratory tests to confirm or refute a clinical diagnosis
Indications for lumbar puncture and CSF sampling; laboratory analysis of CSF samples

SKILLS & BEHAVIOURS
Order and prioritise appropriate investigations
Obtain blood cultures using aseptic techniques
Interpret laboratory results in the context of the patient's condition
Integrate clinical findings with results of investigations
Communicate and collaborate effectively with all laboratory staff
Assemble clinical and laboratory data, logically compare all potential solutions to the patient's problems, prioritise them and establish a clinical management plan
Document investigations undertaken, results and action taken
Undertake further consultation / investigation when indicated
Lead, delegate and supervise others appropriately according to experience and role

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 2 - Please refer to competence 2.1 or the aggregate syllabus at the end of this section.

2.6 Obtains and interprets results from blood gas samples

KNOWLEDGE
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 and routes of obtaining samples - associated indications and complications
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
Indications for and interpretation of arterial blood gas samples
Indications for and interpretation of venous blood gas samples
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^-, HCO_3^-, Mg^{++}, PO_4^-)
Respiratory physiology: gas exchange, O_2 and CO_2 transport, hypoxia, hypo- and hypercarbia, functions of haemoglobin in oxygen carriage and acid-base balance
Renal physiology: regulation of fluid and electrolyte balance
Clinical measurement: pH, pCO_2, pO_2, SaO_2, FiO_2, CO_2 production, oxygen consumption, respiratory quotient
Sensitivity and specificity of the investigation as related to a specific disease
Importance of clinical history and signs in making diagnosis

SKILLS & BEHAVIOURS
Obtain blood gas samples using aseptic techniques
Interpret data from an arterial blood gas sample
Interpret data from a central or mixed venous blood gas sample
Identify deviations from normal range and interpret these in the context of the clinical circumstances
Identify abnormalities requiring urgent intervention
Confirm adequate oxygenation and control of $PaCO_2$ and pH
Undertake further consultation / investigation when indicated
Lead, delegate and supervise others appropriately according to experience and role

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 2 - Please refer to competence 2.1 or the aggregate syllabus at the end of this section

2.7 Interprets chest x-rays

KNOWLEDGE
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
Indications for and basic interpretation of chest radiographs: range of normal features on a chest x-ray; collapse, consolidation, infiltrates (including ALI/ARDS), 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
Sensitivity and specificity of the investigation as related to a specific disease
Importance of clinical history and signs in making diagnosis

SKILLS & BEHAVIOURS
Interpret chest x-rays in a variety of clinical contexts
Identify abnormalities requiring urgent intervention
Identify deviations from normal range and interpret these in the context of the clinical circumstances
Communicate effectively with radiological colleagues to plan, perform and interpret test results
Undertake further consultation / investigation when indicated

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 2 - Please refer to competence 2.1 or the aggregate syllabus at the end of this section.

2.8 Liaises with radiologists to organise and interpret clinical imaging

KNOWLEDGE
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 limitations of investigations
Sensitivity and specificity of the investigation as related to a specific disease
Effect of projection, position, penetration and other factors on the image quality
Chest x-ray interpretation (see 2.7)
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, valve abnormality, size of the heart, any akinetic or dyskinetic segments, pericardial effusion with or without evidence of tamponade)

SKILLS & BEHAVIOURS
Communicate effectively with radiological colleagues to plan, perform and interpret test results
Integrate clinical findings with results of investigations
Undertake further consultation / investigation when indicated

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 2 - Please refer to competence 2.1 or the aggregate syllabus at the end of this section.

2.9 Monitors and responds to trends in physiological variables

KNOWLEDGE
Indications, contraindications and complications associated with monitoring and monitoring devices; advantages and disadvantages of different monitoring systems / modalities taking into account their accuracy, convenience, reliability, safety, cost and relevance to the patient's condition
Interpretation of information from monitoring devices, and identification of common causes of error; principles of monitoring trends of change and their significance
Recognition of life threatening changes in physiological parameters
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
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
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
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 CO_2 monitoring, and relationship between end tidal CO_2 and arterial pCO_2 in various clinical circumstances
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, indications and limitations of intra-abdominal pressure monitoring
Intrathoracic pressure (oesophageal pressure) measurements
Principles of fluid input-output monitoring

SKILLS & BEHAVIOURS

Monitor vital physiological functions as indicated
Obtain and accurately record data from monitors
Differentiate real change from artefact & respond appropriately
Set and interpret data from ventilator alarms
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 O_2, CO_2 and NO
- Intracranial pressure monitoring
- Jugular bulb catheters and SjO_2 monitoring Set monitor alarms appropriately

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
Lead, delegate and supervise others appropriately according to experience and role

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 2 - Please refer to competence 2.1 or the aggregate syllabus at the end of this section

2.10 INTEGRATES CLINICAL FINDINGS WITH LABORATORY INVESTIGATIONS TO FORM A DIFFERENTIAL DIAGNOSIS

KNOWLEDGE

Clinical signs associated with critical illness, their relative importance and interpretation
Sources and methods of obtaining clinical information
Significance and impact of co-morbid disease on the presentation of acute illness
Importance of clinical history and signs in making diagnosis
Impact of drug therapy on organ-system function
Sensitivity and specificity of the investigation as related to a specific disease
Appropriate use of laboratory tests to confirm or refute a clinical diagnosis
Interpretation of information from monitoring devices, and identification of common causes of error; principles of monitoring trends of change and their significance

SKILLS & BEHAVIOURS

Obtain relevant information from the patient, relatives and other secondary sources
Examine patients, elicit and interpret clinical signs (or relevant absence of clinical signs) in the ICU environment
Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
Develop a working, and limited differential diagnosis based on presenting clinical features
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
Identify abnormalities requiring urgent intervention
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 and collaborate effectively with all laboratory staff

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 2 - Please refer to competence 2.1 or the aggregate syllabus at the end of this section.

AGGREGATE SYLLABUS

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

KNOWLEDGE

Importance and principles of obtaining an accurate history of the current condition, comorbidities and previous health status using appropriate sources of information
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
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, pCO_2, pO_2, SaO_2, FiO_2, CO_2 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 CO_2 monitoring, and relationship between end tidal CO_2 and arterial pCO_2 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^-, HCO_3^-, Mg^{++}, PO_4^-)
Respiratory physiology: gas exchange, O_2 and CO_2 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 troubleshooting
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 ALI/ARDS), 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, valve abnormality, size of the heart, any akinetic or dyskinetic segments, pericardial effusion with or without evidence of tamponade)

Principles, indications, limitations and basic interpretation of:
- Intra-abdominal pressure monitoring
- Intrathoracic pressure (oesophageal pressure) measurements
- Fluid input-output monitoring
- Basic principles of ultrasound and the Doppler effect
- Respiratory function tests - Diagnostic bronchoscopy
- Diagnostic ECG (EKG) - Echocardiography
- Electroencephalogram (EEG) and evoked potentials

SKILLS & BEHAVIOURS

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
Listen effectively
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 O_2, CO_2 and NO - Intracranial pressure monitoring
- Jugular bulb catheters and SjO_2 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 $PaCO_2$ 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

ATTITUDES

Consults, communicates and collaborates effectively with patients, relatives and the health care team
Promotes respect for patient privacy, dignity and confidentiality
Avoids extensive invasive procedures or monitoring which can not be adequately interpreted at the bedside
Minimises patient discomfort in relation to monitoring devices
Responds rapidly to acute changes in monitored variables
Ensures safe and appropriate use of equipment
Supports other staff in the correct use of devices
Considers patient comfort during procedures / investigations
Avoids unnecessary tests
Demonstrates compassionate care of patients and relatives
Desire to minimise patient distress

Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

DOMAIN 3: DISEASE MANAGEMENT

ACUTE DISEASE

3.1 MANAGES THE CARE OF THE CRITICALLY ILL PATIENT WITH SPECIFIC ACUTE MEDICAL CONDITIONS

KNOWLEDGE

Pathophysiology, diagnosis and management of commonly encountered acute medical conditions including:
RESPIRATORY DISORDERS: the unprotected airway; pneumonia, lung or lobar collapse, asthma, chronic obstructive airways disease, pulmonary oedema, acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) and their causative factors; pulmonary haemorrhage, pulmonary embolus, pleural effusion, pneumothorax (simple and tension); upper and lower airway obstruction including epiglottitis, respiratory muscle disorders.
CARDIOVASCULAR DISORDERS: shock states (anaphylactic, cardiogenic, hypovolaemic, septic); crescendo or unstable angina; acute myocardial infarction; left ventricular failure; cardiomyopathies; valvular heart disease; 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; post-anoxic brain damage; intracranial haemorrhage and infarction; sub-arachnoid haemorrhage; cerebro-vascular accidents; 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
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: peptic/stress ulceration; upper GI haemorrhage; diarrhoea and vomiting; acute pancreatitis; cholecystitis; jaundice; acute and chronic liver failure; fulminant hepatic failure; paracetamol (acetaminophen)-induced liver injury;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.
HAEMATOLOGICAL AND ONCOLOGICAL DISORDERS: disseminated intravascular coagulation (DIC) and other coagulation disorders, hemolytic syndromes, acute and chronic anemia, immune disorders. Lymphoproliferative disorders. High risk groups: the immunosuppressed or immunoincompetent patient, chemotherapy, agranulocytosis and bone marrow transplant patients. Massive blood transfusion.
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. Pyometra. Septic abortion. 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
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
Treatment algorithms for common medical emergencies
Definitive / long term management of commonly encountered acute medical conditions
Diagnosis and management of other acute medical conditions until appropriate specialist assistance is available
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
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
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
Long term effects of acute medical conditions and late complications
Risk factors, recognition and assessment of single or multiple organ failure

SKILLS & BEHAVIOURS

Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
Develop a working, and limited differential diagnosis based on presenting clinical features
Recognise and diagnose commonly encountered acute medical conditions (according to national case mix)
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
Define targets of therapy and review efficacy at regular intervals
Consider modifying diagnosis and/or therapy if goals are not achieved
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

Demonstrates compassionate care of patients and relatives

Appreciates the importance of timely institution of organ-system support
Appreciates the differences between organ system support and specific treatment
Enquiring mind, undertakes critical analysis of published literature
Adopts a problem solving approach
Desire to minimise patient distress
Consults, communicates and collaborates effectively with patients, relatives and the health care team
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

CHRONIC DISEASE

3.2 IDENTIFIES THE IMPLICATIONS OF CHRONIC AND CO-MORBID DISEASE IN THE ACUTELY ILL PATIENT

KNOWLEDGE
Pathophysiology, diagnosis and management of commonly encountered chronic medical conditions including:
RESPIRATORY DISORDERS: asthma; chronic obstructive airways disease; pulmonary fibrosis; pulmonary thromboembolic disease; respiratory muscle disorders
CARDIOVASCULAR DISORDERS: hypertension; angina; chronic heart failure (LVF / RVF); veno-occlusive disorders; cardiomyopathies; valvular heart disease and prosthetic valves; pulmonary hypertension; cor pulmonale; common arrhythmias and conduction disturbances; peripheral vascular disease
NEUROLOGICAL DISORDERS: cerebro-vascular accidents (CVA / stroke); epilepsy; dementia; neuropathy and myopathy
RENAL DISORDERS: chronic renal failure; renal manifestations of systemic disease including vasculitides; nephrotoxic drugs
GASTROINTESTINAL DISORDERS: chronic pancreatitis; chronic liver failure; cirrhosis; inflammatory bowel diseases
HAEMATOLOGICAL AND ONCOLOGICAL DISORDERS: coagulation disorders, hemolytic syndromes, platelet disorders; chronic anaemia, immune disorders, malignancy including complications of chemotherapy and radiotherapy
ENDOCRINE DISORDERS: diabetes; thyroid, adrenal and pituitary disorders
PSYCHIATRIC DISORDERS: depression; psychosis
Causes and consequences of decompensation in chronic organ failure; diagnosis and management of acute- on-chronic organ failure
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

SKILLS & BEHAVIOURS
Identify and manage chronic co-morbid disease
Identify and evaluate requirements for continuation of chronic treatments during and after the acute illness
Consider potential interactions when prescribing drugs & therapies
Evaluate the impact of chronic disease and prior health on outcomes
Take chronic health factors into account when determining suitability for intensive care

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 3 - Please refer to competence 3.1 or the aggregate syllabus at the end of this section.

ORGAN SYSTEM FAILURE

3.3 RECOGNISES AND MANAGES THE PATIENT WITH CIRCULATORY FAILURE

KNOWLEDGE
Risk factors, recognition and assessment of circulatory failure
Causes, recognition and management of associated disorders:
CARDIOVASCULAR DISORDERS: shock states (anaphylactic, cardiogenic, hypovolaemic, septic); hypotension and hypertension; crescendo or unstable angina; acute myocardial infarction; left ventricular failure; cardiomyopathies; valvular heart disease; vaso-occlusive diseases; pulmonary hypertension; circulatory effects of pulmonary embolism & tension pneumothorax; right ventricular failure; cor pulmonale; malignant hypertension; cardiac tamponade; common arrhythmias and conduction disturbances; pacing box failure; cardiac arrest
RENAL DISORDERS: oliguria and anuria; polyuria; acute renal failure
Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
Complications of specific therapies, their incidence and management
Effect of circulatory failure and its treatment on other organ systems
Effects of concomitant treatment and/or co-morbid conditions on an individual patient's response to treatment
Use of fluids and vasoactive / inotropic / anti-arrhythmic drugs to support the circulation (see 4.4)
Use of mechanical assist devices to support the circulation (see 4.4)
Cardiopulmonary resuscitation
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome

SKILLS & BEHAVIOURS

Identify patients at risk of developing circulatory failure
Measure and interpret haemodynamic variables (including derived variables)
Optimise myocardial function
Assess, predict and manage circulatory shock
Develop a working, and limited differential diagnosis based on presenting clinical features
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
Implement emergency airway management, oxygen therapy and ventilation as indicated
Demonstrate emergency relief of tension pneumothorax
Use fluids and vasoactive / inotropic drugs to support the circulation (see 4.4)
Consider potential interactions when prescribing drugs & therapies
Define targets of therapy and review efficacy at regular intervals
Consider modifying diagnosis and/or therapy if goals are not achieved
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 3 - Please refer to competence 3.1 or the aggregate syllabus at the end of this section.

3.4 RECOGNISES AND MANAGES THE PATIENT WITH, OR AT RISK OF , ACUTE RENAL FAILURE

KNOWLEDGE

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
Causes and complications of renal failure - methods to prevent or treat these
Investigation of impaired renal function
Causes, recognition and management of associated disorders:
RENAL AND GENITO-URINARY DISORDERS: oliguria and anuria; polyuria; urological sepsis; acute renal failure; chronic renal failure; renal manifestations of systemic disease including vasculitides; nephrotoxic drugs and monitoring; rhabdomyolysis
CARDIOVASCULAR DISORDERS: hypotension and hypertension (including hypertensive emergencies); shock (cardiogenic, hypovolaemic, septic, anaphylactic); common arrhythmias and conduction disturbances.
METABOLIC DISORDERS: electrolyte disorders; acid-base disorders; fluid balance disorders
Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
Range of therapeutic interventions available to support organ function and treat the underlying causes
Effects of concomitant treatment and/or co-morbid conditions on an individual patient's response to treatment
Indications, complications and selection of renal replacement therapies (continuous and intermittent)
Effect of renal failure and its treatment on other organ systems
Nephrotoxic drugs and adjustment of drug doses in renal impairment/failure
Indications for and basic interpretation of drug levels in blood or plasma
Urinary catheterisation techniques: transurethral and suprapubic
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome

SKILLS & BEHAVIOURS

Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
Identify patients at risk of developing renal failure
Identify and avoid factors contributing to impaired renal function
Perform aseptic urinary catheterisation: male and female (see 5.24)
Develop a working, and limited differential diagnosis based on presenting clinical features
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
Consider potential interactions when prescribing drugs & therapies
Initiate, manage and wean patients from renal replacement therapy (see 4.7)
Define targets of therapy and review efficacy at regular intervals
Consider modifying diagnosis and/or therapy if goals are not achieved
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 3 - Please refer to competence 3.1 or the aggregate syllabus at the end of this section.

3.5 RECOGNISES AND MANAGES THE PATIENT WITH, OR AT RISK OF , ACUTE LIVER FAILURE

KNOWLEDGE

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
Investigation of impaired hepatic function
Causes, recognition and management of associated disorders:
GASTROINTESTINAL DISORDERS: Abdominal pain and distension; peptic ulceration and upper GI haemorrhage; diarrhoea and vomiting; pancreatitis; jaundice; acute and chronic liver failure; fulminant hepatic failure; paracetamol (acetaminophen)-induced liver injury; rupture of liver or spleen
CARDIOVASCULAR DISORDERS: hypotension and hypertension (including hypertensive emergencies); shock (cardiogenic, hypovolaemic, septic, anaphylactic); common arrhythmias and conduction disturbances.
NEUROLOGICAL DISORDERS: acute confusional states and coma; post-anoxic brain damage; convulsions; encephalopathy; raised intracranial pressure
HAEMATOLOGICAL DISORDERS: coagulation and fibrinolytic pathways and their associated disorders; disseminated intravascular coagulation (DIC); hemolytic syndromes, acute anaemia; complications of massive blood transfusion
METABOLIC DISORDERS: electrolyte disorders; acid-base disorders; fluid-balance disorders; thermoregulation and associated disorders
Causes, recognition and management of HELLP syndrome
Pathogenesis of multiple organ dysfunction (MODS) and the inflammatory response in relation to organ system dysfunction
Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
Effect of liver failure and its treatment on other organ systems
Supportive therapy for the failing liver including extracorporeal liver support and indications for emergency liver transplantation
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
Principles of measurement of jugular venous saturation, cerebral Doppler velocities and cerebral blood flow.
Principles, indications and limitations of electroencephalogram (EEG) and evoked potentials
Hepatotoxic drugs and adjustment of drug doses in hepatic impairment / failure
Indications for and basic interpretation of drug levels in blood or plasma
Principles of blood glucose control: indications, methods, monitoring of safety & efficacy
Principles and techniques for insertion of gastro-oesophageal balloon tamponade tube (e.g. Sengstaken- Blakemore)
Indications for transcutaneous & transjugular liver biopsies and transjugular intrahepatic portosystemic shunt (TIPSS)
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome

SKILLS & BEHAVIOURS

Identify patients at risk of acute liver failure
Interpret laboratory tests of liver function
Recognise impending organ system dysfunction
Order and prioritise appropriate investigations
Critically appraise the evidence for and against specific therapeutic interventions or treatments
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs & therapies
Define targets of therapy and review efficacy at regular intervals
Consider modifying diagnosis and/or therapy if goals are not achieved
Implement emergency airway management, oxygen therapy and ventilation as indicated
Examine and plan care for the confused patient
Assess and document Glasgow Coma Scale (GCS)
Take prompt action to reduce acutely elevated intracranial pressure
Obtain and interpret data from intracranial pressure monitoring
Manage cardiorespiratory physiology to minimise rises in intracranial pressure
Identify and manage coagulopathies
Prevent, identify and manage hyper / hypoglycaemia
Prevent, identify and treat hyponatraemia
Perform abdominal paracentesis (see 5.21)
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 3 - Please refer to competence 3.1 or the aggregate syllabus at the end of this section.

3.6 RECOGNISES AND MANAGES THE PATIENT WITH NEUROLOGICAL IMPAIRMENT

KNOWLEDGE

Signs and symptoms of neurological impairment
The toxic, metabolic, structural, and infectious causes of altered consciousness
Investigation of impaired neurological function; methods for assessing neurological function (e.g. Glasgow Coma Scale)
Indications for urgent imaging of the brain and neurosurgical consultation
Principles, indications and limitations of electroencephalogram (EEG) and evoked potentials
Causes, recognition and management of associated disorders:
NEUROLOGICAL DISORDERS: acute confusional states and coma; post-anoxic brain damage; intracranial haemorrhage and infarction; sub-arachnoid haemorrhage; cerebro-vascular accidents; 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
METABOLIC DISORDERS: electrolyte disorders; acid-base disorders; fluid-balance disorders; thermoregulation and associated disorders
Signs and symptoms of acute airway insufficiency and acute respiratory failure; indications for intervention in the patient with neurological impairment
Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
Effect of impaired neurological function and its support and treatment on other organ systems
Effects of concomitant treatment and/or co-morbid conditions on an individual patient's response to treatment
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
Etiology and management of raised intracranial pressure (ICP)
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
Principles of management of closed head injury
Coup and contra-coup injuries
Methods of preventing the 'second insult' to the brain
Management of vasospasm
Indications, contraindications and complications of lumbar puncture (see 5.18)
Principles of measurement of jugular venous saturation, cerebral Doppler velocities and cerebral blood flow.
Application of techniques to treat or induce hypo/hyperthermia
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome

SKILLS & BEHAVIOURS
Identify patients at risk of neurological impairment
Identify and avoid factors contributing to neurological impairment
Examine and plan care for the confused patient
Assess and document Glasgow Coma Scale (GCS)
Develop a working, and limited differential diagnosis based on presenting clinical features
Order and prioritise appropriate investigations
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs & therapies
Define targets of therapy and review efficacy at regular intervals
Consider modifying diagnosis and/or therapy if goals are not achieved
Undertake or assist in the insertion and maintenance of an intracranial pressure monitor
Obtain and interpret data from intracranial pressure monitoring
Recognise changes in intracranial and cerebral perfusion pressure which are life threatening
Take prompt action to reduce acutely elevated intracranial pressure
Manage cardiorespiratory physiology to minimise rises in intracranial pressure
Perform a lumbar puncture under supervision (see 5.18)
Prevent, identify and treat hyponatraemia
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 3 - Please refer to competence 3.1 or the aggregate syllabus at the end of this section.

3.7 RECOGNISES AND MANAGES THE PATIENT WITH ACUTE GASTROINTESTINAL FAILURE

KNOWLEDGE
Signs and symptoms of gastrointestinal dysfunction (obstruction, ischemia, perforation, dysmotility)
Causes and complications of gastrointestinal failure
Effects of critical illness and treatments on gastric emptying
Investigation of acute gastrointestinal dysfunction
Causes, recognition and management of associated disorders:
GASTROINTESTINAL DISORDERS: Abdominal pain and distension; stress/peptic ulceration and upper GI haemorrhage; lower GI bleeding; diarrhoea and vomiting; pancreatitis; jaundice; cholecystitis; inflammatory bowel diseases; peritonitis; mesenteric infarction; perforated viscus; bowel obstruction; ascites; intra-abdominal hypertension & compartment syndrome; short-bowel syndrome
METABOLIC DISORDERS: electrolyte disorders; acid-base disorders; fluid-balance disorders; thermoregulation and associated disorders
Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
Indications for urgent imaging and surgical consultation
Effects of impaired gastrointestinal function and its treatment on other organ systems
Effects of concomitant treatment and/or co-morbid conditions on an individual patient's response to treatment
Factors and therapies which may influence intra-abdominal pressure; etiology and management of raised intra-abdominal pressure
Principles and techniques for insertion of gastro-oesophageal balloon tamponade tube (e.g. Sengstaken- Blakemore)
Principles of nutritional assessment and support (see 4.9)
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome

SKILLS & BEHAVIOURS

Identify and avoid factors contributing to gastrointestinal dysfunction
Identify patients at risk of gastrointestinal dysfunction
Prevent, identify and manage hyper / hypoglycaemia
Develop a working, and limited differential diagnosis based on presenting clinical features
Order and prioritise appropriate investigations
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs & therapies
Define targets of therapy and review efficacy at regular intervals
Consider modifying diagnosis and/or therapy if goals are not achieved
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 3 - Please refer to competence 3.1 or the aggregate syllabus at the end of this section.

3.8 RECOGNISES AND MANAGES THE PATIENT WITH ACUTE LUNG INJURY SYNDROMES (ALI / ARDS)

KNOWLEDGE

Signs and symptoms of acute airway insufficiency and acute respiratory failure, and indications for intervention
Causes of respiratory failure, their prevention and management
Pathogenesis of acute lung injury (ALI / ARDS)
Pathogenesis of multiple organ dysfunction (MODS) and the inflammatory response in relation to organ system dysfunction
Causes, recognition and management of associated disorders:
RESPIRATORY DISORDERS: tachypnoea, dyspnoea, pneumonia, lung or lobar collapse, pulmonary oedema, acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) and their causative factors;
pulmonary haemorrhage, pulmonary embolus, pleural effusion, pneumothorax (simple and tension), near- drowning
METABOLIC DISORDERS: acid-base disorders; fluid balance disorders
Indications for and basic interpretation of chest radiographs: range of normal features on a chest x-ray; collapse, consolidation, infiltrates (including ALI/ARDS), pneumothorax, pleural effusion, pericardial effusion, position of cannulae, tubes or foreign bodies, airway compression, cardiac silhouette, mediastinal masses
Indications for and methods of invasive and non-invasive mechanical ventilation
Modes of mechanical ventilation - indications, contraindications & expected results of each mode (CMV, IRV, PRVC, HFOV, SIMV, PS, CPAP, BiPAP, NIV)
Initial set-up and modification of ventilator settings according to the condition or response of the patient
Potential adverse effects and complications of respiratory support and methods to minimise these
Ventilator associated pneumonia: definition, pathogenesis and prevention
Detection and management of haemo/pneumothorax (simple and tension)
Lung protective ventilation for acute lung injury (ALI)
Pharmacological and non-pharmacological adjunct therapies for ALI
Principles of weaning from mechanical ventilation and factors which may inhibit weaning
Principles of extra-corporeal membrane oxygenation (ECMO), indications for their use and referral to a specialized centre if needed
Concept of risk : benefit ratio and cost effectiveness of therapies
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome

SKILLS & BEHAVIOURS

Identify patients at risk of acute lung injury (ALI / ARDS)
Identify and avoid factors contributing to acute lung injury
Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
Develop a working, and limited differential diagnosis based on presenting clinical features
Implement emergency airway management, oxygen therapy and ventilation as indicated
Select the appropriate type and mode of ventilation for an individual patient
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
Consider potential interactions when prescribing drugs & therapies
Define targets of therapy and review efficacy at regular intervals
Consider modifying diagnosis and/or therapy if goals are not achieved
Plan, implement, review and adapt lung protective approach during mechanical ventilation
Plan, perform and review lung recruitment manoeuvres
Perform thoracocentesis and manage intercostal drains (see 5.8)
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 3 - Please refer to competence 3.1 or the aggregate syllabus at the end of this section.

3.9 Recognises and manages the septic patient

KNOWLEDGE

Pathogenesis, definitions and diagnostic criteria of sepsis, severe sepsis, septic shock and systemic inflammatory response syndrome (SIRS)
Occult indicators of sepsis
Causes, recognition and management of sepsis-induced organ dysfunction; multi-system effects of sepsis and their impact on clinical management
Infection and its relation to the inflammatory response
Sepsis mediators
Pathogenesis of multiple organ dysfunction (MODS) and the inflammatory response in relation to organ system dysfunction
Causes, recognition and management of associated disorders:
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. Pyometra. Septic abortion.
Organisms causing specific infections: Gram positive and Gram negative bacteria, fungi, protozoa, viruses; nosocomial infections
Evidence based guidelines: sepsis care bundles - rationale and indications; principles of early goal-directed therapy
Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
Effects of concomitant treatment and/or co-morbid conditions on an individual patient's response to treatment
Techniques for effective fluid resuscitation
Use of fluids and vasoactive / inotropic / anti-arrhythmic drugs to support the circulation (see 4.4)
Local patterns of bacterial resistance and antibiotic policy; difference between contamination, colonisation and infection
Indications, complications, interactions, selection, monitoring, and efficacy of common antimicrobial drugs (antibacterial, antifungal, antiviral, antiprotozoal, antihelmintics)
Safe use of therapies which modify the inflammatory response
Principles of blood glucose control: indications, methods, monitoring of safety & efficacy
Detection and management of adrenocortical dysfunction
Concept of risk : benefit ratio and cost effectiveness of therapies
Prognostic implications of multiple systems dysfunction or failure

SKILLS & BEHAVIOURS

Implement emergency airway management, oxygen therapy and ventilation as indicated
Assess, predict and manage circulatory shock
Resuscitate a patient with septic shock using appropriate monitoring, fluid therapy and vasoactive agents
Use fluids and vasoactive / inotropic drugs to support the circulation (see 4.4)
Manage antimicrobial drug therapy (see 4.2)
Obtain and interpret results of microbiological tests (see 2.5)
Develop a working, and limited differential diagnosis based on presenting clinical features
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
Consider potential interactions when prescribing drugs & therapies
Define targets of therapy and review efficacy at regular intervals
Consider modifying diagnosis and/or therapy if goals are not achieved
Prevent, identify and manage hyper / hypoglycaemia
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 3 - Please refer to competence 3.1 or the aggregate syllabus at the end of this section.

3.10 Recognises and manages the patient following intoxication with drugs or environmental toxins

KNOWLEDGE

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
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
Causes, recognition and management of associated disorders:
Respiratory disorders: smoke, inhalation or burned airway damage; carbon monoxide poisoning
Cardiovascular disorders: drug induced arrhythmias and conduction disturbances
Neurological disorders: drug induced neurological impairment
Renal disorders: nephrotoxic drugs - monitoring & adjustment of drug doses in renal impairment / failure; rhabdomyolysis

METABOLIC DISORDERS: electrolyte disorders; acid-base disorders; fluid-balance disorders; thermoregulation and associated disorders
GASTROINTESTINAL DISORDERS: drug induced liver injury; hepatotoxic drugs and adjustment of drug doses in hepatic impairment / failure; fulminant hepatic failure
HAEMATOLOGY: drug induced coagulopathy
Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
Effects of concomitant treatment and/or co-morbid conditions on an individual patient's response to treatment
Management of acute liver failure (see 3.5)
Services available to patients and families to provide emotional or psychiatric support
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome

SKILLS & BEHAVIOURS

Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
Develop a working, and limited differential diagnosis based on presenting clinical features
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
Interpret laboratory tests of liver function
Consider potential interactions when prescribing drugs & therapies
Define targets of therapy and review efficacy at regular intervals
Consider modifying diagnosis and/or therapy if goals are not achieved
Assess and document Glasgow Coma Scale (GCS)
Implement emergency airway management, oxygen therapy and ventilation as indicated
Identify patients at risk of developing renal failure
Identify patients at risk of acute liver failure
Identify and manage coagulopathies
Examine and plan care for the confused patient
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 3 - Please refer to competence 3.1 or the aggregate syllabus at the end of this section.

3.11 RECOGNISES LIFE-THREATENING MATERNAL PERIPARTUM COMPLICATIONS AND MANAGES CARE UNDER SUPERVISION

KNOWLEDGE

Physiological changes associated with a normal pregnancy and delivery
Cardiopulmonary resuscitation of the pregnant patient
Pathophysiology, identification and management of peripartum complications: pre-eclampsia and eclampsia; HELLP syndrome; amniotic fluid embolism; ante-partum and post-partum haemorrhage; ectopic pregnancy; septic abortion
Risks and avoidance of pulmonary aspiration in pregnant patients
Methods of avoiding aorto-caval compression
Risk factors, identification and management of venous thromboembolism
Causes, recognition and management of associated disorders:
CARDIOVASCULAR DISORDERS: peripartum cardiomyopathy; pulmonary hypertension
HAEMATOLOGICAL DISORDERS: coagulation and fibrinolytic pathways and their associated disorders; disseminated intravascular coagulation (DIC); hemolytic syndromes, acute anaemia; complications of massive blood transfusion
METABOLIC DISORDERS: electrolyte disorders; acid-base disorders; fluid-balance disorders; thermoregulation and associated disorders
Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
Effects of concomitant treatment and/or co-morbid conditions on an individual patient's response to treatment
Identification of unexpected concurrent pregnancy in a critically ill woman
Awareness of the psychological impact of separation on the family
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome

SKILLS & BEHAVIOURS

Seek appropriate support and supervision in order to provide optimal patient care
Liaise with obstetric and midwifery services
Recognise and manage emergencies; seek assistance appropriately
Manage pregnancy induced hypertension
Identify and manage coagulopathies
Develop a working, and limited differential diagnosis based on presenting clinical features
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
Consider potential interactions when prescribing drugs & therapies
Define targets of therapy and review efficacy at regular intervals
Consider modifying diagnosis and/or therapy if goals are not achieved

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 3 - Please refer to competence 3.1 or the aggregate syllabus at the end of this section.

AGGREGATE SYLLABUS

DOMAIN 3: DISEASE MANAGEMENT

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, chronic obstructive airways disease, pulmonary oedema, acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) and their causative factors; 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 (anaphylactic, cardiogenic, hypovolaemic, septic); crescendo / unstable / chronic angina; acute myocardial infarction; left ventricular failure; chronic heart failure; cardiomyopathies; 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; peripheral vascular disease

NEUROLOGICAL DISORDERS: acute confusional states and coma; post-anoxic 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); dementia

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: peptic/stress ulceration; 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.

HAEMATOLOGICAL AND ONCOLOGICAL DISORDERS: disseminated intravascular coagulation (DIC) and other coagulation disorders, hemolytic syndromes, acute and chronic anaemia, immune disorders; lymphoproliferative disorders. High risk groups: the immunosuppressed or immunoincompetent 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. Pyometra. Septic abortion.
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

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

Treatment algorithms for common medical emergencies
Diagnosis and management of other acute medical conditions until appropriate specialist assistance is available
Definitive / long term management of commonly encountered acute medical conditions 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 (see 4.4) Use of mechanical assist devices to support the circulation (see 4.4)
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 (see 5.18)
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 (see 4.9)
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, IRV, PRVC, HFOV, SIMV, PS, CPAP, 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/ARDS), 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 membrane oxygenation (ECMO), indications for their use and referral to a specialized centre if needed
Pathogenesis, definitions and diagnostic criteria of sepsis, severe sepsis, septic shock and systemic inflammatory response syndrome (SIRS)
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
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
Physiological changes associated with a normal pregnancy and delivery
Pathophysiology, identification and management of peripartum complications: pre-eclampsia and eclampsia; HELLP syndrome; amniotic fluid embolism; ante-partum and post-partum haemorrhage; ectopic pregnancy; septic abortion
Risks and avoidance of pulmonary aspiration in pregnant patients
Methods of avoiding aorto-caval compression
Cardiopulmonary resuscitation of the pregnant patient
Identification of unexpected concurrent pregnancy in a critically ill woman
Awareness of the psychological impact of separation on the family

SKILLS & BEHAVIOURS

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 (see 4.4)
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 (see 4.7)
Perform aseptic urinary catheterisation: male and female (see 5.24)
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 (see 5.8)
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 (see 4.2)
Obtain and interpret results of microbiological tests (see 2.5)
Perform a lumbar puncture under supervision (see 5.18)
Perform abdominal paracentesis (see 5.21)
Liaise with obstetric and midwifery services
Manage pregnancy induced hypertension
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

Demonstrates compassionate care of patients and relatives
Appreciates the importance of timely institution of organ-system support
Appreciates the differences between organ system support and specific treatment
Enquiring mind, undertakes critical analysis of published literature
Adopts a problem solving approach Desire to minimise patient distress
Consults, communicates and collaborates effectively with patients, relatives and the health care team
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

DOMAIN 4: THERAPEUTIC INTERVENTIONS / ORGAN SYSTEM SUPPORT IN SINGLE OR MULTIPLE ORGAN FAILURE

4.1 PRESCRIBES DRUGS AND THERAPIES SAFELY

KNOWLEDGE

Mode of action of drugs (see basic sciences)
Pharmacokinetics & pharmacodynamics (see basic sciences)
SYSTEMIC PHARMACOLOGY: indications, contraindications, effects 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
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
Physiology of fluid, electrolyte, acid-base and glucose control
Treatment strategies for abnormalities of fluid, electrolyte, acid-base and glucose balance
Principles of blood glucose control: indications, methods, monitoring of safety & efficacy
Methods to assess and monitor intravascular volume and state of hydration using clinical signs and modern technology
Fluid therapies: components, physical properties, distribution and clearance of commonly used fluids; indications, contraindications and complications of their administration
Theoretical advantages and disadvantages of crystalloid and colloid solutions
The pathogenesis and management of anaemia, thrombocytopenia, neutropenia and pancytopaenia
Principles of blood and blood component therapy; principles of massive transfusion
Distinguishing features of acute versus chronic respiratory failure and implications for management
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)
Safe prescribing of oxygen; manifestations of pulmonary oxygen toxicity
Nephrotoxic drugs and adjustment of drug doses in renal impairment/failure
Indications, limitations, methods, and complications of enteral and parenteral nutritional techniques
Risk of bleeding: indications, contraindications, monitoring and complications of therapeutic anticoagulants, thrombolytic and anti-thrombolytic agents
Nutritional formulations: indications, complications and their management

SKILLS & BEHAVIOURS

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
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)
Prescribe appropriate antimicrobial therapy based on history, examination and preliminary investigations
Choose appropriate fluid, volume, rate and method of administration
Consider and exclude unknown pathology if goals of fluid therapy are not achieved (e.g. continued bleeding)
Identify and avoid factors contributing to impaired renal function
Prescribe and manage anticoagulation therapy
Prescribe an appropriate standard enteral feeding regimen
Lead, delegate and supervise others appropriately according to experience and role

ATTITUDES
Appreciates the importance of timely institution of organ-system support
Appreciates the differences between organ system support and specific treatment
Recognises the need for supportive care for all organ systems whether failing / injured or not
Responds rapidly to acute changes in monitored variables
Consults, communicates and collaborates effectively with patients, relatives and the health care team
Demonstrates compassionate care of patients and relatives
Desire to minimise patient distress
Respects the ideas and beliefs of the patient and their family and their impact on decision making (does not impose own views)
Respects the expressed wishes of competent patients
Lead, delegate and supervise others appropriately according to experience and role
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

4.2 Manages antimicrobial drug therapy

KNOWLEDGE
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
Requirements for microbiological surveillance and clinical sampling
Local patterns of bacterial resistance and antibiotic policy
Indications, complications, interactions, selection, monitoring, and efficacy of common antimicrobial drugs (antibacterial, antifungal, antiviral, antiprotozoal, antihelmintics)
Principles of prescribing initial empirical therapy and modification / refinement with further clinical and microbiological information
Safe use of therapies which modify the inflammatory response
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
Prophylactic therapies and indications for their use
Circumstances when treatment is unnecessary
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
Ventilator associated pneumonia: definition, pathogenesis and prevention
Techniques for preventing gastrointestinal microbial translocation
Risks of inappropriate antimicrobial therapy on the patient and the environment

SKILLS & BEHAVIOURS
Collaborate with microbiologists / infectious diseases clinicians to link clinical, laboratory and local (hospital / regional / national) microbiological data
Establish a management plan based on clinical and laboratory information
Critically appraise the evidence for and against specific therapeutic interventions or treatments
Prescribe appropriate antimicrobial therapy based on history, examination and preliminary investigations
Administer intravenous drugs (prepare, select route and mode of administration and document)
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

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 4 - Please refer to competence 4.1 or the aggregate syllabus at the end of this section.

4.3 Administers blood and blood products safely

KNOWLEDGE
Pathophysiological effects of altered intravascular volume
Indications for and basic interpretation of haematological tests (including coagulation and sickle tests)
The pathogenesis and management of anaemia, thrombocytopenia, neutropenia and pancytopaenia
Indications for and basic interpretation of blood grouping and x-matching
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 and laboratory evaluation of haemostasis
Risk of bleeding: indications, contraindications, monitoring and complications of therapeutic anticoagulants, thrombolytic and anti-thrombolytic agents
Recognition and management of serious adverse reactions and anaphylaxis
Principles of plasma exchange

SKILLS & BEHAVIOURS
Obtain informed consent/assent from the patient where appropriate
Identify and correct haemostatic and coagulation disorders
Order, check, verify and administer blood products according to local protocols
Establish a management plan based on clinical and laboratory information
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
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 4 - Please refer to competence 4.1 or the aggregate syllabus at the end of this section.

4.4 USES FLUIDS AND VASOACTIVE / INOTROPIC DRUGS TO SUPPORT CIRCULATION

KNOWLEDGE
Physiology and pathophysiology of the heart and circulation
Pathophysiological effects of altered intravascular volume
Fluid therapies: components, physical properties, distribution and clearance of commonly used fluids; indications, contraindications and complications of their administration
Mechanisms of assessment of response to fluid
Theoretical advantages and disadvantages of crystalloid and colloid solutions
Indications for, contraindication, risks and alternatives to blood transfusion
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
Indications, limitations and complications of techniques of measurement of cardiac output (e.g. pulmonary artery catheters, oesophageal Doppler, PiCCO, LiDCO) and action to prevent them
Pathophysiology, detection and management of shock states according to aetiology and in response to physiological data
Integration of data from clinical examination and haemodynamic monitoring to characterise haemodynamic derangements
Pathophysiology and treatment of cardiac failure
Indications and contraindications, limitations and complications of inotropic / vasoactive drug therapy
Interactions between inotropic agents and concomitant therapies and/or co-morbid diseases (eg. ischaemic heart disease)
Receptor-specific effects of inotropic and vasopressor agents; effects of critical illness and concomitant therapies on receptor function (e.g. down-regulation)

SKILLS & BEHAVIOURS
Measure and interpret haemodynamic variables (including derived variables)
Establish a management plan based on clinical and laboratory information
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)
Resuscitate a patient with septic shock using appropriate monitoring, fluid therapy and vasoactive agents
Select an appropriate inotrope / vasopressor - dose, physiological endpoint, rate and route of administration
Administer intravenous drugs (prepare, select route and mode of administration and document)
Use infusion pumps to administer drugs and fluids
Define targets of therapy and review efficacy at regular intervals
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 4 - Please refer to competence 4.1 or the aggregate syllabus at the end of this section.

4.5 DESCRIBES THE USE OF MECHANICAL ASSIST DEVICES TO SUPPORT THE CIRCULATION

KNOWLEDGE
Pathophysiology and treatment of cardiac failure
Prophylactic therapies and indications for their use
Principles and techniques of cardiac pacing
Principles of right and left ventricular assist devices
Indications, contraindications, complications and basic principles of intra-aortic counter pulsation balloon pump
Principles of extra-corporeal membrane oxygenation (ECMO), indications for their use and referral to a specialized centre if needed
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
Pathophysiology, detection and management of shock states according to aetiology and in response to physiological data

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 4 - Please refer to competence 4.1 or the aggregate syllabus at the end of this section

4.6 Initiates, manages and weans patients from invasive and non-invasive ventilatory support

KNOWLEDGE
Causes of respiratory failure, their prevention and management
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)
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 (see 5.3)
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
Modes of mechanical ventilation - indications, contraindications & expected results of each mode (CMV, IRV, PRVC, HFOV, SIMV, PS, 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
Measures of adequacy of tissue oxygenation
Measurement and interpretation of pulmonary mechanics during mechanical ventilation
Potential adverse effects and complications of respiratory support and methods to minimise these
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
Ventilator associated pneumonia: definition, pathogenesis and prevention
Techniques for preventing gastrointestinal microbial translocation
Prophylactic therapies and indications for their use
Safe prescribing of oxygen; manifestations of pulmonary oxygen toxicity
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 (percutaneous and surgical) and minitracheostomy
Management of and complications associated with tracheostomy tubes
Principles of extra-corporeal membrane oxygenation (ECMO), indications for their use and referral to a specialized centre if needed

SKILLS & BEHAVIOURS
Establish a management plan based on clinical and laboratory information
Select the appropriate type and mode of ventilation for an individual patient
Identify and correct ventilator mis-assembly 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
Interpret data from an arterial blood gas sample
Confirm adequate oxygenation and control of $PaCO_2$ and pH
Set and interpret data from ventilator alarms
Construct, monitor and review a weaning plan
Define targets of therapy and review efficacy at regular intervals
Consider modifying diagnosis and/or therapy if goals are not achieved
Lead, delegate and supervise others appropriately according to experience and role
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 4 - Please refer to competence 4.1 or the aggregate syllabus at the end of this section

4.7 Initiates, manages and weans patients from renal replacement therapy

KNOWLEDGE

Physiology of fluid, electrolyte, acid-base and glucose control
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)
Fluid therapies: components, physical properties, distribution and clearance of commonly used fluids; indications, contraindications and complications of their administration
Effects of concomitant treatment and/or co-morbid conditions on an individual patient's response to treatment
Indications for and interpretation of fluid balance charts
Nephrotoxic drugs and adjustment of drug doses in renal impairment/failure
Effect of renal failure and its treatment on other organ systems

SKILLS & BEHAVIOURS

Prioritise therapy according to the patient's needs
Establish a management plan based on clinical and laboratory information
Critically appraise the evidence for and against specific therapeutic interventions or treatments
Consider risk-benefit and cost-benefit of alternative drugs & therapies
Set realistic goals for therapy (independently or in collaboration with other teams)
Supervise the provision of continuous renal replacement therapy
Set appropriate exchange and fluid balances for renal replacement therapies
Define targets of therapy and review efficacy at regular intervals
Modify fluid and electrolyte therapy according to clinical features and fluid balance charts
Prescribe and manage anticoagulation therapy
Prevent hypokalaemia
Identify and correct haemostatic and coagulation disorders
Consider modifying diagnosis and/or therapy if goals are not achieved
Identify and avoid factors contributing to impaired renal function
Recognise when treatment is unnecessary or futile
Lead, delegate and supervise others appropriately according to experience and role

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 4 - Please refer to competence 4.1 or the aggregate syllabus at the end of this section.

4.8 Recognises and manages electrolyte, glucose and acid-base disturbances

KNOWLEDGE

Effect of critical illness upon homeostatic mechanisms and causes of homeostatic disturbances
Physiology of fluid, electrolyte, acid-base and glucose control
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
Signs, symptoms and causes of renal failure (acute / chronic / acute on chronic) and indications for intervention
Patterns of nutritional impairment; consequences of starvation and malnutrition
Principles of blood glucose control: indications, methods, monitoring of safety & efficacy
Fluid therapies: components, physical properties, distribution and clearance of commonly used fluids; indications, contraindications and complications of their administration

SKILLS & BEHAVIOURS

Establish a management plan based on clinical and laboratory information
Critically appraise the evidence for and against specific therapeutic interventions or treatments
Correct electrolyte disorders (e.g. hyperkalaemia, hyponatraemia)
Institute and manage a regimen to control blood glucose within safe limits
Identify and avoid factors contributing to impaired renal function
Confirm adequate oxygenation and control of $PaCO_2$ and pH
Identify and treat underlying causes for a metabolic acidosis
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
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 4 - Please refer to competence 4.1 or the aggregate syllabus at the end of this section.

4.9 Co-ordinates and provides nutritional assessment and support

KNOWLEDGE

Principles of metabolism: nutrients - carbohydrates, fats, proteins, vitamins and minerals; metabolic pathways, lactate metabolism, energy production and enzymes; metabolic rate; hormonal control of metabolism - regulation of plasma glucose; physiological alterations in starvation, obesity and stress response.
Pathophysiological consequences, signs and symptoms of disordered fluid, electrolyte, acid-base and glucose balance
Methods to assess nutritional status and basal energy expenditure
Patterns of nutritional impairment; consequences of starvation and malnutrition
Fluid & caloric requirements in the critically ill patient including electrolytes, vitamins, trace elements and principles of immunonutrition
Nutritional formulations: indications, complications and their management
Indications, limitations, methods, and complications of enteral and parenteral nutritional techniques
Gastrointestinal physiology: gastric function; secretions; gut motility, sphincters and reflex control; nausea and vomiting; digestive functions
Principles of nasogastric 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
Prokinetics: indications, contraindications, complications and selection
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
Antiemetics: indications, contraindications, complications and selection
Prevention and management of constipation and diarrhoea
Techniques for preventing gastrointestinal microbial translocation
Principles of blood glucose control: indications, methods, monitoring of safety & efficacy

SKILLS & BEHAVIOURS

Establish a management plan (independently or in collaboration with the clinical dietician)
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
Institute and manage a regimen to control blood glucose within safe limits
Manage the transition from parenteral to enteral nutrition
Set realistic goals for therapy (independently or in collaboration with other teams)
Collaborate with nursing staff / clinical dietician in monitoring safe delivery of enteral and parenteral nutrition
Define targets of therapy and review efficacy at regular intervals
Consider modifying diagnosis and/or therapy if goals are not achieved
Liaise with clinical dieticians / medical team to plan feeding regimens after discharge from the ICU

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 4 - Please refer to competence 4.1 or the aggregate syllabus at the end of this section

AGGREGATE SYLLABUS

DOMAIN 4: THERAPEUTIC INTERVENTIONS / ORGAN SYSTEM SUPPORT IN SINGLE OR MULTIPLE ORGAN FAILURE

KNOWLEDGE

Mode of action of drugs (see basic sciences) Pharmacokinetics & pharmacodynamics (see basic sciences)

SYSTEMIC PHARMACOLOGY:

Indications, contraindications, effects 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
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 Principles of prevention of multiple organ failure
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
Interpret data from an arterial blood gas sample
Effect of critical illness upon homeostatic mechanisms and causes of homeostatic disturbances
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
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 and laboratory evaluation of haemostasis
Principles of plasma exchange
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
Indications, limitations and complications of techniques of measurement of cardiac output (e.g. pulmonary artery catheters, oesophageal Doppler, PiCCO, LiDCO) and action to prevent them

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, contraindications, complications and basic principles of intra-aortic counter pulsation balloon pump
Risk of bleeding: indications, contraindications, monitoring and complications of therapeutic anticoagulants, thrombolytic and anti-thrombolytic agents
Causes of respiratory failure, their prevention and management
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)
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 (see 5.3)
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
Modes of mechanical ventilation - indications, contraindications & expected results of each mode (CMV, IRV, PRVC, HFOV, SIMV, PS, 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
Measures of adequacy of tissue oxygenation
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
Safe prescribing of oxygen; manifestations of pulmonary oxygen toxicity
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 (percutaneous and surgical) and minitracheostomy
Management of and complications associated with tracheostomy tubes
Principles of extra-corporeal membrane oxygenation (ECMO), indications for their use and referral to a specialized centre if needed
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
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 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

SKILLS & BEHAVIOURS

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
Confirm adequate oxygenation and control of $PaCO_2$ 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

ATTITUDES

Appreciates the importance of timely institution of organ-system support
Appreciates the differences between organ system support and specific treatment
Recognises the need for supportive care for all organ systems whether failing / injured or not
Responds rapidly to acute changes in monitored variables
Consults, communicates and collaborates effectively with patients, relatives and the health care team
Demonstrates compassionate care of patients and relatives
Desire to minimise patient distress
Respects the ideas and beliefs of the patient and their family and their impact on decision making (does not impose own views)
Respects the expressed wishes of competent patients
Lead, delegate and supervise others appropriately according to experience and role
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

Domain 5: Practical procedures

Respiratory System

5.1 Administers oxygen using a variety of administration devices

KNOWLEDGE
Signs, symptoms and causes of acute airway insufficiency and indications for intervention
Methods of maintaining a clear airway
Respiratory physiology: gaseous exchange; pulmonary ventilation: volumes, flows, dead space; mechanics of ventilation: ventilation/perfusion abnormalities; control of breathing, acute and chronic ventilatory failure, effect of oxygen therapy
Indications, contraindications and complications of oxygen therapy
Indications for specific monitoring to ensure patient safety during an intervention / procedure
Environmental hazards associated with storage and use of oxygen; strategies to promote safety
Storage and use of oxygen, nitric oxide (NO), compressed air and helium, including use of gas cylinders
Use of pipeline gas and suction systems
Principles of pressure regulators, flowmeters, 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
Indications for different modes of ventilation and operation of at least one positive pressure ventilator, one non-invasive ventilator, and a constant positive airway pressure (CPAP) device
Methods of sterilisation and cleaning or disposal of equipment
Principles of emergency airway management (see 5.3)

SKILLS & BEHAVIOURS
Select appropriate equipment or device to deliver oxygen therapy
Check pipelines; check and change portable cylinders
Support ventilation using bag and mask
Recognise and institute appropriate oxygen therapy in the management of medical emergencies; seek assistance as appropriate

ATTITUDES
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Considers patient comfort during procedures / investigations
Desire to minimise patient distress
Accepts personal responsibility for the prevention of cross infection and self infection
Lead, delegate and supervise others appropriately according to experience and role
Supports other staff in the correct use of devices
Promotes respect for patient privacy, dignity and confidentiality

5.2 Performs fibreoptic laryngoscopy under supervision

KNOWLEDGE
Anatomy and bronchoscopic appearance of the upper and lower airways
Airway management in special circumstances, (head injury, full stomach, upper airway obstruction, shock, cervical spine injury)
Indications for and principles of fibreoptic intubation; use of fibreoptic intubation with airway adjuncts
Appropriate use of drugs to facilitate airway control
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.)
Methods and routes of insertion - associated indications and complications
Detection of potential physiological alterations during the procedure
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Methods of sterilisation and cleaning or disposal of equipment
Safety and maintenance of flexible fibreoptic endoscopes
Principles of emergency airway management (see 5.3)
Accurately assess the airway for potential difficulties with airway management

SKILLS & BEHAVIOURS
Seek appropriate supervision - discuss the patient and procedure with supervisor prior to undertaking it
Choose a safe environment to undertake airway management (or optimise environment as circumstances allow)
Prepare equipment, patient and staff prior to undertaking the procedure
Obtain informed consent/assent from the patient where appropriate
Choose an appropriate route / method of insertion and position the patient accordingly
Undertake appropriate investigation to confirm correct placement of device or exclude complications
Sterilise, clean or dispose of equipment appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section

5.3 Performs emergency airway management

KNOWLEDGE

Signs, symptoms and causes of acute airway insufficiency and indications for intervention
Methods of maintaining a clear airway
Anatomy and bronchoscopic appearance of the upper and lower airways
Patient selection - indications, contraindications and potential complications of the procedure / intervention
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
Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)
Appropriate use of drugs to facilitate airway control
Monitoring during sedation/induction of anaesthesia for endotracheal intubation
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
Cricoid pressure: indications and safe provision
Detection of potential physiological alterations during the procedure
Airway management in special circumstances, (head injury, full stomach, upper airway obstruction, shock, cervical spine injury)
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)
Management of difficult or failed airway management (see 5.4)
Principles of endotracheal suctioning (see 5.5)
Management and use of the device once in situ necessary to minimise the risks of complications
Indications and technique for removal
Methods of sterilisation and cleaning or disposal of equipment

SKILLS & BEHAVIOURS

Prioritise tasks and procedures
Choose a safe environment to undertake airway management (or optimise environment as circumstances allow)
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
Choose an appropriate route / method of insertion and position the patient accordingly
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
Accurately assess the airway for potential difficulties with airway management
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 CO_2 detector post-intubation and interpret a capnograph trace
Demonstrate rapid sequence induction of anaesthesia / cricoid pressure
Perform extubation
Change an orotracheal tube
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.4 Performs difficult and failed airway management according to local protocols

KNOWLEDGE

Anatomy and bronchoscopic appearance of the upper and lower airways
Principles of emergency airway management (see 5.3)
Airway management in special circumstances, (head injury, full stomach, upper airway obstruction, shock, cervical spine injury)
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)
Appropriate use of drugs to facilitate airway control
Management of difficult intubation and failed intubation (local algorithm or protocol)
Indications and principles of fibreoptic laryngoscopy (see 5.2)
Indications and methods of securing an emergency surgical airway
Anatomical landmarks for cricothyrotomy/tracheostomy/mini-tracheotomy
Indications and techniques for needle and surgical crycothyroidotomy
Indications and contraindications to tracheostomy (percutaneous and surgical) and minitracheostomy

SKILLS & BEHAVIOURS
Accurately assess the airway for potential difficulties with airway management
Prepare equipment for difficult or failed intubation
Optimise the patient's position for airway management
Demonstrate failed intubation drill (according to local algorithm or protocol)
Maintain a clear airway using oral / nasal airways
Support ventilation using bag and mask
Demonstrate minitracheotomy or needle crico-thyoidotomy
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.5 PERFORMS ENDOTRACHEAL SUCTION

KNOWLEDGE
Signs, symptoms and causes of acute airway insufficiency and indications for intervention
Methods of maintaining a clear airway
Anatomy and bronchoscopic appearance of the upper and lower airways
Principles of endotracheal suctioning
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
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
Consequences of the procedure during ventilation
Methods of sterilisation and cleaning or disposal of equipment
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)

SKILLS & BEHAVIOURS
Select appropriate equipment or device & use resources efficiently
Prepare equipment, patient and staff prior to undertaking the procedure
Choose an appropriate route / method of insertion and position the patient accordingly
Obtain informed consent/assent from the patient where appropriate
Use protective clothing (gloves / mask / gown / drapes) as indicated
Perform endotracheal suction (via oral / nasal / tracheostomy tube)
Perform the procedure in a manner which minimises the risks of complications
Sterilise, clean or dispose of equipment appropriately
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.6 PERFORMS FIBREOPRIC BRONCHOSCOPY AND BRONCHOALVEOLAR LAVAGE IN THE INTUBATED PATIENT

KNOWLEDGE
Signs, symptoms and causes of acute airway insufficiency and indications for intervention
Principles of emergency airway management (see 5.3)
Anatomy and bronchoscopic appearance of the upper and lower airways
Patient selection - indications, contraindications and potential complications of the procedure / intervention
Appropriate use of drugs to facilitate airway control
Principles of aseptic technique and aseptic handling of invasive medical devices
Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Detection of potential physiological alterations during the procedure
Indications for specific monitoring to ensure patient safety during an intervention / procedure
Methods of bronchoscopy via an endotracheal tube
Methods of bronchoscopic broncho-alveolar lavage (BAL) in an intubated patient
Detection and management of haemo/pneumothorax (simple and tension)
Safety and maintenance of flexible fibreoptic endoscopes

SKILLS & BEHAVIOURS
Seek appropriate supervision - discuss the patient and procedure with supervisor prior to undertaking it
Identify relevant anatomical landmarks
Prepare equipment, patient and staff prior to undertaking the procedure

Choose an appropriate route / method of insertion and position the patient accordingly
Obtain informed consent/assent from the patient where appropriate
Undertake bronchoscopy to assess tube position
Undertake bronchoscopy to perform bronchoalveolar lavage
Performs the procedure in an aseptic manner (scrubs, gowns, gloves, drapes & sterile field)
Perform the procedure in a manner which minimises the risks of complications
Sterilise, clean or dispose of equipment appropriately
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section

5.7 PERFORMS PERCUTANEOUS TRACHEOSTOMY

KNOWLEDGE

Indications and contraindications to tracheostomy (percutaneous and surgical) and minitracheostomy
Anatomical landmarks for cricothyrotomy/tracheostomy/mini-tracheotomy
Techniques for percutaneous and surgical tracheotomy
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Selection of tracheal tube type, diameter and length
Appropriate use of drugs to facilitate airway control
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
Detection of potential physiological alterations during the procedure
Indications for specific monitoring to ensure patient safety during an intervention / procedure
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
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
Management of and complications associated with tracheostomy tubes
Indications and technique for removal
Principles of emergency airway management (see 5.3)
Principles of endotracheal suctioning (see 5.5)
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)

SKILLS & BEHAVIOURS

Identify patients requiring tracheostomy; discuss indications and contraindications for percutaneous tracheostomy
Seek appropriate supervision - discuss the patient and procedure with supervisor prior to undertaking it
Change a tracheostomy tube electively
Manage anaesthesia and control the airway during initial tracheostomy tube insertion in the intensive care unit (ICU)
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
Select appropriate tracheal tube type, size and length
Identify relevant anatomical landmarks
Choose an appropriate route / method of insertion and position the patient accordingly
Performs the procedure in an aseptic manner (scrubs, gowns, gloves, drapes & sterile field)
Perform the procedure in a manner which minimises the risks of complications
Undertake appropriate investigation to confirm correct placement of device or exclude complications
Manage and minimise cardiovascular and respiratory changes during and after intubation
Sterilise, clean or dispose of equipment appropriately
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.8 PERFORMS THORACOCENTESIS VIA A CHEST DRAIN

KNOWLEDGE

Detection and management of haemo/pneumothorax (simple and tension)
Anatomical landmarks for intrapleural drains
Insertion and management of chest drains and air exclusion devices
Patient groups at risk who may require chest drain placement under ultrasound or CT guidance
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
Detection of potential physiological alterations during the procedure
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Consequences of the procedure during ventilation
Indications for specific monitoring to ensure patient safety during an intervention / procedure

Management and use of the device once in situ necessary to minimise the risks of complications
Indications and technique for removal
Methods of sterilisation and cleaning or disposal of equipment

SKILLS & BEHAVIOURS
Demonstrate emergency relief of tension pneumothorax
Demonstrate aseptic insertion of an intrapleural chest drain and connection to a one-way seal device
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
Choose an appropriate route / method of insertion and position the patient accordingly
Perform the procedure in a manner which minimises the risks of complications
Performs the procedure in an aseptic manner (scrubs, gowns, gloves, drapes & sterile field)
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

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

CARDIOVASCULAR SYSTEM

5.9 PERFORMS PERIPHERAL VENOUS CATHETERISATION

KNOWLEDGE
Surface anatomy: structures in the antecubital fossa; large veins and anterior triangle of the neck; large veins of the leg and femoral triangle
Principles, routes and techniques of peripheral venous cannulation
Methods for securing vascular access rapidly
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
Management and use of the device once in situ necessary to minimise the risks of complications
Indications, contraindications and complications of peripheral intravenous infusion / injection
Indications and technique for removal
Methods of sterilisation and cleaning or disposal of equipment
Methods for surgical isolation of a vein or artery (see 5.11)

SKILLS & BEHAVIOURS
Obtain informed consent/assent from the patient where appropriate
Insert peripheral cannulae via different routes
Select appropriate equipment or device & use resources efficiently
Prepare equipment, patient and staff prior to undertaking the procedure
Choose an appropriate route / method of insertion and position the patient accordingly
Perform the procedure in a manner which minimises the risks of complications
Use protective clothing (gloves / mask / gown / drapes) as indicated
Confirm correct placement and exclude complications
Sterilise, clean or dispose of equipment appropriately
Establish peripheral venous access appropriate for resuscitation in major haemorrhage

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.10 PERFORMS ARTERIAL CATHETERISATION

KNOWLEDGE
Surface anatomy: arteries of the arms and legs
Patient selection - indications, contraindications and potential complications of the procedure / intervention
Principles of arterial catheterisation
Methods and routes of insertion - associated indications and complications
Allens test - application & limitations
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
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 for surgical isolation of a vein or artery (see 5.11)
Ultrasound techniques for vascular localisation (see 5.12)

Management and use of the device once in situ necessary to minimise the risks of complications
Recognition and management of inadvertent intra-arterial injection of harmful substances
Indications and technique for removal

SKILLS & BEHAVIOURS

Insert arterial catheters by different routes
Obtain informed consent/assent from the patient where appropriate
Select appropriate equipment or device & use resources efficiently
Prepare equipment, patient and staff prior to undertaking the procedure
Choose an appropriate route / method of insertion and position the patient accordingly
Perform the procedure in a manner which minimises the risks of complications
Performs the procedure in an aseptic manner (scrubs, gowns, gloves, drapes & sterile field)
Minimise blood loss related to clinical investigations and procedures
Undertake appropriate investigation to confirm correct placement of device or exclude complications
Sterilise, clean or dispose of equipment appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.11 Describes a method for surgical isolation of a vein / artery

KNOWLEDGE

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 and techniques for surgical isolation of a vein or artery
Patient selection - indications, contraindications and potential complications of the procedure / intervention
Principles, routes and techniques of peripheral and central venous cannulation
Principles of arterial catheterisation
Principles of aseptic technique and aseptic handling of invasive medical devices
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Ultrasound techniques for vascular localisation (see 5.12)

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.12 Describes ultrasound techniques for vascular localisation

KNOWLEDGE

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
Basic principles of ultrasound and the Doppler effect
Methods for securing vascular access rapidly
Patient selection - indications, contraindications and potential complications of the procedure / intervention
Principles, routes and techniques of peripheral and central venous cannulation
Principles of arterial catheterisation
Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.13 Performs central venous catheterisation

KNOWLEDGE

Surface anatomy: structures in the antecubital fossa; large veins and anterior triangle of the neck; large veins of the leg and femoral triangle
Methods for securing vascular access rapidly
Indications, contraindications and complications of central venous infusion / injection
Principles, routes and techniques of central venous cannulation
Patient selection - indications, contraindications and potential complications of the procedure / intervention
Principles of aseptic technique and aseptic handling of invasive medical devices
Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)

Detection of potential physiological alterations during the procedure
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Indications for specific monitoring to ensure patient safety during an intervention / procedure
Chest x-ray interpretation (see 2.7)
Detection and management of haemo/pneumothorax (simple and tension)
Management and use of the device once in situ necessary to minimise the risks of complications
Indications and technique for removal
Methods of sterilisation and cleaning or disposal of equipment
Methods for insertion of a tunnelled central venous catheter (e.g. for parenteral nutrition)
Ultrasound techniques for vascular localisation (see 5.12)

SKILLS & BEHAVIOURS

Obtain informed consent/assent from the patient where appropriate
Insert central venous catheters by different routes
Select appropriate equipment or device & use resources efficiently
Prepare equipment, patient and staff prior to undertaking the procedure
Choose an appropriate route / method of insertion and position the patient accordingly
Performs the procedure in an aseptic manner (scrubs, gowns, gloves, drapes & sterile field)
Minimise blood loss related to clinical investigations and procedures
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
Describe a method for tunnelled intravenous catheterisation

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section

5.14 Performs defibrillation and cardioversion

KNOWLEDGE

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)
Patient selection - indications, contraindications and potential complications of the procedure / intervention
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))
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.
Detection of potential physiological alterations during the procedure
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Principles of emergency airway management (see 5.3)

SKILLS & BEHAVIOURS

Prioritise tasks and procedures
Prepare equipment, patient and staff prior to undertaking the procedure
Perform the procedure in a manner which minimises the risks of complications
Recognise and manage emergencies; seek assistance appropriately
Obtain and interpret data from ECG (3- and 12-lead)
Use manual external defibrillators
Use automated external defibrillators (AED)

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.15 Performs cardiac pacing (transvenous or transthoracic)

KNOWLEDGE

Principles and techniques of cardiac pacing
Patient selection - indications, contraindications and potential complications of the procedure / intervention
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)
Surface anatomy: structures in the antecubital fossa; large veins and anterior triangle of the neck; large veins of the leg and femoral triangle
Methods for securing vascular access rapidly
Principles, routes and techniques of peripheral and central venous cannulation
Principles of emergency airway management (see 5.3)
Principles of aseptic technique and aseptic handling of invasive medical devices

Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)
Detection of potential physiological alterations during the procedure
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Detection and acute management of cardiac tamponade
Detection and management of haemo/pneumothorax (simple and tension)
Insertion and management of chest drains and air exclusion devices
Principles of defibrillation and cardioversion (see 5.14)
Management and use of the device once in situ necessary to minimise the risks of complications
Indications and technique for removal

SKILLS & BEHAVIOURS

Prepare equipment, patient and staff prior to undertaking the procedure
Choose an appropriate route / method of insertion and position the patient accordingly
Perform the procedure in a manner which minimises the risks of complications
Use protective clothing (gloves / mask / gown / drapes) as indicated
Undertake appropriate investigation to confirm correct placement of device or exclude complications
Recognise and manage emergencies; seek assistance appropriately
Insert a temporary pacing wire
Establish & review pacing box settings
Demonstrate emergency percutaneous pericardial aspiration
Demonstrate emergency relief of tension pneumothorax

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.16 Describes how to perform pericardiocentesis

KNOWLEDGE

Detection and acute management of cardiac tamponade
Anatomical landmarks and technique for percutaneous pericardial aspiration
Patient selection - indications, contraindications and potential complications of the procedure / intervention
Methods and routes of insertion - associated indications and complications
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
Detection of potential physiological alterations during the procedure
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Principles of ECG monitoring (heart rate, rhythm, conduction, ST segment change & QT interval) - indications, limitations and techniques. Advantages and disadvantages of different lead configurations
Principles and basic interpretation of echocardiography (see 2.3)
Treatment (algorithm) of patients in ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT)
Principles of defibrillation and cardioversion (see 5.14)
Principles of emergency airway management (see 5.3)

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.17 Demonstrates a method for measuring cardiac output and derived haemodynamic variables

KNOWLEDGE

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
Indications, limitations and complications of techniques of measurement of cardiac output (e.g. pulmonary artery catheters, oesophageal Doppler, PiCCO, LiDCO) and action to prevent them
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
Detection of potential physiological alterations during the procedure
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Management and use of the device once in situ necessary to minimise the risks of complications
Indications and technique for removal

SKILLS & BEHAVIOURS
Prepare equipment for intravascular pressure monitoring
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
Undertake appropriate investigation to confirm correct placement of device or exclude complications
Measure and interpret haemodynamic variables (including derived variables)
Perform the procedure in a manner which minimises the risks of complications
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

CENTRAL NERVOUS SYSTEM

5.18 PERFORMS LUMBAR PUNCTURE (INTRADURAL / 'SPINAL') UNDER SUPERVISION

KNOWLEDGE
Indications for lumbar puncture and CSF sampling; laboratory analysis of CSF samples
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
Detection of potential physiological alterations during the procedure
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Methods of sterilisation and cleaning or disposal of equipment

SKILLS & BEHAVIOURS
Seek appropriate supervision - discuss the patient and procedure with supervisor prior to undertaking it
Select appropriate equipment or device & use resources efficiently
Prepare equipment, patient and staff prior to undertaking the procedure
Choose an appropriate route / method of insertion and position the patient accordingly
Identify relevant anatomical landmarks
Performs the procedure in an aseptic manner (scrubs, gowns, gloves, drapes & sterile field)
Perform the procedure in a manner which minimises the risks of complications
Sterilise, clean or dispose of equipment appropriately
Recognise and manage emergencies; seek assistance appropriately

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.19 MANAGES THE ADMINISTRATION OF ANALGESIA VIA AN EPIDURAL CATHETER

KNOWLEDGE
Physiological effects of pain and anxiety
Recognition and methods of assessment of pain
Indications, contraindications, methods and complications of epidural catheterisation
Pharmakokinetics, pharmacodynamics, indications and complications of opiates and local anaesthetic agents
Principles of aseptic technique and aseptic handling of invasive medical devices
Indications, contraindications and complications of epidural infusion / injection; principles of safe epidural drug administration
Detection of potential physiological alterations during the procedure
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Contraindications, methods and complications of epidural catheter removal

SKILLS & BEHAVIOURS
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

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section

5.20 PERFORMS NASOGASTRIC TUBE PLACEMENT

KNOWLEDGE
Patient selection - indications, contraindications and potential complications of the procedure / intervention
Principles of nasogastric cannulation in the intubated and non-intubated patient
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)
Methods and routes of insertion - associated indications and complications
Detection of potential physiological alterations during the procedure
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Management and use of the device once in situ necessary to minimise the risks of complications
Indications and technique for removal
Alternative routes for enteral feeding: indications, contraindications and complications of post-pyloric and percutaneous feeding tube placement

SKILLS & BEHAVIOURS
Obtain informed consent/assent from the patient where appropriate
Insert a nasogastric tube in an intubated and non-intubated patient
Select appropriate equipment or device & use resources efficiently
Prepare equipment, patient and staff prior to undertaking the procedure
Choose an appropriate route / method of insertion and position the patient accordingly
Identify relevant anatomical landmarks
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

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.21 PERFORMS ABDOMINAL PARACENTESIS

KNOWLEDGE
Anatomy of the abdominal wall; landmarks for abdominal paracentesis and abdominal drainage catheters
Indications, contraindications, complications and technique of abdominal paracentesis
Principles of peritoneal lavage
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
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
Management and use of the device once in situ necessary to minimise the risks of complications
Indications and technique for removal
Methods of sterilisation and cleaning or disposal of equipment

SKILLS & BEHAVIOURS
Obtain informed consent/assent from the patient where appropriate
Select appropriate equipment or device & use resources efficiently
Prepare equipment, patient and staff prior to undertaking the procedure
Choose an appropriate route / method of insertion and position the patient accordingly
Identify relevant anatomical landmarks
Insert an abdominal drain
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

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.22 Describes the indication and use of Sengstaken tube (or equivalent) placement

KNOWLEDGE
Patient selection - indications, contraindications and potential complications of the procedure / intervention
Principles and techniques for insertion of gastro-oesophageal balloon tamponade tube (e.g. Sengstaken- Blakemore)
Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)
Methods and routes of insertion - associated indications and complications
Detection of potential physiological alterations during the procedure
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Management and use of the device once in situ necessary to minimise the risks of complications
Indications and technique for removal
Principles of emergency airway management (see 5.3)

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

5.23 Describes indications for, and safe conduct of gastroscopy

KNOWLEDGE
Patient selection - indications, contraindications and potential complications of the procedure / intervention
Principles of nasogastric 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
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
Methods of maintaining a clear airway
Appropriate use of drugs to facilitate the procedure
Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)
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
Safety and maintenance of flexible fibreoptic endoscopes
Use of pipeline gas and suction systems
Principles of emergency airway management (see 5.3)

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

Genitourinary System

5.24 Performs urinary catheterisation

KNOWLEDGE
Anatomy of the genitourinary system and anatomical landmarks for suprapubic urinary catheters
Urinary catheterisation techniques: transurethral and suprapubic
Urinary catheterisation in pelvic trauma: indications, contraindications and techniques
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
Detection of potential physiological alterations during the 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 & BEHAVIOURS
Obtain informed consent/assent from the patient where appropriate
Select appropriate equipment or device & use resources efficiently
Prepare equipment, patient and staff prior to undertaking the procedure
Choose an appropriate route / method of insertion and position the patient accordingly
Use protective clothing (gloves / mask / gown / drapes) as indicated
Identify relevant anatomical landmarks
Perform aseptic urinary catheterisation: male and female

Perform the procedure in a manner which minimises the risks of complications
Confirm correct placement and exclude complications
Sterilise, clean or dispose of equipment appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 5 - Please refer to competence 5.1 or the aggregate syllabus at the end of this section.

AGGREGATE SYLLABUS

DOMAIN 5: PRACTICAL PROCEDURES

KNOWLEDGE

GENERIC

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

RESPIRATORY SYSTEM

Anatomy and bronchoscopic appearance of the upper and lower airways
Signs, symptoms and causes of acute airway insufficiency and indications for intervention
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 (percutaneous and surgical) and mini-tracheostomy
Techniques for percutaneous and surgical tracheotomy
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
Consequences of the procedure during ventilation
Indications, contraindications and complications of oxygen therapy
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
Respiratory physiology: gaseous exchange; pulmonary ventilation: volumes, flows, dead space; mechanics of ventilation: ventilation/perfusion abnormalities; control of breathing, acute and chronic ventilatory failure, effect of oxygen therapy
Indications for different modes of ventilation and operation of at least one positive pressure ventilator, one non-invasive ventilator, and a constant positive airway pressure (CPAP) device
Indications and complications of hyperbaric oxygenation
Methods of bronchoscopy via an endotracheal tube
Methods of bronchoscopic 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
Patient groups at risk who may require chest drain placement under ultrasound or CT guidance

CARDIOVASCULAR SYSTEM

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
Indications, limitations and complications of techniques of measurement of cardiac output (e.g. pulmonary artery catheters, oesophageal Doppler, PiCCO, LiDCO) and action to prevent them
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))
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.
Basic principles of ultrasound and the Doppler effect
Principles and basic interpretation of echocardiography (see 2.3)
Detection and acute management of cardiac tamponade
Anatomical landmarks and technique for percutaneous pericardial aspiration

CENTRAL NERVOUS SYSTEM

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

GASTROINTESTINAL SYSTEM

Principles of nasogastric 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

GENITOURINARY SYSTEM

Anatomy of the genitourinary system and anatomical landmarks for suprapubic catheterisation Urinary catheterisation techniques: transurethral and suprapubic
Urinary catheterisation in pelvic trauma: indications, contraindications and techniques

SKILLS & BEHAVIOURS

GENERIC

Prioritise tasks and procedures
Select appropriate equipment or device & use resources efficiently
repare 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

RESPIRATORY SYSTEM

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 CO_2 detector post-intubation and interpret a capnograph trace
Demonstrate rapid sequence induction of anaesthesia / cricoid pressure
Change an orotracheal tube Perform extubation
Prepare equipment for difficult or failed intubation
Demonstrate failed intubation drill (according to local algorithm or protocol)
Demonstrate minitracheotomy or needle cricothyroidotomy
Change a tracheostomy tube electively

Identify patients requiring tracheostomy; discuss indications and contraindications for percutaneous 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 SYSTEM

Insert peripheral cannulae via different routes
Establish peripheral venous access appropriate for resuscitation in major haemorrhage
Chest x-ray interpretation (see 2.7)
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)

CENTRAL NERVOUS SYSTEM

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 an abdominal drain

GENITOURINARY SYSTEM

Perform aseptic urinary catheterisation: male and female

ATTITUDES

Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Considers patient comfort during procedures / investigations
Desire to minimise patient distress
Accepts personal responsibility for the prevention of cross infection and self-infection
Lead, delegate and supervise others appropriately according to experience and role
Supports other staff in the correct use of devices
Promotes respect for patient privacy, dignity and confidentiality

DOMAIN 6: PERI-OPERATIVE CARE

6.1 MANAGES THE PRE- AND POST-OPERATIVE CARE OF THE HIGH RISK SURGICAL PATIENT

KNOWLEDGE

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: post NMB apnoea, chest wall rigidity and rapid respiratory depression, anaphylaxis, malignant hyperpyrexia, difficult airway, etc
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 (see 3.1 & 3.2)
Indications and choice of agent for antibiotic prophylaxis
Indications for and methods of perioperative anti-thrombotic treatment
Recognition, assessment and management of acute pain
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
Assessment and management of commonly encountered perioperative conditions & complications including:
RESPIRATORY: Interpretation of symptoms and signs of respiratory insufficiency in the surgical patient; the unprotected airway; upper and lower airway obstruction including laryngeal trauma & oedema; pneumonia, collapse or consolidation, pulmonary infiltrates including acute lung injury (ALI) and the acute respiratory distress syndrome (ARDS) and their causative factors; pulmonary oedema; pleural effusion, haemo/pneumothorax (simple and tension); use of chest drains; factors affecting patients following thoracotomy, lung resection, oesophagectomy, cardiac surgery and thymectomy.
CARDIOVASCULAR: Interpretation of symptoms and signs of cardiovascular insufficiency in the surgical patient; recognition of bleeding; management of hypo/hypertension; operative risk factors in patients with ischaemic heart disease; pulmonary embolus; cardiac tamponade; surgery for acquired and congenital cardiac disease; management of patients following cardiac surgery (coronary grafting, valve replacement) and aortic surgery (arch, thoracic, abdominal); heart and heart-lung transplantation
RENAL: Causes of perioperative oliguria and anuria; prevention and management of acute renal failure; rhabdomyolysis; consequences of nephrectomy, ileal conduits; management post-renal transplantation
NEUROLOGICAL: causes of post-operative confusion, stroke (CVA), coma and raised intracranial pressure; determinants of cerebral perfusion and oxygenation; prevention of secondary brain injury; perioperative management of patients with neuropathies and myopathies; intracranial pressure monitoring; intracerebral haemorrhage; spinal cord injury & ischaemia; brachial plexus injury; complications of neuromuscular blockade
GASTROINTESTINAL: Interpretation of abdominal pain and distension; peptic ulceration and upper GI haemorrhage; diarrhoea, vomiting and ileus; peritonitis; intestinal ischaemia; perforation; abdominal hypertension; pancreatitis; jaundice; cholecystitis; management of the pre- and post-liver transplant patient; perioperative nutrition; post operative nausea & vomiting
HAEMATOLOGY AND ONCOLOGY: Care of the immunosuppressed or immunoincompetent patient; complications of chemotherapy; management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies.
METABOLIC & HORMONAL: Perioperative management of patients with diabetes; blood glucose control; hypo- and hyperadrenalism, surgery to thyroid, adrenal and pituitary glands; perioperative management of electrolyte disorders.
SEPSIS AND INFECTION: fever and hypothermia; postoperative hypoperfusion and impaired oxygen delivery; wound infection; opportunistic and nosocomial infection; perioperative infection risk and prophylactic antibiotics; necrotising fasciitis; peritonitis; intestinal ischaemia; antibiotic selection and prescribing
MUSCULO-SKELETAL: principles and management of external fixators and casts; perioperative positioning; pressure area care; compartment syndromes; paralysed patients; principles of salvage surgery

SKILLS & BEHAVIOURS

Optimise high-risk surgical patients before surgery: consider site of care and management plan
Consider the impact of long-term and chronic treatment on acute surgical care
Communicate the risk of surgery to patients and family
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
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
Lead, delegate and supervise others appropriately according to experience and role

Recognise and manage perioperative emergencies and seek assistance appropriately

ATTITUDES

Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Consults, communicates and collaborates effectively with anaesthesiologist, surgeon, nursing staff, other professionals, patients and relatives where appropriate
Desire to minimise patient distress
Attention to and control of pain

6.2 MANAGES THE CARE OF THE PATIENT FOLLOWING CARDIAC SURGERY UNDER SUPERVISION

KNOWLEDGE

Factors determining perioperative risk
Importance of preoperative health status on postoperative outcomes
Indications for, and interpretation of pre-operative investigations
Dangers of emergency anaesthesia & surgery
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
Implications for postoperative care of common acute and chronic medical conditions (see 3.1 & 3.2)
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
Surgical interventions in patients with cardiac disease, perioperative management of the cardiovascular surgery patient and potential complications occurring within 24 hours of cardiac surgery
Management of cyanosis, hypo- and hypertension, hypothermia and shivering
Recognition, assessment and management of acute pain
Indications for and methods of perioperative anti-thrombotic treatment
Assessment and management of commonly encountered perioperative conditions & complications including:
RESPIRATORY: Interpretation of symptoms and signs of respiratory insufficiency in the surgical patient; pneumonia, collapse or consolidation, pulmonary infiltrates including acute lung injury (ALI) and the acute respiratory distress syndrome (ARDS) and their causative factors; pulmonary oedema; pleural effusion, haemo/pneumothorax (simple and tension); use of chest drains; factors affecting patients following cardiac surgery.
CARDIOVASCULAR: Interpretation of symptoms and signs of cardiovascular insufficiency in the surgical patient; recognition of bleeding; management of hypo/hypertension; pulmonary embolus; cardiac tamponade; surgery for congenital and acquired cardiac disease; management of patients following cardiac surgery (coronary grafting, valve replacement) and aortic surgery (arch, thoracic, abdominal); heart and heart-lung transplantation; principles of cardiac pacing
RENAL: Causes of perioperative oliguria and anuria; prevention and management of acute renal failure
NEUROLOGICAL: stroke (CVA); causes of post-operative confusion.
GASTROINTESTINAL: post-operative alterations in gut motility; perioperative nutrition; post operative nausea & vomiting
HAEMATOLOGY: management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies.
METABOLIC & HORMONAL: Blood glucose control; perioperative management of electrolyte disorders
SEPSIS AND INFECTION: fever and hypothermia; postoperative hypoperfusion and impaired oxygen delivery; wound infection; opportunistic and nosocomial infection; perioperative infection risk and prophylactic antibiotics; intestinal ischaemia; antibiotic selection and prescribing

SKILLS & BEHAVIOURS

Seek appropriate support and supervision in order to provide optimal patient care
Consider the impact of long-term and chronic treatment on acute surgical 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
Identify life-threatening cardiorespiratory complications; manage hypovolaemia and impaired oxygen delivery
Differentiate and manage tension pneumothorax, cardiac tamponade & pulmonary embolus
Recognise and manage perioperative emergencies and seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 6 - Please refer to competence 6.1 or the aggregate syllabus at the end of this section.

6.3 MANAGES THE CARE OF THE PATIENT FOLLOWING CRANIOTOMY UNDER SUPERVISION

KNOWLEDGE

Factors determining perioperative risk
Importance of preoperative health status on postoperative outcomes

Indications for, and interpretation of pre-operative investigations
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
Implications for postoperative care of common acute and chronic medical conditions (see 3.1 & 3.2)
Implications of type of anaesthesia (general/regional/local) for perioperative care
Major neurosurgical procedures, peri-operative management of the patient undergoing major neurosurgery, and potential complications occurring within 24 hours of surgery
Recognition, assessment and management of acute pain
Indications for and methods of perioperative anti-thrombotic treatment
Assessment and management of commonly encountered perioperative conditions & complications including:
RESPIRATORY: Interpretation of symptoms and signs of respiratory insufficiency in the surgical patient
CARDIOVASCULAR: Interpretation of symptoms and signs of cardiovascular insufficiency in the surgical patient; management of hypo/hypertension
RENAL: Causes of perioperative oliguria and anuria; prevention and management of acute renal failure
NEUROLOGICAL: causes of post-operative confusion, stroke (CVA), coma and raised intracranial pressure; determinants of cerebral perfusion and oxygenation; prevention of secondary brain injury; intracranial pressure monitoring; therapeutic correction of raised intracranial pressure; intracerebral haemorrhage, contusion and oedema
GASTROINTESTINAL: post-operative alterations in gut motility; perioperative nutrition; post operative nausea & vomiting
METABOLIC & HORMONAL: Blood glucose control; perioperative management of electrolyte disorders
SEPSIS AND INFECTION: fever and hypothermia; postoperative hypoperfusion and impaired oxygen delivery; wound infection; opportunistic and nosocomial infection; perioperative infection risk and prophylactic antibiotics; intestinal ischaemia; antibiotic selection and prescribing

SKILLS & BEHAVIOURS

Seek appropriate support and supervision in order to provide optimal patient care
Consider the impact of long-term and chronic treatment on acute surgical 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
Monitor and manipulate cerebral perfusion pressure (CPP)
Establish a plan for postoperative management
Recognise and manage perioperative emergencies and seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 6 - Please refer to competence 6.1 or the aggregate syllabus at the end of this section

6.4 MANAGES THE CARE OF THE PATIENT FOLLOWING SOLID ORGAN TRANSPLANTATION UNDER SUPERVISION

KNOWLEDGE

Factors determining perioperative risk
Importance of preoperative health status on postoperative outcomes
Indications for, and interpretation of pre-operative investigations
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
Implications for postoperative care of common acute and chronic medical conditions (see 3.1 & 3.2)
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
Solid organ-specific transplantation (heart-lung, liver, renal): peri-operative considerations, pharmacological management, post operative care and potential complications
Immunosuppression and rejection
Indications for and methods of perioperative anti-thrombotic treatment
Recognition, assessment and management of acute pain
Assessment and management of commonly encountered perioperative conditions & complications including:
RESPIRATORY: Interpretation of symptoms and signs of respiratory insufficiency in the surgical patient; pneumonia, collapse or consolidation, pulmonary infiltrates including acute lung injury (ALI) and the acute respiratory distress syndrome (ARDS) and their causative factors; pulmonary oedema; pleural effusion, haemo/pneumothorax (simple and tension); use of chest drains; factors affecting patients following heart-lung transplantation.
CARDIOVASCULAR: Recognition of bleeding; interpretation of symptoms and signs of cardiovascular insufficiency in the surgical patient; management of hypo/hypertension; pulmonary embolus; management of patients following heart and heart-lung transplantation
RENAL: Causes of perioperative oliguria and anuria; prevention and management of acute renal failure; management post-renal transplantation
NEUROLOGICAL: stroke (CVA); causes of post-operative confusion.

GASTROINTESTINAL: post-operative alterations in gut motility; perioperative nutrition; post operative nausea & vomiting; management of the post-liver transplant patient.
HAEMATOLOGY AND ONCOLOGY: Care of the immunosuppressed or immunocompetent patient; complications of chemotherapy; management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies.
METABOLIC & HORMONAL: Blood glucose control; perioperative management of electrolyte disorders
SEPSIS AND INFECTION: fever and hypothermia; postoperative hypoperfusion and impaired oxygen delivery; wound infection; opportunistic and nosocomial infection; perioperative infection risk and prophylactic antibiotics; intestinal ischaemia; antibiotic selection and prescribing

SKILLS & BEHAVIOURS

Seek appropriate support and supervision in order to provide optimal patient care
Consider the impact of long-term and chronic treatment on acute surgical 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
Review and monitor perioperative immunosuppressive therapy
Identify life-threatening cardiorespiratory complications; manage hypovolaemia and impaired oxygen delivery
Recognise and manage perioperative emergencies and seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 6 - Please refer to competence 6.1 or the aggregate syllabus at the end of this section.

6.5 MANAGES THE PRE- AND POST-OPERATIVE CARE OF THE TRAUMA PATIENT UNDER SUPERVISION

KNOWLEDGE

Factors determining perioperative risk
Importance of preoperative health status on postoperative outcomes
Indications for, and interpretation of pre-operative investigations
Dangers of emergency anaesthesia & surgery
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 (see 3.1 & 3.2)
Indications for and methods of perioperative anti-thrombotic treatment
Recognition, assessment and management of acute pain
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
Assessment and management of commonly encountered perioperative conditions & complications including:
RESPIRATORY: Interpretation of symptoms and signs of respiratory insufficiency in the trauma patient; pneumonia, collapse or consolidation, pulmonary infiltrates including acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) and their causative factors; pulmonary contusion; pulmonary oedema; pleural effusion, haemo/pneumothorax (management of simple and tension); use of chest drains.
CARDIOVASCULAR: Interpretation of symptoms and signs of cardiovascular insufficiency in the trauma patient including cardiac contusion and tamponade; management of hypo/hypertension
RENAL: Causes of perioperative oliguria and anuria; rhabdomyolysis; prevention and management of acute renal failure
NEUROLOGICAL: causes of post-operative confusion, stroke (CVA), coma and raised intracranial pressure; determinants of cerebral perfusion and oxygenation; prevention of secondary brain injury; intracranial pressure monitoring; therapeutic correction of raised intracranial pressure; intracerebral haemorrhage, contusion and oedema
GASTROINTESTINAL: Interpretation of abdominal pain and distension; intestinal ischaemia; abdominal hypertension; risk factors, monitoring and management of abdominal compartment syndrome; perioperative nutrition; post-operative nausea and vomiting
HAEMATOLOGY: management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies.
METABOLIC & HORMONAL: Blood glucose control; perioperative management of electrolyte disorders
SEPSIS AND INFECTION: fever and hypothermia; postoperative hypoperfusion and impaired oxygen delivery; wound infection; opportunistic and nosocomial infection; perioperative infection risk and prophylactic antibiotics; necrotising fasciitis; peritonitis; intestinal ischaemia; antibiotic selection and prescribing
MUSCULO-SKELETAL: principles and management of external fixators and casts; perioperative positioning; pressure area care; compartment syndromes; paralysed patients; principles of salvage surgery

SKILLS & BEHAVIOURS

Seek appropriate support and supervision in order to provide optimal patient care
Consider the impact of long-term and chronic treatment on acute surgical care

Identify pre-operative health status and intercurrent disease, medications, allergies and their interaction with the nature of anaesthetic and surgery
Communicate the risk of surgery to patients and family
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
Conduct a secondary survey following ATLS (or equivalent) principles
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 including plans for further surgery
Describe the risk period for use of depolarizing neuromuscular blocking agents in patients undergoing repeated surgical procedures
Identify life-threatening cardiorespiratory complications; manage hypovolaemia and impaired oxygen delivery
Recognise and manage perioperative emergencies and seek assistance appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 6 - Please refer to competence 6.1 or the aggregate syllabus at the end of this section

AGGREGATE SYLLABUS

DOMAIN 6: PERIOPERATIVE CARE

KNOWLEDGE

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: post NMB apnoea, chest wall rigidity and rapid respiratory depression, anaphylaxis, malignant hyperpyrexia, difficult airway, etc
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 (see 3.1 & 3.2) 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
Assessment and management of commonly encountered perioperative conditions & complications including:
RESPIRATORY: Interpretation of symptoms and signs of respiratory insufficiency in the surgical patient; the unprotected airway; upper and lower airway obstruction including laryngeal trauma & oedema; pneumonia, collapse or consolidation, pulmonary infiltrates including acute lung injury (ALI) and the acute respiratory distress syndrome (ARDS) and their causative factors; pulmonary oedema; pleural effusion, haemo/pneumothorax (simple and tension); use of chest drains; factors affecting patients following thoracotomy, lung resection, oesophagectomy, cardiac surgery and thymectomy.
CARDIOVASCULAR: Interpretation of symptoms and signs of cardiovascular insufficiency in the surgical patient; recognition of bleeding; management of hypo/hypertension; operative risk factors in patients with ischaemic heart disease; pulmonary embolus; cardiac tamponade; surgery for acquired and congenital cardiac disease; management of patients following cardiac surgery (coronary grafting, valve replacement) and aortic surgery (arch, thoracic, abdominal); heart and heart-lung transplantation
RENAL: Causes of perioperative oliguria and anuria; prevention and management of acute renal failure; rhabdomyolysis; consequences of nephrectomy, ileal conduits; management post-renal transplantation
NEUROLOGICAL: causes of post-operative confusion, stroke (CVA), coma and raised intracranial pressure; determinants of cerebral perfusion and oxygenation; prevention of secondary brain injury; perioperative management of patients with neuropathies and myopathies; intracranial pressure monitoring; intracerebral haemorrhage; spinal cord injury & ischaemia; brachial plexus injury; complications of neuromuscular blockade
GASTROINTESTINAL: Interpretation of abdominal pain and distension; peptic ulceration and upper GI haemorrhage; diarrhoea, vomiting and ileus; peritonitis; intestinal ischaemia; perforation; abdominal hypertension; pancreatitis; jaundice; cholecystitis; management of the pre- and post-liver transplant patient; perioperative nutrition; post-operative nausea & vomiting
HAEMATOLOGY AND ONCOLOGY: Care of the immunosuppressed or immunocompetent patient; complications of chemotherapy; management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies.
METABOLIC AND HORMONAL: Perioperative management of patients with diabetes; blood glucose control; hypo- and hyper adrenalism, surgery to thyroid, adrenal and pituitary glands; perioperative management of electrolyte disorders.
SEPSIS AND INFECTION: fever and hypothermia; postoperative hypoperfusion and impaired oxygen delivery; wound infection; opportunistic and nosocomial infection; perioperative infection risk and prophylactic antibiotics; necrotising fasciitis; peritonitis; intestinal ischaemia; antibiotic selection and prescribing
MUSCULO-SKELETAL: principles and management of external fixators and casts; perioperative positioning; pressure area care; compartment syndromes; paralysed patients; principles of salvage surgery Recognition, assessment and management of acute pain
Indications and choice of agent for antibiotic prophylaxis
Indications for and methods of perioperative anti-thrombotic treatment
Surgical interventions in patients with cardiac disease, perioperative management of the cardiovascular surgery patient and potential complications occurring within 24 hours of cardiac surgery
Major neurosurgical procedures, peri-operative management of the patient undergoing major neurosurgery, and potential complications occurring within 24 hours of surgery
Solid organ-specific transplantation (heart-lung, liver, renal): peri-operative considerations, pharmacological management, post-operative care and potential complications
Immunosuppression and rejection

SKILLS & BEHAVIOURS

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

ATTITUDES

Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Consults, communicates and collaborates effectively with anaesthesiologist, surgeon, nursing staff, other professionals, patients and relatives where appropriate
Desire to minimise patient distress
Attention to and control of pain

DOMAIN 7: COMFORT AND RECOVERY

7.1 IDENTIFIES AND ATTEMPTS TO MINIMISE THE PHYSICAL AND PSYCHOSOCIAL CONSEQUENCES OF CRITICAL ILLNESS FOR PATIENTS AND FAMILIES

KNOWLEDGE

Common symptomatology following critical illness
Causes and methods of minimising distress in patients
The role of patient's relatives and their contribution to care
Physiological effects of pain and anxiety
Stress responses
Recognition and methods of assessment of pain
Principles of acute pain management
Pharmacokinetics, pharmacodynamics, indications and complications of commonly used analgesic, hypnotic, and neuromuscular blocking drugs in patients with normal and abnormal organ system function
Sleep deprivation and its consequences
Causes and management of acute confusional states
Sensory deprivation / sensory overload
Environmental and drug-related psychopathology associated with critical illness (e.g. anxiety, sleep disorders, hallucinations, drug withdrawal)
Impact of staff-patient contact and environmental factors on patient stress
Post-traumatic stress disorders
Relevance and methods to care for skin, mouth, eyes and bowels, and to maintain mobility and muscle strength in critically ill patients
Methods of communicating with patients who are unable to speak
Fluid & caloric requirements in the critically ill patient including electrolytes, vitamins, trace elements and principles of immune-nutrition
Methods to assess nutritional status and basal energy expenditure
Causes, prevention and management of critical illness polyneuropathy, motor neuropathy, and myopathy
Consequences of immobilisation and mobilisation techniques (including disuse atrophy, foot-drop, ectopic calcification)
Prevention & management of pressure sores
Principles of rehabilitation: physical and psychological
Resources available to patients and relatives for education and support (eg societies, local groups, publications, referral to allied health care professionals)
Methods to minimise potential psychological trauma to the patient and their family of transfer from the ICU (especially with regard to long term ICU patients)
Common risk factors for post-ICU mortality or re-admission and their minimisation
The implications for relatives of adopting a role as a carer at home
Impact of chronic illness post-ICU on socialisation and employment

SKILLS & BEHAVIOURS

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
Use analgesic, hypnotic and neuromuscular blocking drugs appropriately and safely
Propose and implement a plan to provide adequate sleep and rest in ICU patients
Communicate effectively with relatives who may be anxious, angry, confused, or litigious
Participate in the education of patients/families
Appropriate and timely referral to specialists / allied health professionals
Take decisions to admit, discharge or transfer patients
Follow-up patients after discharge to the ward
Participate in follow-up clinics / services where available

ATTITUDES

Appreciates that physical and psychological consequences of critical illness can have a significant and long lasting effect for both patients and their relatives
Desire to minimise patient distress
Establishes trusting relationships with and demonstrates compassionate care of patients and their relatives
Seeks to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff
Acknowledges the consequences of the language used to impart information
Regards each patient as an individual
Respects the religious beliefs of the patient and is willing to liaise with a religious representative if requested by patient or family
Willingness to communicate with and support families / significant others
Early planning for rehabilitation
Recognises that intensive care is a continuum throughout the 'patient journey'
Promotes appropriate and timely discharge from ICU
Fosters effective communication and relationships with medical and nursing staff in other wards / departments
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

7.2 MANAGES THE ASSESSMENT, PREVENTION AND TREATMENT OF PAIN AND DELIRIUM

KNOWLEDGE
Physiological effects of pain and anxiety
Stress responses
Causes and methods of minimising distress in patients
Recognition and methods of assessment of pain
Principles of acute pain management
Pharmacokinetics, pharmacodynamics, indications and complications of commonly used analgesic, hypnotic, and neuromuscular blocking drugs in patients with normal and abnormal organ system function
Indications, contra-indications, methods and complications of regional analgesia in critical illness
Patient-controlled analgesia
Environmental and drug-related psychopathology associated with critical illness (e.g. anxiety, sleep disorders, hallucinations, drug withdrawal)
Causes and management of acute confusional states
Sleep deprivation and its consequences
Relevance and methods to care for skin, mouth, eyes and bowels, and to maintain mobility and muscle strength in critically ill patients

SKILLS & BEHAVIOURS
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
Select & determine adequacy and route of administration of analgesia
Use analgesic, hypnotic and neuromuscular blocking drugs appropriately and safely
Minimise complications associated with opioid and non-opioid analgesics
Propose and implement a plan to provide adequate sleep and rest in ICU patients
Work with colleagues and relatives to minimise patient distress

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 7 - Please refer to competence 7.1 or the aggregate syllabus at the end of this section

7.3 MANAGES SEDATION AND NEUROMUSCULAR BLOCKADE

KNOWLEDGE
Physiological effects of pain and anxiety
Causes and methods of minimising distress in patients
Stress responses
Causes and management of acute confusional states
Recognition and assessment of anxiety
Environmental and drug-related psychopathology associated with critical illness (e.g. anxiety, sleep disorders, hallucinations, drug withdrawal)
Sensory deprivation / sensory overload
Sleep deprivation and its consequences
Pharmacokinetics, pharmacodynamics, indications and complications of commonly used analgesic, hypnotic, and neuromuscular blocking drugs in patients with normal and abnormal organ system function
Methods of measuring depth of sedation; effects of over-sedation and strategies to avoid this
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
Prevention & management of pressure sores
Relevance and methods to care for skin, mouth, eyes and bowels, and to maintain mobility and muscle strength in critically ill patients
Post-traumatic stress disorders

SKILLS & BEHAVIOURS
Anticipate the development of pain and/or anxiety and adopt strategies for its prevention or minimisation
Use analgesic, hypnotic and neuromuscular blocking drugs appropriately and safely
Interpret data from scoring or scaling systems to assess pain and sedation
Obtain and interpret data from a nerve stimulator to monitor the degree of neuromuscular blockade
Identify complications associated with critical illness
Propose and implement a plan to provide adequate sleep and rest in ICU patients
Work with colleagues and relatives to minimise patient distress

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 7 - Please refer to competence 7.1 or the aggregate syllabus at the end of this section.

7.4 COMMUNICATES THE CONTINUING CARE REQUIREMENTS OF PATIENTS AT ICU DISCHARGE TO HEALTH CARE PROFESSIONALS, PATIENTS AND RELATIVES

KNOWLEDGE

Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
Common symptomatology following critical illness
Common risk factors for post-ICU mortality or re-admission and their minimisation
Post-traumatic stress disorders
Environmental and drug-related psychopathology associated with critical illness (e.g. anxiety, sleep disorders, hallucinations, drug withdrawal)
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
Fluid & caloric requirements in the critically ill patient including electrolytes, vitamins, trace elements and principles of immune-nutrition
Methods to assess nutritional status and basal energy expenditure
Principles of rehabilitation: physical and psychological
Methods of communicating with patients who are unable to speak
Causes and methods of minimising distress in patients
Resources available to patients and relatives for education and support (eg societies, local groups, publications, referral to allied health care professionals)
Supportive services integral to the long term rehabilitation of critically ill patients (physiotherapy, occupational therapy, orthotics, social services).
The implications for relatives of adopting a role as a carer at home
Impact of chronic illness post-ICU on socialisation and employment
Methods for assessing or measuring quality of life
Methods to minimise potential psychological trauma to the patient and their family of transfer from the ICU (especially with regard to long term ICU patients)
Management of tracheostomy care and avoidance of complications outside the ICU
Long-term ventilation outside the ICU environment (eg. home ventilation)
Persistent vegetative state

SKILLS & BEHAVIOURS

Anticipate the development of pain and/or anxiety and adopt strategies for its prevention or minimisation
Work with colleagues and relatives to minimise patient distress
Appropriate and timely referral to specialists / allied health professionals
Ensure effective information exchange before patient discharge from ICU
Liaise with medical and nursing staff in other departments to ensure optimal communication and continuing care after ICU discharge
Communicate effectively with relatives who may be anxious, angry, confused, or litigious
Participate in the education of patients/families
Follow-up patients after discharge to the ward

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 7 - Please refer to competence 7.1 or the aggregate syllabus at the end of this section.

7.5 MANAGES THE SAFE AND TIMELY DISCHARGE OF PATIENTS FROM THE ICU

KNOWLEDGE

Common symptomatology following critical illness
The role of patient's relatives and their contribution to care
Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
Common risk factors for post-ICU mortality or re-admission and their minimisation
Methods to minimise potential psychological trauma to the patient and their family of transfer from the ICU (especially with regard to long term ICU patients)
Potential psychological impact of inter-hospital transfer and family dislocation
Management of tracheostomy care and avoidance of complications outside the ICU
Long-term ventilation outside the ICU environment (eg. home ventilation)

SKILLS & BEHAVIOURS

Anticipate the development of pain and/or anxiety and adopt strategies for its prevention or minimisation
Work with colleagues and relatives to minimise patient distress
Appropriate and timely referral to specialists / allied health professionals
Identify discharge criteria for individual patients
Take decisions to admit, discharge or transfer patients
Ensure effective information exchange before patient discharge from ICU
Liaise with medical and nursing staff in other departments to ensure optimal communication and continuing care after ICU discharge
Communicate effectively with relatives who may be anxious, angry, confused, or litigious
Follow-up patients after discharge to the ward
Change a tracheostomy tube electively

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 7 - Please refer to competence 7.1 or the aggregate syllabus at the end of this section.

AGGREGATE SYLLABUS

DOMAIN 7: COMFORT & RECOVERY

KNOWLEDGE

Common symptomatology following critical illness
The role of patient's relatives and their contribution to care
Causes and methods of minimising distress in patients
Physiological effects of pain and anxiety
Stress responses
Recognition and methods of assessment of pain Recognition and assessment of anxiety
Pharmacokinetics, 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
Methods of measuring depth of sedation; effects of over-sedation and strategies to avoid this
Environmental and drug-related psychopathology associated with critical illness (e.g. anxiety, sleep disorders, hallucinations, drug withdrawal)
Sensory deprivation / sensory overload
Sleep deprivation and its consequences
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
Fluid & caloric requirements in the critically ill patient including electrolytes, vitamins, trace elements and principles of immune-nutrition
Methods to assess nutritional status and basal energy expenditure
Prevention & management of pressure sores
Relevance and methods to care for skin, mouth, eyes and bowels, and to maintain mobility and muscle strength in critically ill patients
Causes and management of acute confusional states
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, orthotics, social services).
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 to minimise potential psychological trauma to the patient and their family of transfer from the ICU (especially with regard to long term ICU patients)
Post-traumatic stress disorders
Impact of staff-patient contact and environmental factors on patient stress
The implications for relatives of adopting a role as a carer at home
Methods for assessing or measuring quality of life
Impact of chronic illness post-ICU on socialisation and employment
Management of tracheostomy care and avoidance of complications outside the ICU
Long-term ventilation outside the ICU environment (e.g. home ventilation)
Persistent vegetative state

SKILLS & BEHAVIOURS

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 elect & 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

ATTITUDES

Appreciates that physical and psychological consequences of critical illness can have a significant and long lasting effect for both patients and their relatives
Desire to minimise patient distress
Establishes trusting relationships with and demonstrates compassionate care of patients and their relatives
Seeks to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff
Acknowledges the consequences of the language used to impart information
Regards each patient as an individual
Respects the religious beliefs of the patient and is willing to liaise with a religious representative if requested by patient or family
Willingness to communicate with and support families / significant others
Early planning for rehabilitation
Recognises that intensive care is a continuum throughout the 'patient journey'
Promotes appropriate and timely discharge from ICU
Fosters effective communication and relationships with medical and nursing staff in other wards / departments
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

DOMAIN 8: END OF LIFE CARE

8.1 MANAGES THE PROCESS OF WITHHOLDING OR WITHDRAWING TREATMENT WITH THE MULTIDISCIPLINARY TEAM

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: doctrine of double effect
With-holding and withdrawing treatment: omission and commission
Decision-making processes for withholding and withdrawing life sustaining therapies including documentation and iterative review
The limitations of intensive care medicine - expectations of what can and cannot be achieved
Principles of delivering bad news to patients and families
Local resources available to support dying patients and their families, and how to access them
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
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 & BEHAVIOURS

Recognise when treatment is unnecessary or futile
Discuss end of life decisions with members of the health care team
Willing and able to communicate and discuss issues pertaining to end of life with patients and relatives
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
Relieve distress in the dying patient
Withdraw life sustaining treatment or organ support
Aware of the emotional needs of self and others; seeks and offers support appropriately

ATTITUDES

Values clear decision-making and communication
Acknowledges the consequences of the language used to impart information
Willingness to communicate with and support families / significant others
Respects the ideas and beliefs of the patient and their family and their impact on decision making (does not impose own views)
Respects the expressed wishes of competent patients
Respects the religious beliefs of the patient and is willing to liaise with a religious representative if requested by patient or family
Offers psychological, social and spiritual support to patients, their relatives or colleagues as required
Desire to support patient, family, and other staff members appropriately during treatment withdrawal
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

8.2 DISCUSSES END OF LIFE CARE WITH PATIENTS AND THEIR FAMILIES / SURROGATES

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 doctrine of double effect
With-holding and withdrawing treatment: omission and commission
Decision-making processes for withholding and withdrawing life sustaining therapies including documentation and iterative review
The limitations of intensive care medicine - expectations of what can and cannot be achieved
Principles of delivering bad news to patients and families
Local resources available to support dying patients and their families, and how to access them
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
Causes and prognosis of vegetative states
Causes of brain stem death
Cultural and religious factors which may influence attitude to brain stem death and organ donation
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 & BEHAVIOURS

Recognise when treatment is unnecessary or futile

Willing and able to communicate and discuss issues pertaining to end of life with patients and relatives
Discuss treatment options with a patient or relatives before ICU admission
Differentiate competent from incompetent statements by patients
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
Explain the concept of brain stem death and organ donation clearly
Lead a discussion about end of life goals, preferences and decisions with a patient and/or their relatives
Obtain consent/assent for treatment, research, autopsy or organ donation

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 8 - Please refer to competence 8.1 or the aggregate syllabus at the end of this section.

8.3 MANAGES PALLIATIVE CARE OF THE CRITICALLY ILL PATIENT

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 doctrine of double effect
Principles of delivering bad news to patients and families
Local resources available to support dying patients and their families, and how to access them
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

SKILLS & BEHAVIOURS

Recognise when treatment is unnecessary or futile
Willing and able to communicate and discuss issues pertaining to end of life with patients and relatives
Discuss treatment options with a patient or relatives before ICU admission
Differentiate competent from incompetent statements by patients
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
Lead a discussion about end of life goals, preferences and decisions with a patient and/or their relatives
Relieve distress in the dying patient
Aware of the emotional needs of self and others; seeks and offers support appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 8 - Please refer to competence 8.1 or the aggregate syllabus at the end of this section.

8.4 PERFORMS BRAIN STEM DEATH TESTING

KNOWLEDGE

Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Causes of brain stem death
Legal aspects of brain stem death diagnosis
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 brain stem death
Preconditions and exclusions for the diagnosis of brain stem death
Clinical, imaging and electrophysiologic tests to diagnose brain death
Cultural and religious factors which may influence attitude to brain stem death and organ donation
Responsibilities in relation to legal authorities for certifying death (e.g. coroner, procurator fiscal or equivalent), and reasons for referral

SKILLS & BEHAVIOURS

Perform and document tests of brain stem function
Consult and confirm findings of brain stem function tests with colleagues as required by local / national policy or as indicated
Document pre-conditions and exclusions to brain stem death testing

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 8 - Please refer to competence 8.1 or the aggregate syllabus at the end of this section.

8.5 MANAGES THE PHYSIOLOGICAL SUPPORT OF THE ORGAN DONOR

KNOWLEDGE

Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Causes of brain stem death
Physiological changes associated with brain stem death
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 co-ordinators

SKILLS & BEHAVIOURS

Explain the concept of brain stem death and organ donation clearly
Obtain consent/assent for treatment, research, autopsy or organ donation
Liaise with transplant co-ordinators (local organ donation authority) to plan management of the organ donor
Monitor vital physiological functions as indicated
Recognise and rapidly respond to adverse trends in monitored parameters
Aware of the emotional needs of self and others; seeks and offers support appropriately

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 8 - Please refer to competence 8.1 or the aggregate syllabus at the end of this section.

AGGREGATE SYLLABUS

DOMAIN 8: END OF LIFE CARE

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: doctrine of double effect With-holding 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
Local resources available to support dying patients and their families, and how to access them
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 brain stem 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 brain stem death
Preconditions and exclusions for the diagnosis of brain stem death
Clinical, imaging and electrophysiologic tests to diagnose brain death
Legal aspects of brain stem death diagnosis
Cultural and religious factors which may influence attitude to brain stem 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 co-ordinators
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 & BEHAVIOURS

Recognise when treatment is unnecessary or futile
Discuss end of life decisions with members of the health care team
Willing and able 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 brain stem 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 brain stem death testing
Perform and document tests of brain stem function
Consult and confirm findings of brain stem function tests with colleagues as required by local / national policy or as indicated
Liaise with transplant co-ordinators (local organ donation authority) to plan management of the organ donor
Monitor vital physiological functions as indicated
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

ATTITUDES

Values clear decision-making and communication
Acknowledges the consequences of the language used to impart information
Willingness to communicate with and support families / significant others
Respects the ideas and beliefs of the patient and their family and their impact on decision making (does not impose own views)
Respects the expressed wishes of competent patients
Respects the religious beliefs of the patient and is willing to liaise with a religious representative if requested by patient or family
Offers psychological, social and spiritual support to patients, their relatives or colleagues as required
Desire to support patient, family, and other staff members appropriately during treatment withdrawal
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

DOMAIN 9: PAEDIATRIC CARE

9.1 DESCRIBES THE RECOGNITION OF THE ACUTELY ILL CHILD AND INITIAL MANAGEMENT OF PAEDIATRIC EMERGENCIES

KNOWLEDGE

Key stages of physical and psychological development
Major anatomical and physiological differences between adults and children
Pathophysiology and principles of management of disorders which are life-threatening to paediatric patients (determined by national case mix, but may include: acute respiratory failure, cardiac failure, trauma, severe infections including meningitis and epiglottitis, intoxications, metabolic disorders, seizures, croup, diarrhoea)
Paediatric management of conditions common to both children and adults (e.g. acute severe asthma, renal failure, trauma)
Paediatric resuscitation and the differences between adult and paediatric resuscitation
Principles of paediatric airway management: methods & techniques; calculation of tube sizes; selection of masks and airways
Principles of mechanical ventilation in a child
Preparation for and methods of securing venous access
Intraosseous cannulation
Estimation of blood volume, replacement of fluid loss
Paediatric dosing of common emergency drugs
General principles for stabilising the critically ill or injured child until senior or more experienced help arrives
Operation of local paediatric referral /retrieval services
Principles of communication (verbal and non verbal) with children of different ages; awareness of the consequences of the language used to impart information
Issues of consent in children

SKILLS & BEHAVIOURS *(if paediatric patients are routinely managed in the adult ICU setting)*

Paediatric resuscitation at advanced life support level (APLS, PALS or equivalent)
Prepare equipment & drugs for paediatric intubation
Demonstrate paediatric tracheal intubation
Secure venous access (including local anaesthesia pre-medication)
Manage mechanical ventilation in a critically ill child
Communicate effectively with, and attempt to reassure the child and parents
Recognise and manage paediatric emergencies until senior or more experienced help arrives
Manage and stabilise the injured child until senior or more experienced help arrives

ATTITUDES

Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

9.2 DESCRIBES NATIONAL LEGISLATION AND GUIDELINES RELATING TO CHILD PROTECTION AND THEIR RELEVANCE TO CRITICAL CARE

KNOWLEDGE

Key stages of physical and psychological development
Principles of communication (verbal and non-verbal) with children of different ages; awareness of the consequences of the language used to impart information
Legal and ethical aspects of caring for children
Issues of consent in children
National child protection guidelines
Impact of occupational and environmental exposures, socio-economic factors, and lifestyle factors on critical illness
Operation of local paediatric referral /retrieval services

ATTITUDES

Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

AGGREGATE SYLLABUS

DOMAIN 9: PAEDIATRIC CARE

KNOWLEDGE

Key stages of physical and psychological development
Major anatomical and physiological differences between adults and children
Pathophysiology and principles of management of disorders which are life-threatening to paediatric patients (determined by national case mix, but may include: acute respiratory failure, cardiac failure, trauma, severe infections including meningitis and epiglottitis, intoxications, metabolic disorders, seizures, croup, diarrhoea)
Paediatric management of conditions common to both children and adults (e.g. acute severe asthma, renal failure, trauma)
Paediatric resuscitation and the differences between adult and paediatric resuscitation
Principles of paediatric airway management: methods & techniques; calculation of tube sizes; selection of masks and airways
Principles of mechanical ventilation in a child Preparation for and methods of securing venous access
Intraosseous cannulation
Estimation of blood volume, replacement of fluid loss
Paediatric dosing of common emergency drugs
General principles for stabilising the critically ill or injured child until senior or more experienced help arrives
Operation of local paediatric referral /retrieval services
Principles of communication (verbal and non verbal) with children of different ages; awareness of the consequences of the language used to impart information
Legal and ethical aspects of caring for children Issues of consent in children
National child protection guidelines
Impact of occupational and environmental exposures, socio-economic factors, and life style factors on critical illness

SKILLS & BEHAVIOURS *(if paediatric patients are routinely managed in the adult ICU setting)*

Paediatric resuscitation at advanced life support level (APLS, PALS or equivalent)
Prepare equipment & drugs for paediatric intubation
Demonstrate paediatric tracheal intubation
Secure venous access (including local anaesthesia pre-medication)
Manage mechanical ventilation in a critically ill child
Communicate effectively with, and attempt to reassure the child and parents
Recognise and manage paediatric emergencies until senior or more experienced help arrives
Manage and stabilise the injured child until senior or more experienced help arrives

ATTITUDES

Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

Domain 10: Transport

10.1 Undertakes transport of the mechanically ventilated critically ill patient outside the ICU

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 safe patient transfer (before, during and after)
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 & BEHAVIOURS

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)
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

ATTITUDES

Appreciates the importance of communication between referring, transporting and receiving staff
Anticipates and prevents problems during transfer
Desire to minimise patient distress
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

N.B. There is only one competence in domain 10 therefore the aggregate syllabus is the same as Above

DOMAIN 11: PATIENT SAFETY AND HEALTH SYSTEMS MANAGEMENT

11.1 LEADS A DAILY MULTIDISCIPLINARY WARD ROUND

KNOWLEDGE

Roles of different members of the multidisciplinary team and local referral practices
Triage and management of competing priorities
Principles of crisis management, conflict resolution, negotiation and debriefing
Confidentiality and data protection - legal and ethical issues

SKILLS & BEHAVIOURS

Lead, delegate and supervise others appropriately according to experience and role
Demonstrate initiative in problem solving
Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
Confirm accuracy of clinical information provided by members of the health care team
Summarise a case history
Assemble clinical and laboratory data, logically compare all potential solutions to the patient's problems, prioritise them and establish a clinical management plan
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
Organise multidisciplinary care for groups of patients in the ICU
Collaborate with other team members to achieve common goals
Listen effectively
Professional and reassuring approach - generates confidence and trust in patients and their relatives

ATTITUDES

Accepts responsibility for patient care and staff supervision
Recognises impaired performance (limitations) in self and colleagues and takes appropriate action
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Consults, communicates and collaborates effectively with patients, relatives and the health care team
Desire to minimise patient distress
Seeks to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff
Establishes collaborative relations with other health care providers to promote continuity of patient care as appropriate
Consult and take into account the views of referring clinicians; promote their participation in decision making where appropriate
Ensures effective information transfer
Adopts a problem-solving approach
Enquiring mind, undertakes critical analysis of published literature

11.2 COMPLIES WITH LOCAL INFECTION CONTROL MEASURES

KNOWLEDGE

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
Recognition of patient groups at high risk of developing infectious complications
Autogenous infection: routes and methods of prevention
Cross infection: modes of transfer and common agents
Ventilator associated pneumonia: definition, pathogenesis and prevention
Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)
Requirements for microbiological surveillance and clinical sampling
Benefits and risks of different prophylactic antibiotic regimens
Local patterns of bacterial resistance and antibiotic policy
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)
Local policies and procedures relevant to practice
Published standards of care at local, national and international level (including consensus statements and care bundles)

SKILLS & BEHAVIOURS

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

Prescribe antibiotics safely and appropriately

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 11 - Please refer to competence 11.1 or the aggregate syllabus at the end of this section.

11.3 IDENTIFIES ENVIRONMENTAL HAZARDS AND PROMOTES SAFETY FOR PATIENTS AND STAFF

KNOWLEDGE
Principles of risk prevention
Physical requirements of ICU design
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, nitrous 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.
Equipment requirements and selection: clinical need & priority; accuracy, reliability, safety and practical issues (ease of use, acceptance by staff)
Critical incident or error monitoring
Confidentiality and data protection - legal and ethical issues
Local policies and procedures relevant to practice
Published standards of care at local, national and international level (including consensus statements and care bundles)
Identification and critical appraisal of literature; integration of findings into local clinical practice
Epidemiology and prevention of infection in the ICU
Risk of colonisation with potentially pathogenic micro-organisms and the factors associated with patient, staff, equipment and environmental colonisation
Types of organisms - emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between contamination, colonisation & infection
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
Benefits and risks of different prophylactic antibiotic regimens
Methods of sterilisation and cleaning or disposal of equipment
Infections from contaminated blood / body fluids; strategy if contaminated (e.g. needle stick injury)

SKILLS & BEHAVIOURS
Maximise safety in everyday practice
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
Seek expert help to ensure all equipment in the ICU conforms with and is maintained to the relevant safety standard
Document adverse incidents in a timely, detailed and appropriate manner

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 11 - Please refer to competence 11.1 or the aggregate syllabus at the end of this section.

11.4 IDENTIFIES AND MINIMISES THE RISK OF CRITICAL INCIDENTS AND ADVERSE EVENTS, INCLUDING COMPLICATIONS OF CRITICAL ILLNESS

KNOWLEDGE
Common sources of error and factors which contribute to critical incidents / adverse events (ICU environment, personnel, equipment, therapy and patient factors)
Principles of risk prevention
Pathogenesis, risk factors, prevention, diagnosis and treatment of complications of ICU management including: nosocomial infection ventilator associated pneumonia (VAP) ventilator associated lung injury -
pulmonary barotrauma pulmonary oxygen toxicity thromboembolism (venous, arterial, pulmonary, intracardiac) stress ulceration pain malnutrition critical illness poly-neuropathy, motor-neuropathy & myopathy
Modification of treatment or therapy to minimise the risk of complications and appropriate monitoring to allow early detection of complications
Risk of bleeding: indications, contraindications, monitoring and complications of therapeutic anticoagulants, thrombolytic and anti-thrombolytic agents
Recognition of patient groups at high risk for developing complications
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
Autogenous infection: routes and methods of prevention
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
Staff safety: susceptibility to harmful physical, chemical and infectious hazards in the ICU
Factors that determine the optimum staff establishment for specialist and junior medical staff, nurses and allied professional and non-clinical ICU staff
Methods of effective communication of information (written; verbal etc)
Confidentiality and data protection - legal and ethical issues
Principles of crisis management, conflict resolution, negotiation and debriefing
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
Critical incident or error monitoring
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
Published standards of care at local, national and international level (including consensus statements and care bundles)
Purpose and methods of clinical audit (e.g. mortality reviews, complication rates)
Identification and critical appraisal of literature; integration of findings into local clinical practice
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

SKILLS & BEHAVIOURS

Assemble clinical and laboratory data, logically compare all potential solutions to the patient's problems, prioritise them and establish a clinical management plan
Consider potential interactions when prescribing drugs & therapies
Record relevant clinical information accurately
Confirm accuracy of clinical information provided by members of the health care team
Monitor complications of critical illness
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
Aware of relevant guidelines and consensus statements and apply these effectively in every day practice under local conditions
Implement and evaluate protocols and guidelines
Participate in the processes of clinical audit, peer review and continuing medical education
Demonstrate an interest in quality control, audit and reflective practice
Manage inter-personal conflicts which arise between different sectors of the organisation, professionals, patients or relatives
Inform colleagues, patients and relatives as applicable, of medical errors or adverse events in an honest and appropriate manner
Document adverse incidents in a timely, detailed and appropriate manner
Maximise safety in everyday practice

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 11 - Please refer to competence 11.1 or the aggregate syllabus at the end of this section.

11.5 Organises a case conference

KNOWLEDGE

Roles of different members of the multidisciplinary team and local referral practices
Principles of crisis management, conflict resolution, negotiation and debriefing

SKILLS & BEHAVIOURS

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
Plan long-term multidisciplinary care for patients in the ICU
Collaborate with other team members to achieve common goals

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 11 - Please refer to competence 11.1 or the aggregate syllabus at the end of this section.

11.6 Critically appraises and applies guidelines, protocols and care bundles

KNOWLEDGE
Purpose and process of quality improvement activities such as evidence-based practice, best practice guidelines & benchmarking and change management
Purpose and methods of clinical audit (e.g. mortality reviews, complication rates)
Local policies and procedures relevant to practice
Published standards of care at local, national and international level (including consensus statements and care bundles)
Treatment algorithms for common medical emergencies
Recent advances in medical research relevant to intensive care
Identification and critical appraisal of literature; integration of findings into local clinical practice
Electronic methods of accessing medical literature
Principles of appraisal of evidence: levels of evidence; interventions; diagnostic tests; prognosis; integrative literature (meta-analyses, practice guidelines, decision & economic analyses)
Principles of applied research and epidemiology necessary to evaluate new guidelines / forms of therapy
Research methods (see basic sciences)
Statistical concepts (see basic sciences)

SKILLS & BEHAVIOURS
Demonstrate an interest in quality control, audit and reflective practice
Aware of relevant guidelines and consensus statements and apply these effectively in every day practice under local conditions
Implement and evaluate protocols and guidelines
Propose realistic initiatives / projects to promote improvement
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) to access information from the medical & scientific literature
Participate in the processes of clinical audit, peer review and continuing medical education
Recognise the need for clinical audit and quality improvement activities to be non-threatening and non- punitive to individuals
Manage resistance to change in the ICU / hospital environment in order to optimize the outcome of a task

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 11 - Please refer to competence 11.1 or the aggregate syllabus at the end of this section.

11.7 Describes commonly used scoring systems for assessment of severity of illness, case mix and workload

KNOWLEDGE
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. Glasgow Coma Scale, APACHE II and III, PRISM, organ system failure scores, injury severity scores)
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 (severity scoring systems)
Principles of case-mix adjustment
Principles of workforce planning
Factors that determine the optimum staff establishment for specialist and junior medical staff, nurses and allied professional and non-clinical ICU staff

ATTITUDES
The attitudes required for this competence are the same for all competencies in Domain 11 - Please refer to competence 11.1 or the aggregate syllabus at the end of this section.

11.8 Demonstrates an understanding of the managerial and administrative responsibilities of the ICM specialist

KNOWLEDGE
Principles of local / national health care provision; strategic planning of the ICU service (structure, function, financing) within the wider health care environment
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 administration and management
Physical requirements of ICU design
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
Difference between absolute requirement and possible benefit when applying expensive technology to critically ill patients

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
Principles of health economics, departmental budgeting, financial management and preparation of a business plan
Factors that determine the optimum staff establishment for specialist and junior medical staff, nurses and allied professional and non-clinical ICU staff
Principles of workforce planning
Practical application of equal opportunities legislation
Principles of national / local health care legislation applicable to ICM practice
Methods of effective communication of information (written; verbal etc)
Principles of crisis management, conflict resolution, negotiation and debriefing
Principles of risk prevention
Critical incident or error monitoring
Purpose and process of quality improvement activities such as evidence based practice, best practice guidelines & benchmarking and change management
Purpose and methods of clinical audit (e.g. mortality reviews, complication rates)
Recent advances in medical research relevant to intensive care
Identification and critical appraisal of literature; integration of findings into local clinical practice
Electronic methods of accessing medical literature
Principles of appraisal of evidence: levels of evidence; interventions; diagnostic tests; prognosis; integrative literature (meta-analyses, practice guidelines, decision & economic analyses)
Local policies and procedures relevant to practice
Published standards of care at local, national and international level (including consensus statements and care bundles)

SKILLS & BEHAVIOURS

Lead, delegate and supervise others appropriately according to experience and role
Contribute to departmental / ICU activities
Manage inter-personal conflicts which arise between different sectors of the organisation, professionals, patients or relatives
Propose realistic initiatives / projects to promote improvement
Document adverse incidents in a timely, detailed and appropriate manner
Manage resistance to change in the ICU / hospital environment in order to optimize the outcome of a task
Respect, acknowledge & encourage the work of others
Demonstrate an interest in quality control, audit and reflective practice

ATTITUDES

The attitudes required for this competence are the same for all competencies in Domain 11 - Please refer to competence 11.1 or the aggregate syllabus at the end of this section.

AGGREGATE SYLLABUS

DOMAIN 11: PATIENT SAFETY AND HEALTH SYSTEMS MANAGEMENT

KNOWLEDGE

Principles of local / national health care provision; strategic planning of the ICU service (structure, function, financing) within the wider health care environment
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 administration and management Physical requirements of ICU design
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
Difference between absolute requirement and possible benefit when applying expensive technology to critically ill patients
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
Principles of health economics, departmental budgeting, financial management and preparation of a business plan
Factors that determine the optimum staff establishment for specialist and junior medical staff, nurses and allied professional and non-clinical ICU staff
Principles of workforce planning
Practical application of equal opportunities legislation
Principles of national / local health care legislation applicable to ICM practice
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
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
Research methods (see basic sciences)
Statistical concepts (see basic sciences)
Principles of applied research and epidemiology necessary to evaluate new guidelines / forms of therapy 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)
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)
Critical incident or error monitoring
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 ventilator associated pneumonia (VAP) ventilator associated lung injury - pulmonary barotrauma pulmonary oxygen toxicity thromboembolism (venous, arterial, pulmonary, intracardiac) stress ulceration pain malnutrition critical illness poly-neuropathy, motor-neuropathy & myopathy
Risk of bleeding: indications, contraindications, monitoring and complications of therapeutic anticoagulants, thrombolytic and anti-thrombolytic agents
Modification of treatment or therapy to minimise the risk of complications and appropriate monitoring to allow early detection of complications
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)
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, nitrous 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. Glasgow Coma Scale, APACHE II and III, PRISM, organ system failure scores, injury severity scores)
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 (severity scoring systems)
Principles of case-mix adjustment

SKILLS & BEHAVIOURS

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
Aware 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) to access information from the medical & scientific literature
Recognise the need for clinical audit and quality improvement activities to be non-threatening and non-punitive 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

ATTITUDES

Accepts responsibility for patient care and staff supervision
Recognises impaired performance (limitations) in self and colleagues and takes appropriate action
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Consults, communicates and collaborates effectively with patients, relatives and the health care team
Desire to minimise patient distress
Seeks to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff
Establishes collaborative relations with other health care providers to promote continuity of patient care as appropriate
Consult and take into account the views of referring clinicians; promote their participation in decision making where appropriate
Ensures effective information transfer Adopts a problem solving approach

Enquiring mind, undertakes critical analysis of published literature

Domain 12: Professionalism

Communication skills

12.1 Communicates effectively with patients and relatives
12.2 Communicates effectively with members of the health care team
12.3 Maintains accurate and legible records / documentation

KNOWLEDGE
Consent and assent in the competent and non-competent patient
Confidentiality and data protection - legal and ethical issues
Methods of effective communication of information (written; verbal etc)
Principles of crisis management, conflict resolution, negotiation and debriefing
Principles of delivering bad news to patients and families
Strategies to communicate to the general population critical care issues and their impact on the maintenance and improvement of health care

SKILLS & BEHAVIOURS
Communicate with patients and relatives - give accurate information and re-iterate to ensure comprehension; clarify ambiguities
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
Communicate effectively with professional colleagues to obtain accurate information and plan care
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
Listen effectively

ATTITUDES
Integrity, honesty & respect for the truth underpin relationships with patients, relatives and colleagues
Establishes trusting relationships with and demonstrates compassionate care of patients and their relatives
Consults, communicates and collaborates effectively with patients, relatives and the health care team
Sensitive to the reactions and emotional needs of others
Approachable and accessible when on duty
Regards each patient as an individual
Willingness to communicate with and support families / significant others
Promotes respect for patient privacy, dignity and confidentiality
Acknowledges the consequences of the language used to impart information
Recognises that communication is a two-way process

Professional relationships with patients and relatives

12.4 Involves patients (or their surrogates if applicable) in decisions about care and treatment
12.5 Demonstrates respect of cultural and religious beliefs and an awareness of their impact on decision making
12.6 Respects privacy, dignity, confidentiality and legal constraints on the use of patient data

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
Methods of effective communication of information (written; verbal etc)
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

SKILLS & BEHAVIOURS
Communicate with patients and relatives - give accurate information and re-iterate to ensure comprehension; clarify ambiguities
Involve patients in decisions about their care and treatment
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
Professional and reassuring approach - generates confidence and trust in patients and their relatives
Manage inter-personal conflicts which arise between different sectors of the organisation, professionals, patients or relatives
Listen effectively

ATTITUDES

Integrity, honesty & respect for the truth underpin relationships with patients, relatives and colleagues
Establishes trusting relationships with and demonstrates compassionate care of patients and their relatives
Consults, communicates and collaborates effectively with patients, relatives and the health care team
Sensitive to the reactions and emotional needs of others
Assesses, communicates with, and supports patients and families confronted with critical illness
Sensitive to patients' expectations and responses; considers their perspective in order to understand their conduct and attitudes
Respects the cultural and religious beliefs of the patient; demonstrate an awareness of their impact on decision making
Respects the expressed wishes of competent patients
Regards each patient as an individual
Desire to minimise patient distress
Seeks to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff
Willingness to communicate with and support families / significant others
Promotes respect for patient privacy, dignity and confidentiality
Acknowledges the consequences of the language used to impart information
Recognises that communication is a two-way process

PROFESSIONAL RELATIONSHIPS WITH MEMBERS OF THE HEALTH CARE TEAM

12.7 COLLABORATES AND CONSULTS; PROMOTES TEAMWORKING
12.8 ENSURES CONTINUITY OF CARE THROUGH EFFECTIVE HAND-OVER OF CLINICAL INFORMATION
12.9 SUPPORTS CLINICAL STAFF OUTSIDE THE ICU TO ENABLE THE DELIVERY OF EFFECTIVE CARE
12.10 APPROPRIATELY SUPERVISES, AND DELEGATES TO OTHERS, THE DELIVERY OF PATIENT CARE

KNOWLEDGE

Methods of effective communication of information (written; verbal etc)
Management of information
Principles of crisis management, conflict resolution, negotiation and debriefing
Principles of professional appraisal and constructive feedback

SKILLS & BEHAVIOURS

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
Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
Manage inter-personal conflicts which arise between different sectors of the organisation, professionals, patients or relatives
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
Listen effectively
Respect, acknowledge & encourage the work of others

ATTITUDES

Integrity, honesty & respect for the truth underpin relationships with patients, relatives and colleagues
Consults, communicates and collaborates effectively with patients, relatives and the health care team
Sensitive to the reactions and emotional needs of others
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Recognises impaired performance (limitations) in self and colleagues and takes appropriate action
Approachable and accessible when on duty
Recognises personal strengths and limitations as a consultant to other specialists
Desire to minimise patient distress
Adopts a problem solving approach
Fosters effective communication and relationships with medical and nursing staff in other wards / departments
Seeks to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff
Accepts responsibility for patient care and staff supervision
Promotes respect for patient privacy, dignity and confidentiality
Recognises that communication is a two-way process
Generates enthusiasm amongst others

Desire and willingness to share knowledge
Contributes effectively to interdisciplinary team activities.
Participates in, and promotes continuing education of members of the multi-disciplinary health care team

SELF GOVERNANCE

12.11 TAKES RESPONSIBILITY FOR SAFE PATIENT CARE

12.12 FORMULATES CLINICAL DECISIONS WITH RESPECT FOR ETHICAL AND LEGAL PRINCIPLES

12.13 SEEKS LEARNING OPPORTUNITIES AND INTEGRATES NEW KNOWLEDGE INTO CLINICAL PRACTICE

12.14 PARTICIPATES IN MULTIDISCIPLINARY TEACHING

12.15 PARTICIPATES IN RESEARCH OR AUDIT UNDER SUPERVISION

KNOWLEDGE

Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Ethical and legal issues in decision-making for the incompetent patient
Confidentiality and data protection - legal and ethical issues
Management of information
Methods of effective communication of information (written; verbal etc)
Principles of crisis management, conflict resolution, negotiation and debriefing
Principles of professional appraisal and constructive feedback
Principles of adult education and factors that promote learning
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 local clinical practice
Principles of appraisal of evidence: levels of evidence; interventions; diagnostic tests; prognosis; integrative literature (meta-analyses, practice guidelines, decision & economic analyses)
Principles of applied research and epidemiology necessary to evaluate new guidelines / forms of therapy
Principles of medical research: research questions; protocol design; power analysis, data collection, data analysis and interpretation of results; manuscript preparation and publication rules.
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 & BEHAVIOURS

Attentive to detail, punctual, reliable, polite and helpful
Take decisions at a level commensurate with experience; accept the consequences of these decisions
Lead, delegate and supervise others appropriately according to experience and role
Collaborate with other team members to achieve common goals
Contribute to departmental / ICU activities
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 (e.g. PubMed) 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
Participate appropriately in educational activities and teaching medical and non-medical members of the health care team
Demonstrate initiative in problem solving
Listen effectively

ATTITUDES

Integrity, honesty & respect for the truth underpin relationships with patients, relatives and colleagues
Takes responsibility for his/her personal physical and mental health, especially where impairment may affect patient care and professional conduct
Consults, communicates and collaborates effectively with patients, relatives and the health care team
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Recognises impaired performance (limitations) in self and colleagues and takes appropriate action
Participates in and promotes continuing education of members of the multi-disciplinary health care team.
Enquiring mind, undertakes critical analysis of published literature
Recognises and uses teaching and learning opportunities arising from clinical experiences, including errors
Recognises personal strengths and limitations as a consultant to other specialists
Recognises and manages circumstances where personal prejudices or biases may affect behaviour, including cultural, financial and academic aspects
Accepts responsibility for patient care and staff supervision
Promotes respect for patient privacy, dignity and confidentiality
Well-being of the patient takes precedence over the needs of society or research
Desire to contribute to the development of new knowledge
Seeks to recognise those changes in the specialty, medicine or society, which should modify their practice and adapt their skills accordingly.
Desire and willingness to share knowledge

AGGREGATE SYLLABUS

DOMAIN 12: PROFESSIONALISM

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
Methods of effective communication of information (written; verbal etc)
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, data analysis and 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 & BEHAVIOURS

Communicate with patients and relatives - give accurate information and re-iterate to ensure comprehension; clarify ambiguities
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
Listen effectively
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
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

ATTITUDES

Well-being of the patient takes precedence over the needs of society or research
Desire to contribute to the development of new knowledge
Seeks to recognise those changes in the specialty, medicine or society, which should modify their practice and adapt their skills accordingly
Integrity, honesty & respect for the truth underpin relationships with patients, relatives and colleagues
Establishes trusting relationships with and demonstrates compassionate care of patients and their relatives
Consults, communicates and collaborates effectively with patients, relatives and the health care team Sensitive to the reactions and emotional needs of others
Approachable and accessible when on duty
Regards each patient as an individual
Willingness to communicate with and support families / significant others
Promotes respect for patient privacy, dignity and confidentiality
Acknowledges the consequences of the language used to impart information
Recognises that communication is a two-way process
Assesses, communicates with, and supports patients and families confronted with critical illness
Sensitive to patients' expectations and responses; considers their perspective in order to understand their conduct and attitudes
Respects the cultural and religious beliefs of the patient; demonstrate an awareness of their impact on decision making
Respects the expressed wishes of competent patients
Desire to minimise patient distress
Seeks to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Recognises impaired performance (limitations) in self and colleagues and takes appropriate action
Recognises personal strengths and limitations as a consultant to other specialists
Adopts a problem-solving approach
Fosters effective communication and relationships with medical and nursing staff in other wards / departments
Accepts responsibility for patient care and staff supervision
Generates enthusiasm amongst others
Desire and willingness to share knowledge
Contributes effectively to interdisciplinary team activities.
Participates in and promotes continuing education of members of the health care team.
Takes responsibility for his/her personal physical and mental health, especially where impairment may affect patient care and professional conduct
Enquiring mind, undertakes critical analysis of published literature
Recognises and uses teaching and learning opportunities arising from clinical experiences, including errors
Recognises and manages circumstances where personal prejudices or biases may affect behaviour, including cultural, financial and academic aspects

BASIC SCIENCES

ANATOMY

RESPIRATORY SYSTEM:
Mouth, nose, pharynx, larynx, trachea, main bronchi, segmental bronchi, structure of bronchial tree: differences in the child
Airway and respiratory tract, blood supply, innervation and lymphatic drainage
Pleura, mediastinum and its contents
Lungs, lobes, microstructure of lungs
Diaphragm, other muscles of respiration, innervation
The thoracic inlet and 1st rib
Interpretation of a chest x-ray

CARDIOVASCULAR SYSTEM:
Heart, chambers, conducting system, blood and nerve supply
Congenital deviations from normal anatomy
Pericardium
Great vessels, main peripheral arteries and veins Foetal and maternal-foetal circulation

NERVOUS SYSTEM:
Brain and its subdivisions
Spinal cord, structure of spinal cord, major ascending and descending pathways
Spinal meninges, subarachnoid and extradural space, contents of extradural space.
Cerebral blood supply CSF and its circulation
Spinal nerves, dermatomes
Brachial plexus, nerves of arm
Intercostal nerves
Nerves of abdominal wall
Nerves of leg and foot
Autonomic nervous system
Sympathetic innervation, sympathetic chain, ganglia and plexuses
Parasympathetic innervation.
Stellate ganglion
Cranial nerves: base of skull: trigeminal ganglion
Innervation of the larynx
Eye and orbit

VERTEBRAL COLUMN:
Cervical, thoracic, and lumbar vertebrae Interpretation of cervical spinal imaging in trauma
Sacrum, sacral hiatus
Ligaments of vertebral column
Surface anatomy of vertebral spaces, length of cord in child and adult

SURFACE ANATOMY:
Structures in antecubital fossa
Structures in axilla: identifying the brachial plexus
Large veins and anterior triangle of neck
Large veins of leg and femoral triangle
Arteries of arm and leg
Landmarks for tracheostomy, cricothyrotomy
Abdominal wall (including the inguinal region): landmarks for suprapubic urinary and peritoneal lavage catheters
Landmarks for intrapleural drains and emergency pleurocentesis
Landmarks for pericardiocentesis

ABDOMEN:
Gross anatomy of intra-abdominal organs
Blood supply to abdominal organs and lower body

PHYSIOLOGY & BIOCHEMISTRY GENERAL:

Organisation of the human body and homeostasis
Variations with age
Function of cells; genes and their expression
Mechanisms of cellular and humoral defence
Cell membrane characteristics; receptors: Protective mechanisms of the body
Genetics & disease processes

BIOCHEMISTRY:
Acid base balance and buffers Ions e.g. Na^{+} , K^{+}, Ca^{++} , Cl^{-}, HCO_3^{-}, Mg^{++}, PO_4^{-}
Cellular and intermediary metabolism; variations between organs
Enzymes

BODY FLUIDS:
Capillary dynamics and interstitial fluid
Oncotic pressure
Osmolarity: osmolality, partition of fluids across membranes
Lymphatic system
Special fluids: cerebrospinal, pleural, pericardial and peritoneal fluids

HAEMATOLOGY & IMMUNOLOGY:
Red blood cells: haemoglobin and its variants
Blood groups
Haemostasis and coagulation; pathological variations
White blood cells
Inflammation and its disorders
Immunity and allergy

MUSCLE:
Action potential generation and its transmission
Neuromuscular junction and transmission
Muscle types
Skeletal muscle contraction
Motor unit
Muscle wasting
Smooth muscle contraction: sphincters

HEART & CIRCULATION:
Cardiac muscle contraction
The cardiac cycle: pressure and volume relationships
Rhythmicity of the heart
Regulation of cardiac function; general and cellular
Control of cardiac output (including the Starling relationship)
Fluid challenge and heart failure
Electrocardiogram and arrhythmias
Neurological and humoral control of systemic blood pressures, blood volume and blood flow (at rest and during physiological disturbances e.g. exercise, haemorrhage and Valsalva manoeuvre)
Peripheral circulation: capillaries, vascular endothelium and arteriolar smooth muscle
Autoregulation and the effects of sepsis and the inflammatory response on the peripheral vasculature
Characteristics of special circulations including pulmonary, coronary, cerebral, renal, portal and foetal

RENAL TRACT:
Blood flow, glomerular filtration and plasma clearance
Tubular function and urine formation
Endocrine functions of kidney
Assessment of renal function
Regulation of fluid and electrolyte balance
Regulation of acid-base balance
Micturition
Pathophysiology of acute renal failure

RESPIRATION:
Gaseous exchange: O_2 and CO_2 transport, hypoxia and hyper- and hypocapnia, hyper-and hypobaric pressures
Functions of haemoglobin in oxygen carriage and acid-base equilibrium
Pulmonary ventilation: volumes, flows, dead space.
Effect of IPPV and PEEP on lungs and circulation
Mechanics of ventilation: ventilation/perfusion abnormalities
Control of breathing, acute and chronic ventilatory failure, effect of oxygen therapy
Non-respiratory functions of the lungs
Cardio-respiratory interactions in health & disease

NERVOUS SYSTEM:
Functions of nerve cells: action potentials, conduction, synaptic mechanisms and transmitters
The brain: functional divisions
Intracranial pressure: cerebrospinal fluid, blood flow
Maintenance of posture
Autonomic nervous system: functions
Neurological reflexes Motor function: spinal and peripheral receptor: receptors, nociception, special receptor
Pain: afferent nociceptive pathways, dorsal horn, peripheral and central mechanisms, neuromodulatory systems, supraspinal mechanisms, visceral pain, neuropathic pain, influence of therapy on nociceptive mechanisms
Spinal cord: anatomy and blood supply, effects of spinal cord section

LIVER:
Functional anatomy and blood supply
Metabolic functions
Tests of function

GASTROINTESTINAL:
Gastric function; secretions, nausea and vomiting
Gut motility, sphincters and reflex control
Digestive functions and enzymes
Nutrition: calories, nutritional fuels and sources, trace elements, growth factors

METABOLISM AND NUTRITION:
Nutrients: carbohydrates, fats, proteins, vitamins, minerals and trace elements
Metabolic pathways, energy production and enzymes; metabolic rate
Hormonal control of metabolism: regulation of plasma glucose, response to trauma
Physiological alterations in starvation, obesity, exercise and the stress response
Body temperature and its regulation

ENDOCRINOLOGY:
Mechanisms of hormonal control: feedback mechanisms, effect on membrane and intracellular receptors
Central neuro-endocrine interactions
Adrenocortical hormones
Adrenal medulla: adrenaline (epinephrine) and noradrenaline (norepinephrine)
Pancreas: insulin, glucagon and exocrine function
Thyroid and parathyroid hormones and calcium homeostasis

PREGNANCY:
Physiological changes associated with a normal pregnancy and delivery
Materno-foetal, foetal and neonatal circulation
Functions of the placenta: placental transfer Foetus: changes at birth

PHARMACOLOGY

PRINCIPLES OF PHARMACOLOGY:
Dynamics of drug-receptor interaction
Agonists, antagonists, partial agonists, inverse agonists

Efficacy and potency
Tolerance
Receptor function and regulation
Metabolic pathways; enzymes; drug: enzyme interactions; Michaelis-Menten equation
Enzyme inducers and inhibitors.
Mechanisms of drug action Ion channels: types: relation to receptors.
Gating mechanisms.
Signal transduction: cell membrane/receptors/ion channels to intracellular molecular targets, second messengers
Action of gases and vapours Osmotic effects
pH effects
Adsorption and chelation Mechanisms of drug interactions:
Inhibition and promotion of drug uptake.
Competitive protein binding.
Receptor inter-actions.
Effects of metabolites and other degradation products.

PHARMACOKINETICS & PHARMACODYNAMICS

Drug uptake from: gastrointestinal tract, lungs, nasal, transdermal, subcutaneous, IM, IV, epidural and intrathecal routes
Bioavailability
Factors determining the distribution of drugs: perfusion, molecular size, solubility, protein binding.
The influence of drug formulation on disposition
Distribution of drugs to organs and tissues:
Body compartments Influence of specialised membranes: tissue binding and solubility
Materno-foetal distribution
Distribution in CSF and extradural space
Modes of drug elimination:
Direct excretion
Metabolism in organs of excretion: phase I & II mechanisms
Renal excretion and urinary pH
Non-organ breakdown of drugs
Pharmacokinetic analysis:
Concept of a pharmacokinetic compartment
Apparent volume of distribution
Orders of kinetics
Clearance concepts applied to whole body and individual organs Simple 1 and 2 compartmental models:
Concepts of wash-in and washout curves
Physiological models based on perfusion and partition coefficients
Effect of organ blood flow: Fick principle
Pharmacokinetic variation: influence of body size, sex, age, disease, pregnancy, anaesthesia, trauma, surgery, smoking, alcohol and other drugs
Effects of acute organ failure (liver, kidney) on drug elimination Influence of renal replacement therapies on clearance of commonly used drugs
Pharmacodynamics: concentration-effect relationships: hysteresis
Pharmacogenetics: familial variation in drug response
Adverse reactions to drugs: hypersensitivity, allergy, anaphylaxis, anaphylactoid reactions

SYSTEMIC PHARMACOLOGY

Hypnotics, sedatives and intravenous anaesthetic agents Simple analgesics
Opioids and other analgesics; Opioid antagonists Non-steroidal anti-inflammatory drugs
Neuromuscular blocking agents (depolarising and non-depolarising) and anti-cholinesterases
Drugs acting on the autonomic nervous system (including inotropes, vasodilators, vasoconstrictors, antiarrhythmics, diuretics)
Drugs acting on the respiratory system (including respiratory stimulants and bronchodilators)
Antihypertensives
Anticonvulsants Anti-diabetic agents Diuretics
Antibiotics
Corticosteroids and other hormone preparations Antacids. Drugs influencing gastric secretion and motility
Antiemetic agents
Local anaesthetic agents Immunosuppressants
Principles of therapy based on modulation of inflammatory mediators indications, actions and limitations
Plasma volume expanders
Antihistamines Antidepressants Anticoagulants
Vitamins A-E, folate, B12

PHYSICS & CLINICAL MEASUREMENT

MATHEMATICAL CONCEPTS: Relationships and graphs
Concepts of exponential functions and logarithms: wash-in and washout
Basic measurement concepts: linearity, drift, hysteresis, signal: noise ratio, static and dynamic response
SI units: fundamental and derived units
Other systems of units where relevant to ICM (e.g. mmHg, bar, atmospheres)
Simple mechanics: Mass, Force, Work and Power

GASES & VAPOURS:

Absolute and relative pressure.
The gas laws; triple point; critical temperature and pressure
Density and viscosity of gases.
Laminar and turbulent flow; Poiseuille's equation, the Bernoulli principle
apour pressure: saturated vapour pressure
Measurement of volume and flow in gases and liquids.
The pneumotachograph and other respirometers.
Principles of surface tension

ELECTRICITY & MAGNETISM:

Basic concepts of electricity and magnetism.
Capacitance, inductance and impedance
Amplifiers: bandwidth, filters
Amplification of biological potentials: ECG, EMG, EEG.
Sources of electrical interference
Processing, storage and display of physiological measurements
Bridge circuits

ELECTRICAL SAFETY:
Principles of cardiac pacemakers and defibrillators : Electrical hazards: causes and prevention.
Electrocution, fires and explosions. Diathermy and its safe use
Basic principles and safety of lasers
Basic principles of ultrasound and the Doppler effect

PRESSURE & FLOW MONITORING:
Principles of pressure transducers
Resonance and damping, frequency response
Measurement and units of pressure.
Direct and indirect methods of blood pressure measurement; arterial curve analysis
Principles of pulmonary artery and wedge pressure measurement
Cardiac output: Fick principle, thermodilution

CLINICAL MEASUREMENT:
Measurement of gas and vapour concentrations, (oxygen, carbon dioxide, nitrous oxide, and volatile anaesthetic agents) using infrared, paramagnetic, fuel cell, oxygen electrode and mass spectrometry
methods
Measurement of H^+, pH, pCO_2 , pO_2
Measurement CO_2 production/ oxygen consumption/ respiratory quotient
Colligative properties: osmometry
Simple tests of pulmonary function e.g. peak flow measurement, spirometry
Capnography
Pulse oximetry
Measurement of neuromuscular blockade
Measurement of pain

RESEARCH METHODS

DATA COLLECTION:
Simple aspects of study design (research question, selection of the method of investigation, population, intervention, outcome measures)
Power analysis
Defining the outcome measures and the uncertainty of measuring them
The basic concept of meta-analysis and evidence based medicine

DESCRIPTIVE STATISTICS:
Types of data and their representation
The normal distribution as an example of parametric distribution
Indices of central tendency and variability

DEDUCTIVE & INFERENTIAL STATISTICS:
Simple probability theory and the relation to confidence intervals
The null hypothesis.
Choice of simple statistical tests for different data types
Type I and type II errors
Inappropriate use of statistics