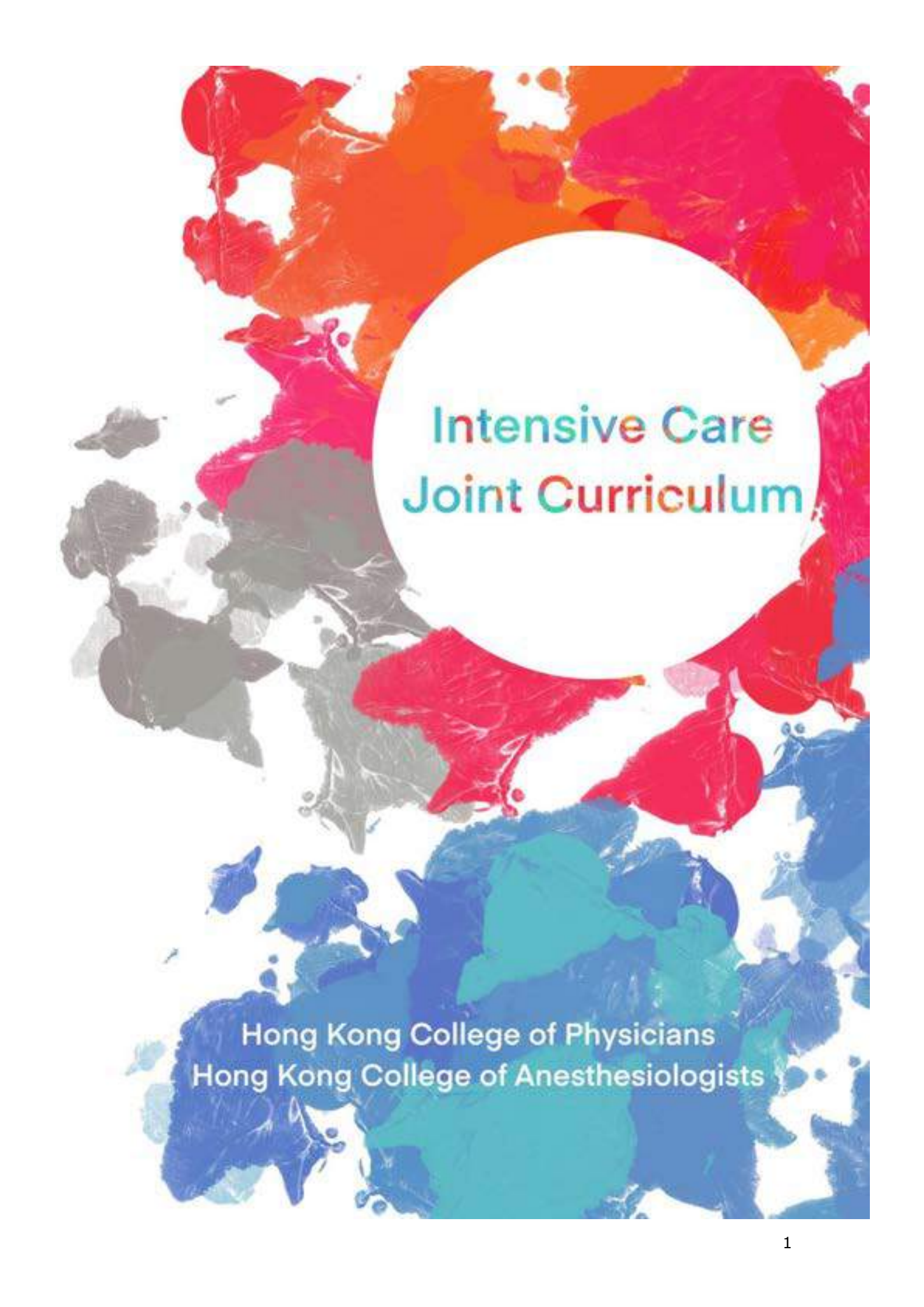




Intensive Care Joint Curriculum

Hong Kong College of Physicians
Hong Kong College of Anesthesiologists

Preface

The Intensive Care training program under the Hong Kong College of Anaesthesiologist (HKCA) and the Critical Care Medicine training program under the Hong Kong College of Physicians (HKCP) have been in place for over 2 decades. We have together trained over one hundred specialists under these programs and we are proud to say that the quality of our training has been comparable to international standard. Because of our different origins and evolution, there exist significant differences amongst the two programs. A survey performed by the Hong Kong Society of Critical Care Medicine, which involved not only medical practitioners working in intensive care units but those of other disciplines, supported the harmonisation of the two curriculums¹. With the support of the Hong Kong Academy of Medicine and the councils of the two colleges, the Joint Curriculum Workgroup on Intensive Care (JWGIC) was formed in 2018. The JWGIC reports to the councils of HKCP and HKCA through the Board of Critical Care Medicine (BOCCM) and the Board of Intensive Care Medicine (BOICM) respectively, and its missions are:

1. To ensure the similarity in standard of professional training under the two Boards;
2. To improve effectiveness of training in intensive care through application of principles of modern education;
3. To safeguard the sustainability of the new training curriculum.

The JWGIC decided that our training programs should be harmonised by both moving towards competency-based medical education (CBME). CBME is an approach to preparing specialists for practice that is fundamentally oriented to graduate outcome abilities and organised around competencies derived from an analysis of societal and patient needs. It de-emphasized time-based training and promises greater accountability, flexibility and learner-centredness ². This is an important paradigm shift from the existing practice which focuses on the process instead of the outcome of training.

In order to facilitate CBME, it is necessary to define the competencies of specialists in intensive care/critical care medicine so that both trainees and trainers understand the expected outcomes. The purpose of this syllabus is to fulfill that need. We would like to take this opportunity to acknowledge the European Society of Intensive Care Medicine for their generosity in granting us the right to use and modify the CoBaTrICE (Competency Based Training in Intensive Care Medicine in Europe) syllabus³ to suit our local situation. The CoBaTrICE syllabus was developed through a vigorous process and is currently adopted by many European countries ^{4,5}. We would also thank our colleagues in the Syllabus Review Taskforce who, under the leadership of Dr. George WY Ng, reviewed the syllabus meticulously and made a few essential modifications to ensure that it is applicable to Hong Kong.

Meaningful assessment of competence is critical for the implementation of effective CBME⁶. The BOCCM and BOICM are going to introduce workplace based assessment (WBA) as an educational tool to facilitate learning ⁷. This syllabus is an indispensable resource in WBA. We hope this syllabus is the beginning of our long journey to link the two professional boards together and achieve the missions of the JWGIC.

Dr. Philip KN Lam, Co-Chairman of JWGIC & Chairman of BOCCM, HKCP

Dr. HY So, Co-Chairman of JWGIC & Chairman of BOICM, HKCA

8th June 2021.

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Contents

	Domain	Page
1.	Resuscitation and Initial Management of the Acutely Ill Patient	9-23
2.	Diagnosis: Assessment, Investigation, Monitoring and Data Interpretation	24-36
3.	Disease Management	37-58
4.	Therapeutic Interventions and Organ System Support in Single or Multiple Organ Failure	59-76
5.	Practical Procedures	77-102
6.	Perioperative Care	103-114
7.	Comfort and Recovery	115-123
8.	End of Life Care	124-130
9.	Professionalism	131-140
10.	Transport	141-142
11.	Patient Safety and Health System Management	143-156

Domain	Competencies
1. Resuscitation and Initiation Management of the Acutely Ill Patient	
	1.1. Adopt a structured and timely approach to the recognition, assessment and stabilization of the acutely ill patient with disordered physiology 1.2. Manage cardiopulmonary resuscitation 1.3. Manage the patient post-resuscitation 1.4. Triage and prioritise patients appropriately, including timely admission to ICU 1.5. Assess and provide initial management of the trauma patient 1.6. Assess and provide initial management of the patient with burns 1.7. Describe the management of mass casualties
2. Diagnosis: Assessment, Investigation, Monitoring and Data Interpretation	
	2.1. Obtain a history and perform an accurate clinical examination 2.2. Undertake timely and appropriate investigations 2.3. Describe indications for echocardiography (transthoracic /trans oesophageal) 2.4. Perform electrocardiography (ECG) and interpret the results 2.5. Obtain appropriate microbiological samples and interpret results 2.6. Obtain and interpret results from blood gas samples 2.7. Interpret clinical imaging 2.8. Monitor and respond to trends in physiological variables
3. Disease Management	
	3.1. Manage the care of the critically ill patient with specific acute medical conditions 3.2. Identify the implications of chronic and co-morbid disease in the acutely ill patient 3.3. Recognise and manage the patient with circulatory failure 3.4. Recognise and manage the patient with, or at risk of, acute renal failure 3.5. Recognise and manage the patient with circulatory failure, or at risk of, acute liver failure 3.6. Recognise and manage the patient with neurological impairment 3.7. Recognise and manage the patient with acute gastrointestinal failure 3.8. Recognise and manage the patient with acute lung injury syndromes (ALI/ARDS) 3.9. Recognise and manage the septic patient 3.10. Recognise and manage the patient following intoxication with drugs or environmental toxin 3.11. Recognise life-threatening maternal peripartum complications and manage care under supervision

4. Therapeutic Interventions and Organ System Support in Single or Multiple Organ Failure

- 4.1. Prescribe drugs and therapies safely
- 4.2. Manage antimicrobial drug therapy
- 4.3. Administer blood and blood products safely
- 4.4. Use fluids and vasoactive/inotropic drugs to support circulation
- 4.5. Describe the use of mechanical assist devices to support the circulation
- 4.6. Initiate, manage and wean patient from invasive and non-invasive ventilatory support
- 4.7. Initiate, manage, and wean patient from renal replacement therapy
- 4.8. Recognise and manage electrolyte, glucose and acid-base disturbances
- 4.9. Co-ordinate and provide nutritional assessment and support
- 4.10. Use of hyperbaric oxygen therapy

5. Practical Procedures

Respiratory System

- 5.1. Administer oxygen using a variety of administrative devices
- 5.2. Perform fiberoptic laryngoscopy under supervision
- 5.3. Perform emergency airway management
- 5.4. Perform difficult and failed airway management according to local protocols
- 5.5. Perform endotracheal suction
- 5.6. Perform fiberoptic bronchoscopy and BAL in the intubated patient under supervision
- 5.7. Perform percutaneous tracheostomy under supervision
- 5.8. Perform thoracentesis via a chest drain

Cardiovascular System

- 5.1. Perform peripheral venous catheterization
- 5.2. Perform arterial catheterisation
- 5.3. Describe ultrasound techniques for vascular localization
- 5.4. Perform central venous catheterisation
- 5.5. Perform defibrillation and cardioversion
- 5.6. Perform cardiac pacing (transvenous or transthoracic)
- 5.7. Describe how to perform pericardiocentesis
- 5.8. Demonstrate a method for measuring cardiac output and derived haemodynamic variables

Central Nervous System

- 5.9. Perform lumbar puncture (intradural/"spinal") under supervision
- 5.10. Manage the administration of analgesia via an epidural catheter

	<i>Gastrointestinal System</i> 5.11. Perform nasogastric tube placement 5.12. Perform abdominal paracentesis 5.13. Describe Sengstaken tube (or equivalent) placement 5.14. Describe indications for, and safe conduct of gastroscopy <i>Genitourinary System</i> 5.15. Perform urinary catheterisation
6. Perioperative Care	
	6.1. Manage the pre-post-operative care of the high risk surgical patient 6.2. Manage the care of the patient following cardiac surgery under supervision 6.3. Manage the care of the patient following craniotomy under supervision 6.4. Manage the care of the patient following solid organ transplantation under supervision 6.5. Manage the pre- and post-operative care of the trauma patient under supervision
7. Comfort and Recovery	
	7.1. Identify and attempt to minimize the physical and psychosocial consequences of critical illness for patients and families 7.2. Manage the assessment, prevention and treatment of pain and delirium 7.3. Manage sedation and neuromuscular blockade 7.4. Communicate the continuing care requirements of patients at ICU discharge to health care professionals, patients and relatives 7.5. Manage the safe and timely discharge of patients from the ICU
8. End of Life Care	
	8.1. Manage the process of withholding or withdrawing treatment with the multidisciplinary team 8.2. Discuss end of life care with patients and their families/surrogates 8.3. Manage palliative care of the critically ill patient 8.4. Perform brain-stem death testing 8.5. Manage the physiological support of the organ donor
9. Professionalism	
	<i>Communication Skills</i> 9.1. Communicate effectively with patients and relatives 9.2. Communicate effectively with members of the health care team 9.3. Maintain accurate and legible records/documentation

	<i>Professional Relationships with Patients and Relatives</i> 9.4. Involve patients (or their surrogates if applicable) in decisions about care and treatment 9.5. Demonstrate respect of cultural and religious beliefs and an awareness of their impact on decision making 9.6. Respect privacy, dignity, confidentiality and legal constraints on the use of patient data <i>Professional Relationship</i> 9.7. Collaborate and consult; promote team-working 9.8. Ensure continuity of care through effective hand-over of clinical information 9.9. Support clinical staff outside the ICU to enable the delivery of effective care 9.10. Appropriately supervise, and delegate to others, the delivery of patient care <i>Self-Governance</i> 9.11. Takes responsibility for safe patient care 9.12. Formulate clinical decisions with respect for ethical and legal principles 9.13. Seeks learning opportunities and integrates new knowledge into clinical practice 9.14. Participate in multidisciplinary teaching 9.15. Participate in research or audit under supervision
10. Transport	
	10.1. Undertakes transport of the mechanically ventilated critically ill patient outside the ICU
11. Patient Safety and Health Systems Management	
	11.1. Lead a daily multidisciplinary ward round 11.2. Comply with local infection control measures 11.3. Identify environmental hazards and promote safety for patients and staff 11.4. Identify and minimize risk of critical incidents and adverse events, including complications of critical illness 11.5. Organise a case conference 11.6. Critically appraise and apply guidelines, protocols and care bundles 11.7. Describe commonly used scoring systems for assessment of severity of illness, casemix and workload 11.8. Demonstrate an understanding of the managerial and administrative responsibilities of the ICM specialist

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

1.1. Adopt a structured and timely approach to the recognition, assessment and stabilization 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 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
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

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 analgesia

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

Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

Rapid response and resuscitation

Appreciate the importance of timely institution of organ-system support

Recognise 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

Recognise personal limitations, seek and accept assistance or supervision (knows how, when and who to ask)

1.2. Manage 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 i.e. ACLS guideline or equivalent) 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 (including 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

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

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.
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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 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. Triage and Prioritise 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,

SKILLS & BEHAVIOURS

Consider legal and ethical issues: patient autonomy, appropriateness of resuscitation and ICU admission.

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 communicate 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 - generate 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. Assess and Provide 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

Management guideline of trauma patients (e.g. ATLS or equivalent)

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 pelvic 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 radionuclide 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 cannula, 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)

Indications of surgical method 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

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. Assess and Provide 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

Management of skin graft

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

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 (including 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 Appreciate the importance of timely institution of organ-system support Recognise 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 Establish trusting relationships with and demonstrates compassionate care of patients and their relatives
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DOMAIN 2: DIAGNOSIS: ASSESSMENT, INVESTIGATION, MONITORING AND DATA INTERPRETATION

2.1. Obtain a History and Perform 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	- Consult, communicate and collaborate effectively with patients, relatives and the health care team - Promote respect for patient privacy, dignity and confidentiality - Avoid extensive invasive procedures or monitoring which cannot be adequately interpreted at the bedside - Minimise patient discomfort in relation to monitoring devices - Respond rapidly to acute changes in monitored variables - Ensure safe and appropriate use of equipment - Support other staff in the correct use of devices - Consider patient comfort during procedures / investigations

Avoid unnecessary tests Demonstrate compassionate care of patients and relatives Desire to minimise patient distress Recognise personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

2.2. Undertake 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:

- Respiratory function tests
- Intrathoracic pressure (oesophageal pressure)
- Diagnostic bronchoscopy
- Diagnostic ECG
- Fluid input-output monitoring
- Focused USG lungs and abdomen
- Viscoelastic tests of coagulation
- Echocardiography
- Basic principles of ultrasound and the Doppler
- Electroencephalogram (EEG) and evoked potentials
- Intra-abdominal pressure monitoring

Invasive & non-invasive systems available for measuring cardiac output and derived haemodynamic variables, 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 (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
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. Describe 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

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 sect

2.4. Perform Electrocardiography (ECG) and Interpret 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. Obtain Appropriate Microbiological Samples and Interpret 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
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

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. Obtain and Interpret Results from Blood Gas

KNOWLEDGE

Methods and routes of obtaining samples - associated indications and complications
 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. Interpret Clinical Imagings

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 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 Importance of clinical history and signs in making diagnosis Basic interpretation of radiological investigations: - Neck 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)
SKILLS & BEHAVIOURS	Communicate effectively with radiological colleagues to plan, perform and interpret test results Integrate clinical findings with results of investigations. 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. Monitor and Respond 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
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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 electro-manometer 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 and limitations, physiological parameters and waveform interpretation

Invasive and non-invasive systems available for measuring cardiac output and derived haemodynamic variables, 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 CO₂ monitoring, and relationship between end tidal CO₂ and arterial pCO₂ in various clinical circumstances

Methods for assessing pain and sedation

Methods for assessing neurological function

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 O₂, CO₂ and NO
- Intracranial pressure monitoring
- Regional oximetry 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

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 electro-manometer 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, principles involved and the type and site of placement of the monitoring device

Interpretation of, relationships between, sources of error and limitations of measured and derived cardiovascular variables including pressure, flow, volume and gas transport

Methods for measuring temperature

Principles, indications and limitations of pulse oximetry

Principles of ECG monitoring (heart rate, rhythm, conduction, ST segment change & QT interval) - indications, limitations and techniques. Advantages and disadvantages of different lead configurations

Clinical measurement: pH, pCO₂, pO₂, SaO₂, FiO₂, CO₂ production, oxygen consumption, respiratory quotient

Principles of monitoring ventilation - significance of respiratory rate, tidal volume, minute volume, mean, peak, end expiratory and plateau pressure, intrinsic and extrinsic PEEP, inspired oxygen concentration, arterial blood gas and acid base status; relationship between mode of ventilation and choice of parameters monitored; airflow and airway pressure waveforms

Physical principles, indications and limitations of end tidal CO₂ monitoring, and relationship between end tidal CO₂ and arterial pCO₂ in various clinical circumstances

Pre-analytical errors of arterial blood gas sampling (choice of sample site, sampling device, heparin, mixing, storage and transport)

Homeostatic regulation of acid base balance and buffer ions (e.g. Na⁺, K⁺, Ca⁺⁺, Cl⁻, HCO₃⁻, Mg⁺⁺, PO₄⁻)

Respiratory physiology: gas exchange, O₂ and CO₂ transport, hypoxia, hypo- and hypercarbia, functions of haemoglobin in oxygen carriage and acid-base balance

Renal physiology: regulation of fluid and electrolyte balance

Methods for assessing pain and sedation

Methods for assessing neurological function e.g. Glasgow Coma Scale

Systems available for intracranial pressure monitoring - indications, principles, type and site of placement of the monitoring device, data collection and trouble-shooting

Indications and techniques of jugular bulb oximetry

Principles, including indications, limitations and therapeutic modalities of basic radiological methods, CT scanning, MRI, ultrasound, angiography and radio nucleotide studies in the critically ill patient

Risks to patient and staff of radiological procedures and precautions to minimise risk

Indications for and basic interpretation of chest radiographs: range of normal features on a chest x-ray; collapse, consolidation, infiltrates (including 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:

- Respiratory function tests
- Diagnostic bronchoscopy
- Diagnostic ECG
- Echocardiography
- Electroencephalogram (EEG) and evoked potentials
- Intra-abdominal pressure monitoring
- Fluid input-output monitoring
- Focused USG lungs and abdomen
- Viscoelastic tests of coagulation
- Basic principles of ultrasound and the Doppler effect

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 (3 and 12 lead)
- Central venous catheters
- Pulmonary artery catheters or oesophageal Doppler
- Pulse oximetry
- FVC, spirometry and peak flow measurement
- Inspired and expired gas monitoring for O₂, CO₂ and NO
- Intracranial pressure monitoring
- Regional oximetry monitoring

Set and interpret data from ventilator alarms

Obtain blood gas samples using aseptic techniques; interpret data from arterial, central venous or mixed venous samples

Confirm adequate oxygenation and control of PaCO₂ and pH

Obtain blood cultures using aseptic techniques

Interpret chest x-rays in a variety of clinical contexts

Interpret data from scoring or scaling systems to assess pain and sedation

Assess and document Glasgow Coma Scale (GCS)

Recognise changes in intracranial and cerebral perfusion pressure which are life threatening Identify abnormalities requiring urgent intervention

Recognise significant changes and the need for repeated testing (i.e. that a single normal result is not as significant as identifying trends of change by repeated testing where indicated)

Document investigations undertaken, results and action taken

Assemble clinical and laboratory data, logically compare all potential solutions to the patient's problems, prioritise them and establish a clinical management plan

Undertake further consultation / investigation when indicated

Communicate effectively with radiological colleagues to plan, perform and interpret test results

Communicate and collaborate effectively with all laboratory staff

ATTITUDES

Consult, communicate and collaborate effectively with patients, relatives and the health care team

Promote respect for patient privacy, dignity and confidentiality

Avoid extensive invasive procedures or monitoring which cannot be adequately interpreted at the

bedside

Minimise patient discomfort in relation to monitoring devices

Respond rapidly to acute changes in monitored variables

Ensure safe and appropriate use of equipment

Support other staff in the correct use of devices

Consider patient comfort during procedures / investigations

Avoid unnecessary tests

Demonstrate compassionate care of patients and relatives

Desire to minimise patient distress

DOMAIN 3: DISEASE MANAGEMENT

ACUTE DISEASE

3.1. Manage 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 immune-incompetent 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)

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. Identify 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

Neurologic 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 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. Recognise and Manage 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. Recognise and Manage 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. Recognise and Manage 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 & trans-jugular liver biopsies and trans-jugular 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.
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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. Recognise and Manage 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. Recognise and Manage 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. Recognise and Manage 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) 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
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SKILLS & BEHAVIOURS

Identify patients at risk of acute lung injury (ALI / ARDS) Identify and avoid factors contributing to acute lung injury Acquire, interpret, synthesise, 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
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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.
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3.9. Recognise and Manage 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
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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. Recognise and Manage 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
Haematological Disorders: 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, synthesise, 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. Recognise Life-Threatening Maternal Peripartum Complications and Manage 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 immune-incompetent patient, chemotherapy, agranulocytosis and bone marrow transplant patients. Massive blood transfusion. Malignancy including complications of chemotherapy and radiotherapy Infections: pyrexia and hypothermia; organ-specific signs of infection including haematogenous (venous catheter-related, endocarditis, meningococcal disease), urological, pulmonary, abdominal (peritonitis, diarrhoea), skeletal (septic arthritis) soft tissue and neurological. 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, antihelminthics)

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 & trans-jugular liver biopsies and trans-jugular 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)

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

- Demonstrate compassionate care of patients and relatives
- Appreciate the importance of timely institution of organ-system support
- Appreciate the differences between organ system support and specific treatment
- Enquiring mind, undertake critical analysis of published literature
- Adopt a problem solving approach
- Desire to minimise patient distress
- Consult, communicate and collaborate effectively with patients, relatives and the health care team
- Recognise personal limitations, seeks and accepts assistance or supervision (know how, when and who to ask)

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

4.1. Prescribe 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 pancytopenia

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

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

4.2. Manage 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) 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. Administer Blood and Blood Products Safely

KNOWLEDGE	
	Pathophysiological effects of altered intravascular volume Indications for and basic interpretation of haematological tests The pathogenesis and management of anaemia, thrombocytopenia, neutropenia and pancytopenia 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. Use 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, 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 (e.g. 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. Describe 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)
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, 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. Initiate, Manage and Wean 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)

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 PaCO₂ 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. Initiate, Manage and Wean Patient 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. Recognise and Manage 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 PaCO₂ 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-ordinate and Provide 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.

4.10. Use of Hyperbaric Oxygen Therapy

KNOWLEDGE

Principle of hyperbaric oxygen therapy (HBOT)

Diving related physiology

Hyperbaric pathophysiology

Outline the indications for hyperbaric oxygen therapy in the critically ill patient

How to prepare the patient and the staff

Potential risks/ complications associated with HBOT

How to resuscitate a critically ill patient that is receiving HBOT

SKILLS & BEHAVIOURS

Establish a management plan in collaboration with other specialists in hyperbaric oxygen
Aware of the local safety checklist and treatment protocol of HBOT
Recognize and identify critical issues before, during and after HBOT
Define targets of therapy and review efficacy of prescription at regular intervals
Collaborate with medical staff, nursing staff, and technical staff in provide safe delivery of HBOT
Recognise and manage emergencies; seek assistance appropriately
Critically appraise the evidence for and against of using hyperbaric oxygen for different disease entities

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, antiprotzoal, antihelminthics)

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

Indications for and basic interpretation of blood grouping and x-matching

The pathogenesis and management of anaemia, thrombocytopenia, neutropenia and pancytopenia

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, 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)

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 & troubleshooting)

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

Principle of hyperbaric oxygen therapy (HBOT)

Indications and potential risks/ complications for HBOT

Fitness to receive hyperbaric oxygen therapy

How to prepare the patient and the staff

How to resuscitate a critically ill patient that is receiving HBOT

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 PaCO₂ and pH

Set and interpret data from ventilator alarms

Construct, monitor and review a weaning plan

Identify and avoid factors contributing to impaired renal function

Supervise the provision of continuous renal replacement therapy

Set appropriate exchange and fluid balances for renal replacement therapies

Modify fluid and electrolyte therapy according to clinical features and fluid balance charts Prescribe and manage anticoagulation therapy Correct electrolyte disorders (e.g. hyperkalaemia, hyponatraemia) Prevent hypokalaemia Institute and manage a regimen to control blood glucose within safe limits Prescribe an appropriate standard enteral feeding regimen Identify surgical and other contraindications to enteral feeding Prescribe and supervise safe administration of a standard / customized parenteral (TPN) preparation Collaborate with nursing staff / clinical dietician in monitoring safe delivery of enteral and parenteral nutrition Liaise with clinical dieticians / medical team to plan feeding regimens after discharge from the ICU Aware of the local safety checklist and treatment protocol of HBOT Recognize and identify critical issues before, during and after HBOT Institute and manage the hyperbaric oxygen treatment in a safe environment Collaborate with medical staff, nursing staff, and technical staff in provide safe delivery of HBOT Recognise and manage emergencies; seek assistance appropriately

ATTITUDES

Appreciate the importance of timely institution of organ-system support Appreciate the differences between organ system support and specific treatment Recognise the need for supportive care for all organ systems whether failing / injured or not Respond rapidly to acute changes in monitored variables Consult, communicate and collaborate effectively with patients, relatives and the health care team Demonstrate compassionate care of patients and relatives Desire to minimise patient distress Respect the ideas and beliefs of the patient and their family and their impact on decision making (does not impose own views) Respect the expressed wishes of competent patients Lead, delegate and supervise others appropriately according to experience and role Recognise personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
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DOMAIN 5: PRACTICAL PROCEDURES

Respiratory System

5.1. Administer 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	Recognise personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask) Consider patient comfort during procedures / investigations Desire to minimise patient distress Accept personal responsibility for the prevention of cross infection and self-infection Lead, delegate and supervise others appropriately according to experience and role

Support other staff in the correct use of devices
Promote respect for patient privacy, dignity and confidentiality

5.2. Performs Fiberoptic 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 fiberoptic intubation; use of fiberoptic 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 fiberoptic 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. Perform 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's) 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 minimise 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 CO₂ detector post-intubation and interpret a capnograph trace
- Demonstrate rapid sequence induction of anaesthesia/cricoid pressure
- Perform cuff leak test
- 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. Perform 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 fiberoptic 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 cricothyroidotomy
- 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-thyroidotomy
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. Perform 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 minimise 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. Perform Fibreoptic Bronchoscopy and BAL in the Intubated Patient Under Supervision

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 minimise 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. Perform Percutaneous Tracheostomy Under Supervision

KNOWLEDGE

Indications and contraindications to tracheostomy (percutaneous and surgical) and minitracheostomy
Anatomical landmarks for cricothyrotomy/tracheostomy/mini-tracheostomy
Techniques for percutaneous and surgical tracheostomy
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 minimise 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
- Describe how to de-cannulate a tracheostomy, and management of tracheostomy wound

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. Perform Thoracentesis 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 minimize 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. Perform 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 minimise 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. Perform 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
Allen's 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
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 minimise 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. Describe 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.

5.12. Perform 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 Describe how to manage a tunneled central venous catheter (e.g. for parenteral nutrition)

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 minimise 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.

5.13. Perform 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 minimise 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.

5.14. Perform 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 minimise 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.

5.15. Describe 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.

5.16. Demonstrate 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, 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 minimise 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

5.17. Perform 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 Perform 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.

5.18. Manage the Administration of Analgesia via an Epidural Catheter

KNOWLEDGE
Physiological effects of pain and anxiety Recognition and methods of assessment of pain Recognize complications of epidural anaesthesia and describe initial appropriate treatment Contraindications, methods, and complications of epidural catheter removal

SKILLS & BEHAVIOURS
Proper assessment of epidural block

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

Gastrointestinal System

5.19. Perform 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 minimise 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.

5.20. Perform 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 minimise 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.

5.21. Describe 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.

5.22. Describe 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 fiberoptic 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

5.23. Perform 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 minimise 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's) 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 fiberoptic intubation; use of fiberoptic 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 fiberoptic 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

Allen's 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, 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

Pharmacokinetics, 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 Prepare equipment, patient and staff prior to undertaking the procedure Obtain informed consent/assent from the patient where appropriate Use drugs as indicated to facilitate the procedure Choose an appropriate route / method of insertion and position the patient accordingly Identify relevant anatomical landmarks Use protective clothing (gloves / mask / gown / drapes) as indicated Perform the procedure in a manner which minimise 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 CO₂ 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)

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

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

Consider patient comfort during procedures/investigations

Desire to minimise patient distress

Accept personal responsibility for the prevention of cross infection and self-infection

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

Support other staff in the correct use of devices

Promote respect for patient privacy, dignity and confidentiality

DOMAIN 6: PERIOPERATIVE CARE

6.1. Manage the Pre- and Post-Operative Care of the High Risk Surgical Patient

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

Haematological and Oncological: Care of the immunosuppressed or immune-incompetent patient; complications of chemotherapy; management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies.

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

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

Establish a plan for postoperative management

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. Manage 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

Haematological: management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies.

Metabolic and 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. Manage 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 and 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

6.4. Manage 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.**

Haematological and Oncological: Care of the immunosuppressed or immune-incompetent patient; complications of chemotherapy; management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies.

Metabolic and 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. Manage 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

Haematological: management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies.

Metabolic and 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
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	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: suxamethonium apnoea, anaphylaxis, malignant hyperpyrexia, difficult airway Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU)) Perioperative implications of current drug therapy Consent and assent in the competent and non-competent patient Implications for postoperative care of common acute and chronic medical conditions (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; abdominal aortic surgery; endovascular surgeries; 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; postoperative nausea & vomiting

Haematological and Oncological: Care of the immunosuppressed or immune-incompetent 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 cardiovascular 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
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	ATTITUDES
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	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
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DOMAIN 7. COMFORT AND RECOVERY

7.1. Identify and Attempt 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) 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 immunonutrition 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 (e.g. 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 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

ATTITUDES	
	Appreciate 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 Establish trusting relationships with and demonstrate compassionate care of patients and their relatives Seek to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff Acknowledge the consequences of the language used to impart information Regard each patient as an individual Respect 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 Recognise that intensive care is a continuum throughout the 'patient journey' Promote appropriate and timely discharge from ICU Foster effective communication and relationships with medical and nursing staff in other wards / departments Recognise personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

7.2. Manage 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. Manage 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. Communicate 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 immunonutrition

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 (e.g. 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).

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

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. Manage 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

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 immunonutrition. 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 minimization

Methods to minimize 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

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

Persistent vegetative state

SKILLS & BEHAVIOURS

Identify complications associated with critical illness

Work with colleagues and relatives to minimize patient distress

Anticipate the development of pain and/or anxiety and adopt strategies for its prevention or minimization

Interpret data from scoring or scaling systems to assess pain and sedation

Use analgesic, hypnotic and neuromuscular blocking drugs appropriately and safely

Select & determine adequacy and route of administration of analgesia

Minimise complications associated with opioid and non-opioid analgesics

Obtain and interpret data from a nerve stimulator to monitor the degree of neuromuscular blockade

Propose and implement a plan to provide adequate sleep and rest in ICU patients

Communicate effectively with families who may be anxious, angry, confused, or litigious

Participate in the education of patients/families

Appropriate and timely referral to specialists / allied health professionals

Identify discharge criteria for individual patients

Ensure effective information exchange before patient discharge from ICU

Take decisions to admit, discharge or transfer patients

Liaise with medical and nursing staff in other departments to ensure optimal communication and continuing care after ICU discharge

Change a tracheostomy tube electively

Follow-up patients after discharge to the ward

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

ATTITUDES

Appreciate 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

Establish trusting relationships with and demonstrates compassionate care of patients and their relatives

Seek to modify the stresses which the intensive care environment places upon patients, their relatives

and members of staff

Acknowledge the consequences of the language used to impart information

Regard each patient as an individual

Respect 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

Recognise that intensive care is a continuum throughout the 'patient journey'

Promotes appropriate and timely discharge from ICU

Foster effective communication and relationships with medical and nursing staff in other wards / departments

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

DOMAIN 8 - END OF LIFE CARE

8.1. Manage 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. Discuss 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. Manage 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

he 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. Perform 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 electrophysiological 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 the policy in Hong Kong or as indicated
 Document pre-conditions and exclusions to brain stem death testing

ATTITUDES

he 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. Manage 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 Hong Kong policy)
 Common investigations and procedures undertaken in the ICU prior to organ harvesting
 Role of organ/tissue procurement authority in Hong Kong 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 organ donation coordinator 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 Legal aspects of brain stem death diagnosis With-holding and withdrawing treatment: omission and commission Decision-making processes for withholding and withdrawing life sustaining therapies including documentation and iterative review Principles of management of the organ donor Physiological changes associated with brain stem death Preconditions and exclusions for the diagnosis of brain stem death Clinical, imaging and electrophysiological tests to diagnose brain death Principles of delivering bad news to patients and families Bereavement: anticipating and responding to grief Principles of pain and symptom management Procedure for withdrawing treatment and support Causes and prognosis of vegetative states Causes of brain stem death Responsibilities in relation to legal authorities for certifying death (e.g. coroner, procurator fiscal or equivalent), and reasons for referral 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 policy or as indicated

Liaise with organ donation coordinator 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

Establish 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

Appreciate 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

Value clear decision-making and communication

Acknowledge the consequences of the language used to impart information Willingness to communicate with and support families/significant others

Respect the ideas and beliefs of the patient and their family and their impact on decision making (does not impose own views)

Respect the expressed wishes of competent patients

Respect the religious beliefs of the patient and is willing to liaise with a religious representative if requested by patient or family

Offer 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

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

DOMAIN 9 - PROFESSIONALISM

Communication Skills

9.1. Communicate Effectively with Patients and Relatives

9.2. Communicate Effectively with Members of the Health Care Team

9.3. Maintain 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 Establish trusting relationships with and demonstrates compassionate care of patients and their relatives Consult, communicate and collaborate effectively with patients, relatives and the health care team Sensitive to the reactions and emotional needs of others Approachable and accessible when on duty Regard each patient as an individual

- Willingness to communicate with and support families / significant others
- Promote respect for patient privacy, dignity and confidentiality
- Acknowledge the consequences of the language used to impart information
- Recognise that communication is a two-way process

Professional Relationships with Patients and Relatives

- 9.4. **Involve Patients (or their Surrogates If Applicable) in Decisions about Care and Treatment**
- 9.5. **Demonstrate Respect of Culture and Religious Beliefs and an Awareness of their Impact on Decision Making**
- 9.6. **Respect 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

Establish trusting relationships with and demonstrates compassionate care of patients and their relatives

Consult, communicate and collaborate effectively with patients, relatives and the health care team

Sensitive to the reactions and emotional needs of others

Assess, communicate with, and support patients and families confronted with critical illness

Sensitive to patients' expectations and responses; considers their perspective in order to understand their conduct and attitudes

Respect the cultural and religious beliefs of the patient; demonstrate an awareness of their impact on decision making

Respect the expressed wishes of competent patients

Regard each patient as an individual

Desire to minimise patient distress

Seek 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

Acknowledge the consequences of the language used to impart information

Recognise that communication is a two-way process

Professional Relationships with Members of the Health Care Team

9.7. Collaborate and Consult; Promote Teamworking

9.8. Ensure Continuity of Care Through Effective Hand-Over of Clinical Information

9.9. Support Clinical Staff Outside the ICU to Enable the Delivery of Effective Care

9.10. Appropriately Supervise, and Delegate 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

Consult, communicate and collaborate effectively with patients, relatives and the health care team

Sensitive to the reactions and emotional needs of others

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

Recognise impaired performance (limitations) in self and colleagues and takes appropriate action

Approachable and accessible when on duty

Recognise personal strengths and limitations as a consultant to other specialists

Desire to minimise patient distress

Adopt a problem solving approach

Foster effective communication and relationships with medical and nursing staff in other wards / departments

Seek to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff

Accept responsibility for patient care and staff supervision

Promote respect for patient privacy, dignity and confidentiality

Recognise that communication is a two-way process

Generate enthusiasm amongst others

Desire and willingness to share knowledge

Contribute effectively to interdisciplinary team activities.

Participate in, and promote continuing education of members of the multi-disciplinary health care team

Self-Governance

9.11. Take Responsibility for Safe Patient Care

9.12. Formulate Clinical Decisions with Respect for Ethical and Legal Principles

9.13. Seek Learning Opportunities and Integrates New Knowledge into Clinical Practice

9.14. Participate in Multidisciplinary Teaching

9.15. Participate 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 ethical approval processes in Hong Kong Ethical management of relationships with industry Requirements of ICM training at local and territorial 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

Take responsibility for his/her personal physical and mental health, especially where impairment may affect patient care and professional conduct

Consult, communicate and collaborate effectively with patients, relatives and the health care team

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

Recognise impaired performance (limitations) in self and colleagues and takes appropriate action

Participate in, and promotes continuing education of members of the multi-disciplinary health care team.

Enquiring mind, undertakes critical analysis of published literature

Recognise and use teaching and learning opportunities arising from clinical experiences, including errors

Recognise personal strengths and limitations as a consultant to other specialists

Recognise and manages circumstances where personal prejudices or biases may affect behaviour, including cultural, financial and academic aspects

Accept responsibility for patient care and staff supervision

Promote 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

Seek 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 9: PROFESSIONALISM

KNOWLEDGE
Basic ethical principles: autonomy, beneficence, non-maleficence, justice Consent and assent in the competent and non-competent patient Confidentiality and data protection - legal and ethical issues Management of information Ethical and legal issues in decision-making for the incompetent patient Principles of conflict resolution, negotiation and debriefing Principles of delivering bad news to patients and families 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 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 Ethical principles involved in conducting research (including subject protection, consent, confidentiality and competing interests) and local ethical approval processes Ethical management of relationships with industry
SKILLS & BEHAVIOURS
Act appropriately as a member or leader of the team (according to skills & experience) Communicate with patients and relatives - give accurate information and re-iterate to ensure comprehension; clarify ambiguities Lead, delegate and supervise others appropriately according to experience and role Discuss treatment options with a patient or relatives before ICU admission Differentiate competent from incompetent statements by patients Collaborate with other team members to achieve common goals Communicate effectively with relatives who may be anxious, angry, confused, or litigious Consult and consider the views of referring clinicians; promote their participation in decision making where appropriate Obtain consent/assent for treatment, research, autopsy Involve patients in decisions about their care and treatment Liaise with medical and nursing staff in other departments to ensure optimal communication and continuing care after ICU discharge 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

Participate appropriately in educational activities and teaching medical and non-medical members of the health care team

Manage inter-personal conflicts which arise between different sectors of the organization, professionals, patients or relatives

Contribute to professional meetings - understand their rules, structure and etiquette

Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information

Listen effectively (listening skills)

Respect, acknowledge & encourage the work of others

Attentive to detail, punctual, reliable, polite and helpful

Take decisions at a level commensurate with experience; accept the consequences of these decisions

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

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

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

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

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

Approachable and accessible when on duty

Recognizes impaired performance (limitations) in self and colleagues and takes appropriate action

Regards each patient as an individual

Assesses, communicates with, and supports patients and families confronted with critical illness

Willingness to communicate with and support families / significant others

Sensitive to patients' expectations and responses; considers their perspective in order to understand their conduct and attitudes

Recognizes personal strengths and limitations as a consultant to other specialists

Promotes respect for patient privacy, dignity and confidentiality

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

Adopts a problem-solving approach

Desire to minimize patient distress

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

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.

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

Recognizes and uses teaching and learning opportunities arising from clinical experiences, including errors

Recognizes and manages circumstances where personal prejudices or biases may affect behaviors, including cultural, financial and academic aspects

Well-being of the patient takes precedence over the needs of society or research

Desire and willingness to contribute to the development of new knowledge

Seeks to recognize those changes in the specialty, medicine or society, which should modify their practice and adapt their skills accordingly.

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

Appreciate the importance of communication between referring, transporting and receiving staff

Anticipate and prevents problems during transfer

Desire to minimise patient distress

Recognise 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 SYSTEM MANAGEMENT

11.1. Lead a Daily Multidisciplinary Ward Round

KNOWLEDGE	Roles of different members of the multidisciplinary team and Hong Kong 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	Accept responsibility for patient care and staff supervision Recognise impaired performance (limitations) in self and colleagues and takes appropriate action Recognise personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask) Consult, communicate and collaborate effectively with patients, relatives and the health care team Desire to minimise patient distress Seek to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff Establish 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 Ensure effective information transfer Adopt a problem solving approach

11.2. Comply 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, Hong Kong 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. Identify Environmental Hazards and Promote 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. Identify and Minimise 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. Organise 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 Appraise and Apply 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 nonpunitive to individuals Manage resistance to change in the ICU / hospital environment in order to optimize the outcome of a task
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	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. Describe 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 legislations related to ICU in Hong Kong

Principles of Hong Kong 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 SYSTEM MANAGEMENT

KNOWLEDGE

Principles of Hong Kong 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 legislations related to ICU in Hong Kong

Principles of Hong Kong 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 Hong Kong 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 colonization

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 and is maintained to 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

Accept responsibility for patient care and staff supervision

Recognise impaired performance (limitations) in self and colleagues and takes appropriate action

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

Consult, communicate and collaborate effectively with patients, relatives and the health care team

Desire to minimise patient distress

Seek to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff

Establish 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

Ensure effective information transfer

Adopt a problem solving approach

Enquiring mind, undertakes critical analysis of published literature