Intercollegiate Board for Training in
INTENSIVE CARE MEDICINE

Curriculum for a CCT in
Intensive Care Medicine

Part III

The Syllabus

Revisions and comments:
Comments on the training programme are welcome from all, and should be directed to the Chair of the IBTICM. It will be kept under review and any changes to be implemented will come into effect six months following their publication.

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1. Introduction

The development of the syllabus for the CCT in ICM has drawn unashamedly and gratefully on the CoBaTrICE syllabus developed under the auspices of the European Society of Intensive Care Medicine. It is central to the development of the CCT Curriculum that it should be a valid and accepted qualification for the professional practice of Intensive Care Medicine throughout Europe.

A full description of the CoBaTrICE methodology can be found in *Part I* of this curriculum.

1.1 Competencies

Due to the nature of ICM training in the UK, the competence statements for **Basic**, **Intermediate**, and **Advanced** level intensive care are presented separately below for ease of reference, broken down by Domain. This serves as an overview of the competencies required at each stage, however it must be emphasised that this is an additive, spiral curriculum. A great deal of knowledge must be acquired during Basic training to enable the trainee to understand and function within a critical care unit. During Intermediate and Advanced training the competencies gained during Basic training will be developed and reassessed so trainees can demonstrate their achievement of expertise in the specialty.

It is important to view the curriculum as a whole; whilst an individual competence might be in the Basic curriculum, not all syllabus elements will be appropriate to Basic training. These can be considered when the competence is revisited at higher levels of training.

Conversely a competence, for example **1.5 Assesses and provides initial management of the trauma patient**, should be acquired during Intermediate training; however some syllabus elements may be appropriate to Basic trainees, for example undertaking a primary survey.

1.2 Assessment Tools Key

Each competence is mapped to the relevant assessment tools as follows:

Workplace Based Assessment Tools	
Code	**Full name**
D	Direct Observation of procedural Skills (DOPS)
I	ICM Mini- Clinical Evaluation Exercise (ICM-CEX)
C	Case Based Discussion (CBD)
M	Multisource Feedback (MSF)
T	Acute Care Assessment Tool (ACAT)
S	Simulation

1.3 Good Medical Practice

Each competence is also mapped to the four domains of Good Medical Practice:

Domains of Good Medical Practice	
Domain	**Descriptor**
1	Knowledge, skills and performance
2	Safety and quality
3	Communication, partnership and teamwork
4	Maintaining trust

INTENSIVE CARE MEDICINE – BASIC LEVEL

Training objectives:

During Basic training in ICM the trainee will be working under direct supervision for the majority of the time, being introduced to the knowledge and skills required for ICM. A broad-based outline knowledge of the wide range of problems which are seen in ICM is necessary at Basic level. Greater understanding and expertise can be built upon this during higher stages of training so the trainee can become a progressively more autonomous practitioner.

The composite competencies for Basic level ICM are outlined here by Domain, mapped to the relevant assessment tools and Good Medical Practice. The components that make up each competence are listed in the full syllabus below.

After Basic level training (i.e. after 3 months of post-Foundation training) a trainee should:

- Appreciate the factors involved in the decision to admit to the ICU
- Identify a sick patient at an early stage
- Be able to undertake immediate resuscitation of patients with cardiac arrest and sepsis
- Have an outline understanding of the pathology, clinical features and the management of common problems which present to ICU
- Understand the principles and place of the common monitoring and interventions in ICU
- Be able to follow a management plan for common ICU problems and recognise developing abnormalities, but appreciate that they will need assistance in deciding on an appropriate action.
- Be able to continue the management, with distant supervision, of, for example:
  - a resuscitated patient
  - a stable post-operative patient
  - a patient established on non-invasive ventilation

Competence	*Description*	*Assessment Methods*	*GMP*
Domain 1: Resuscitation and initial management of the acutely ill patient			
1.1	Adopts a structured and timely approach to the recognition, assessment and stabilisation of the acutely ill patient with disordered physiology	I, C, M, T, S	1
1.2	Manages cardiopulmonary resuscitation	I, M, T, S	1
1.3	Manages the patient post resuscitation	I, M, T	1

Domain 2: Diagnosis, Assessment, Investigation, Monitoring and Data Interpretation			
2.1	Obtains a history and performs an accurate clinical examination	I, M	1
2.2	Undertakes timely and appropriate investigations	I, C, M	1
2.3	Performs electrocardiography (ECG / EKG) and interprets the results	D, I, C	1
2.4	Obtains appropriate microbiological samples and interprets results	D, C	1
2.5	Obtains and interprets the results from blood gas samples	D, C	1
2.6	Interprets imaging studies	I, C	1
2.7	Monitors and responds to trends in physiological variables	I, T	1
2.8	Integrates clinical findings with laboratory investigations to form a differential diagnosis	I, C, T	1
Domain 3: Disease Management			
3.1	Manages the care of the critically ill patient with specific acute medical conditions	D, I, C, M, T	1
3.2	Identifies the implications of chronic and co-morbid disease in the acutely ill patient	C, E	1
3.3	Recognises and manages the patient with circulatory failure	I, C, T	1
3.4	Recognises and manages the patient with, or at risk of, acute renal failure	I, C, T	1
3.5	Recognises and manages the patient with, or at risk of, acute liver failure	I, C, T	1
3.6	Recognises and manages the patient with neurological impairment	I, C, T	1
3.7	Recognises and manages the patient with acute gastrointestinal failure	I, C, T	1
3.8	Recognises and manages the patient with acute lung injury syndromes (ALI / ARDS)	I, C, T	1
3.9	Recognises and manages the septic patient	I, C, T	1
3.10	Recognises and manages the patient following intoxication with drugs or environmental toxins	I, C	1
Domain 4: Therapeutic interventions / Organ system support in single or multiple organ failure			
4.1	Prescribes drugs and therapies safely	D, C, M	1
4.2	Manages antimicrobial drug therapy	I, C, M	1
4.3	Administers blood and blood products safely	D, C, M	1
4.4	Uses fluids and vasoactive / inotropic drugs to support the circulation	I, C	1
4.6	Initiates, manages, and weans patients from invasive and non-invasive ventilatory support	D, C, T	1
4.8	Recognises and manages electrolyte, glucose and acid-base disturbances	I, C, T	1
4.9	Co-ordinates and provides nutritional assessment and support	I, C, T	1
Domain 5: Practical procedures			
5.1	Administers oxygen using a variety of administration devices	D	1
5.2	Performs emergency airway management	D	1
5.4	Performs endotracheal suction	D	1, 4
5.7	Performs chest drain insertion	D	1, 4
5.8	Performs arterial catheterisation	D	1, 4

5.9	Performs ultrasound techniques for vascular localisation	D	1, 4
5.10	Performs central venous catheterisation	D	1, 4
5.11	Performs defibrillation and cardioversion	D	1, 4
5.14	Demonstrates a method for measuring cardiac output and derived haemodynamic variables	D, C	1
5.15	Performs lumbar puncture (intradural / 'spinal') under supervision	D	1, 4
5.19	Performs nasogastric tube placement in the intubated patient	D	1, 4
5.20	Performs urinary catheterisation	D	1
Domain 6: Peri-operative care			
6.1	Manages the pre- and post-operative care of the high risk surgical patient	C, M, T	1
Domain 7: Comfort and recovery			
7.1	Identifies and attempts to minimise the physical and psychosocial consequences of critical illness for patients and families	C, M	1, 3
7.2	Manages the assessment, prevention and treatment of pain and delirium	D, I, C, M, T	1
7.3	Manages sedation and neuromuscular blockade	D, I, C, M, T	1
7.4	Communicates the continuing care requirements of patients at ICU discharge to health care professionals, patients and relatives	M, T	3
Domain 8: End of life care			
8.2	Discusses end of life care with patients and their families / surrogates	D, C, M	3, 4
Domain 9: Paediatric care			
See Intermediate level competencies, below			
Domain 10: Transport			
See Intermediate level competencies, below			
Domain 11: Patient safety and health systems management			
11.2	Complies with local infection control measures	C, M	2
11.3	Identifies environmental hazards and promotes safety for patients and staff	C, M	2
11.4	Identifies and minimises risk of critical incidents and adverse events, including complications of critical illness	C, M	2
11.6	Critically appraises and applies guidelines, protocols and care bundles	C	1
11.7	Describes commonly used scoring systems for assessment of severity of illness, case mix and workload	C	1
Domain 12: Professionalism			
12.1	Communicates effectively with patients and relatives	D, M, T	3
12.2	Communicates effectively with members of the health care team	D, M	3
12.3	Maintains accurate and legible records / documentation	D, M, T	1
12.6	Respects privacy, dignity, confidentiality and legal constraints on the use of patient data	C, M	1, 4
12.7	Collaborates and consults; promotes team-working	M	3
12.8	Ensures continuity of care through effective hand-over of clinical information	C, M, T	1

12.11	Takes responsibility for safe patient care	D, C, M, T	1, 3
12.13	Seeks learning opportunities and integrates new knowledge into clinical practice	M	1
12.14	Participates in multidisciplinary teaching	M	1
12.15	Participates in research or audit under supervision	M	1, 4

INTENSIVE CARE MEDICINE – INTERMEDIATE LEVEL

Training objectives:

During Intermediate training the trainee is gaining a more in depth knowledge of and skill set for intensive care, this acquisition is a continual process. It is not appropriate to attempt to complete intermediate level competencies immediately after Basic training; greater experience, time in training and maturity as a doctor are necessary to be able to take advantage of training at this level. At completion of Intermediate training and base specialty training the trainee would be able to undertake a consultant role with on-call commitment to an intensive care unit with support from colleagues for more complex problems.

The composite competencies for Intermediate level ICM are outlined here by Domain, mapped to the relevant assessment tools and Good Medical Practice. The components that make up each competence are listed in the full syllabus below.

After Intermediate level training (i.e. after completing 3 months Basic ICM, 6 months ICM training post-ST2, completing complementary specialty training, and reaching at least ST4 in their primary specialty, and completing 10 case summaries) a trainee should:

- Recognise and manage the factors which may lead to deterioration in sick patients
- Be able to undertake post-resuscitation management and be able to manage the initial resuscitation of more complex specialist patients.
- Have an understanding of the pathology, clinical features and prognosis of the majority of problems presenting to ICU, and be able to initiate management of them, with distant supervision.
- Be able to appropriately request and interpret (in discussion with appropriate specialists) investigations such as CT, ultrasound, and microbiology.
- Be able to make a critical appraisal of the evidence for treatment and investigations.
- Appreciate that ICUs are complex systems which require management and leadership skills.
- Be able to lead a ward round, planning care for the next 24 hours.

During Intermediate training the trainee will be expected to expand and develop competencies gained at Basic level.

Competence	*Description*	*Assessment Methods*	*GMP*
Domain 1: Resuscitation and initial management of the acutely ill patient			
1.4	Triages and prioritises patients appropriately, including timely admission to ICU	C, M, T	1
1.5	Assesses and provides initial management of the trauma patient	D, I, C, M, T	1
1.6	Assesses and provides initial management of the patient with burns	D, I, C, M, T	1
Domain 2: Diagnosis, Assessment, Investigation, Monitoring and Data Interpretation			
See Basic level competencies, above			
Domain 3: Disease Management			

3.11	Recognises life-threatening maternal peripartum complications and manages care under supervision	I, C	1
Domain 4: Therapeutic interventions / Organ system support in single or multiple organ failure			
4.7	Initiates, manages and weans patients from renal replacement therapy	D, I, C, T	1, 4
Domain 5: Practical procedures			
5.3	Performs difficult and failed airway management according to local protocols	D	1, 4
5.5	Performs fibreoptic bronchoscopy and BAL in the intubated patient under supervision	D	1, 4
5.12	Performs transthoracic cardiac pacing; describes transvenous	D, C	1, 4
5.13	Describes how to perform pericardiocentesis	C,	1, 4
5.16	Manages the administration of analgesia via an epidural catheter	I	1, 4
5.17	Performs abdominal paracentesis	D	1, 4
5.18	Describes Sengstaken tube (or equivalent) placement	C	1, 4
Domain 6: Peri-operative care			
6.5	Manages the pre- and post-operative care of the trauma patient under supervision	C, T	1
Domain 7: Comfort and recovery			
7.5	Manages the safe and timely discharge of patients from the ICU	M, T, C	1, 3
Domain 8: End of life care			
8.1	Manages the process of withholding or withdrawing treatment with the multidisciplinary team	C, M	1, 3, 4
8.3	Manages palliative care of the critically ill patient	C, M, T	1, 3, 4
8.4	Performs brain-stem death testing	D	1
8.5	Manages the physiological support of the organ donor	I, C	1
Domain 9: Paediatric care			
9.1	Describes the recognition of the acutely ill child and initial management of paediatric emergencies	I, C	1
9.2	Describes national legislation and guidelines relating to child protection and their relevance to critical care	C	1
Domain 10: Transport			
10.1	Undertakes transport of the mechanically ventilated critically ill patient outside the ICU	D, I, C, M	1, 3
Domain 11: Patient safety and health systems management			
11.1	Leads a daily multidisciplinary ward round	M, T	1, 2, 3, 4
11.5	Organises a case conference	M, C	3
Domain 12: Professionalism			
12.4	Involves patients (or their surrogates if applicable) in decisions about care and treatment	C, M, T	3, 4
12.5	Demonstrates respect of cultural and religious beliefs and an awareness of their impact on decision making	C, M, T	3, 4
12.9	Supports clinical staff outside the ICU to enable the delivery of effective care	C, M, T	1
12.10	Appropriately supervises and delegates to others, the delivery of patient care	C. M, T	1

INTENSIVE CARE MEDICINE – ADVANCED LEVEL

Training objectives:

Advanced training is for clinicians who will take on a consultant role with a significant commitment to an intensive care unit. During this training they will be able to progressively increase their level of autonomy so they are capable of becoming an independent practitioner. Whilst knowledge and skills gained during Basic and Intermediate training will be consolidated, education of others, management and leadership assume a greater importance.

The composite competencies for Advanced level ICM are outlined here by Domain, mapped to the relevant assessment tools and Good Medical Practice. The components that make up each competence are listed in the full syllabus below.

After Advanced training (i.e. completing Intermediate training and a further 12 months of ICM and are thus in the last year of training in their primary specialty) a trainee should:

- Have a detailed knowledge of the majority of conditions presenting to ICU
- Have a wide experience of ICM in varied situations.
- Be able to manage initial resuscitation and stabilisation of any acutely ill patient, adult or child, prior to transfer to an appropriate specialist centre.
- Be able to operate unsupervised and take on a management and leadership role in an ICU.

During Advanced training the trainee will be expected to expand and develop competencies gained at Basic and Intermediate level.

Competence	*Description*	*Assessment Methods*	*GMP*
Domain 1: Resuscitation and initial management of the acutely ill patient			
1.7	Describes the management of mass casualties	C	1, 3
Domain 2: Diagnosis, Assessment, Investigation, Monitoring and Data Interpretation			
See Basic level competencies, above			
Domain 3: Disease Management			
See Basic and Intermediate level competencies, above			
Domain 4: Therapeutic interventions / Organ system support in single or multiple organ failure			
4.5	Describes the uses of mechanical assist devices to support the circulation	C	1
Domain 5: Practical procedures			
5.6	Performs percutaneous tracheostomy	D	1, 4
Domain 6: Peri-operative care			
6.2	Manages the care of the patient following cardiac surgery	C	1
6.3	Manages the care of the patient following craniotomy under supervision	C, T	1
6.4	Manages the care of the patient following solid organ transplantation	C	1
Domain 7: Comfort and recovery			
See Basic and Intermediate level competencies, above			
Domain 8: End of life care			

See Basic and Intermediate level competencies, above			
8.6	Manages non heart beating organ donation	C, T	1, 3, 4
Domain 9: Paediatric care			
See Intermediate level competencies, above			
Domain 10: Transport			
See Intermediate level competencies, above			
Domain 11: Patient safety and health systems management			
11.8	Demonstrates an understanding of the managerial and administrative responsibilities of the ICM specialist	C	1, 3
Domain 12: Professionalism			
12.12	Formulates clinical decisions with respect for ethical and legal principles	C, M, T	1

Domain 1: Resuscitation and initial management of the acutely ill patient

General Principles

The point of first contact with an acutely ill, deteriorating, or collapsed patient requires clinicians to take action to prevent or correct physiological deterioration despite uncertainty about causation and the precise underlying diagnosis in acutely ill patients. Meeting this challenge – action in uncertainty – demands a structured approach to patient management, as exemplified by the resuscitation algorithms. Although less well developed for the acutely ill patient, they are of equal importance.

A wide outline knowledge is expected even at an early stage of training; however the level at which a trainee would be expected to manage different problems is indicated in the text.

Features of competent performance may include:

- Recognition of presenting signs and symptoms
- Identification and rapid response to life-threatening complications
- Planning and prioritisation of investigations and monitoring – appropriate; timely
- Appropriate differential diagnosis
- Clear decision making and immediate management strategies (including application of relevant protocols / guidelines / care bundles)
- Effective team working and leadership – clear communication and instructions
- Appropriate referral / consultation
- Recognition of limitations (self and others)
- Attention to patient safety

Domain 1: *Competencies*

Competence	*Description*	*IBTICM level*	*Assessment methods*	*GMP*
1.1	Adopts a structured and timely approach to the recognition, assessment and stabilisation of the acutely ill patient with disordered physiology	Basic	I, C, M, T, S	1
1.2	Manages cardiopulmonary resuscitation	Basic	I, M, T, S	1
1.3	Manages the patient post resuscitation	Basic	I, M, T	1
1.4	Triages and prioritises patients appropriately, including timely admission to ICU	Intermediate	C, M, T	1
1.5	Assesses and provides initial management of the trauma patient	Intermediate	D, I, M, T, C	1
1.6	Assesses and provides initial management of the patient with burns	Intermediate	D, I, M, T, C	1
1.7	Describes the management of mass casualties	Advanced	C	1, 3

Domain 1: *Syllabus*

Knowledge, skills and attitudes common to all competencies
Knowledge
Recognises the importance of ensuring physiological safety as a primary aim
Recognises the importance of timely institution of organ-system support
Recognises the need for supportive care for all organ systems whether failing / injured or not
Principles of oxygen therapy and use of oxygen administration devices (*see 5.1*)
Skills

Recognise and manage emergencies; seek assistance appropriately
Order and prioritise appropriate investigations
Professional and reassuring approach - generates confidence and trust in patients and their relatives
Lead, delegate and supervise others appropriately according to experience and role
Clear explanations given to patient, relatives and staff
Consults and takes into account the views of referring clinicians; promotes their participation in decision making where appropriate
Attitudes
Patient safety is paramount
Rapid response and resuscitation
Determination to provide best and most appropriate care possible regardless of environment
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

1.1 Adopts a structured and timely approach to the recognition, assessment and stabilisation of the acutely ill patient with disordered physiology
Basic
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
Causes, recognition and management of: • Acute chest pain • Tachypnoea and dyspnoea • Upper and lower airway obstruction • Pulmonary oedema • Pneumothorax (simple and tension) • Hypoxaemia • Hypotension • Shock states • Anaphylactic and anaphylactoid reactions • Hypertensive emergencies • Acute confusional states and altered consciousness • Acute seizures / convulsions • Oliguria and anuria • Acute disturbances in thermoregulation
Treatment algorithms for common medical emergencies
Immediate management of acute coronary syndromes
Peri-arrest arrythmias and the principles of their management (bradycardia, broad complex tachycardia, atrial fibrillation, narrow complex tachycardia)
Methods for securing vascular access rapidly
Surface anatomy: structures in the antecubital fossa; large veins and anterior triangle of the neck; large veins of the leg and femoral triangle
Techniques for effective fluid resuscitation
Principles of emergency airway management (*see 5.3*)
Indications for, and methods of, ventilatory support
Indications for not starting resuscitation or ceasing an initiated attempt
Relevance of prior health status in determining risk of critical illness and outcomes
Skills
Considers legal and ethical issues: patient autonomy, appropriateness of resuscitation and ICU admission.
Conduct a primary survey: obtain relevant information rapidly and accurately
Assess conscious level, status of airway and cervical spine, and conduct careful systems review
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 and ventilation under direct supervision
Demonstrate emergency relief of tension pneumothorax
Obtain vascular access sufficient to manage acute haemorrhage, rapid fluid infusion and monitor cardiovascular variables

Initiate emergency external cardiac pacing
Respond to an emergency in a positive, organised and effective manner.
Participate in timely discussion and regular review of 'do not attempt resuscitation' orders and treatment limitation decisions
Perform a comprehensive secondary survey; integrate history with clinical examination to form a differential diagnosis.
Evaluate evidence for diagnoses already made and search for other diagnoses.
Assess, predict and manage circulatory shock
Prescribe appropriate analgesia
Intermediate
Knowledge
Measures of adequacy of tissue oxygenation, e.g. base deficit, lactate, central venous saturation
Treatment strategies for abnormalities of fluid, electrolyte, acid-base and glucose balance
Criteria for admission to, and discharge from ICU – factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
Skills
Examine and plan care for the confused patient
Implement emergency airway management and ventilation

1.2 Manages cardiopulmonary resuscitation – ALS recommended
Basic
Knowledge
Causes of cardio-respiratory arrest, identification of patients at risk and corrective treatment of reversible causes
Methods for securing vascular access rapidly
Causes and recognition of acute airway obstruction
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 and methods to minimise these
Treatment (algorithm) of patients in ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT)
Treatment (algorithm) of patients with non-VT/VF rhythms (asystole / PEA)
Tracheal route for drug administration: indications, contraindications, dosage
Indications, dosages and actions of drugs used in the peri-arrest period
Defibrillation: principles of monophasic and biphasic defibrillators; mechanism, indications, complications, modes and methods (manual and automated external defibrillators (AED)
Indications and methods of cardiac pacing in the peri-arrest setting
Effect of cardiorespiratory arrest on body systems
Principles of emergency airway management (see 5.3)
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
Skills
Consider legal and ethical issues: patient autonomy, appropriateness of resuscitation and ICU admission.
Conduct a primary survey: obtain relevant information rapidly and accurately
Monitor vital physiological functions as indicated
Check and assemble resuscitation equipment
Demonstrate advanced life support skills (ALS standard or equivalent)
Principles of emergency airway management (see 5.3)
Recognise and manage choking / obstructed airway
Implement emergency airway management and ventilation under direct supervision
Act appropriately as a member or leader of the team (according to skills and experience)
Respond to an emergency in a positive, organised and effective manner.
Participate in timely discussion and regular review of 'do not attempt resuscitation' orders and treatment limitation decisions
Intermediate
Skills
Protect a potentially unstable cervical spine

Implement emergency airway management and ventilation

1.3 Manages the patient post-resuscitation
Basic
Knowledge
Causes of cardio-respiratory arrest, identification of patients at risk and corrective treatment of reversible causes
Causes, recognition and management of: • Upper and lower airway obstruction • Tachypnoea and dyspnoea • Hypoxaemia • Pneumothorax (simple and tension) • Acute chest pain • Pulmonary oedema • Hypotension • Shock states • Anaphylactic and anaphylactoid reactions • Hypertensive emergencies • Acute confusional states and altered consciousness • Acute seizures / convulsions • Oliguria and anuria • Acute disturbances in thermoregulation
Peri-arrest arrythmias and the principles of their management (bradycardia, broad complex tachycardia, atrial fibrillation, narrow complex tachycardia)
Techniques for effective fluid resuscitation
Indications for and methods of ventilatory support
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
Skills
Implement emergency airway management and ventilation under direct supervision
Assess conscious level, status of airway and cervical spine, and conduct careful systems review
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
Demonstrate emergency relief of tension pneumothorax
Respond to an emergency in a positive, organised and effective manner.
Participate in timely discussion and regular review of 'do not attempt resuscitatation' orders and treatment limitation decisions
Assess, predict and manage circulatory shock
Intermediate
Knowledge
Measures of adequacy of tissue oxygenation, e.g. base deficit, lactate, central venous saturation
Treatment strategies for abnormalities of fluid, electrolyte, acid-base and glucose balance
Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
Skills
Consider the need for and implement pre-transfer stabilisation
Implement emergency airway management and ventilation

1.4 Triages and prioritises patients appropriately, including timely admission to ICU
Basic
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
Indications for not starting resuscitation or ceasing an initiated attempt
Relevance of prior health status in determining risk of critical illness and outcomes
Skills
Consider legal and ethical issues: patient autonomy, appropriateness of resuscitation and ICU admission.
Conduct a primary survey: obtain relevant information rapidly and accurately
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.
Participate in timely discussion and regular review of 'do not attempt resuscitatation' orders and treatment limitation decisions
Consider legal and ethical issues: patient autonomy, appropriateness of resuscitation and ICU admission.
Intermediate
Knowledge
Triage and management of competing priorities
Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
Skills
Assess and communicate effectively the risks and benefits of intensive care admission
Take decisions to admit, discharge or transfer patients
Explain life-sustaining therapies, in clear language, and describe the expected outcome of such therapies in view of the patient's goals and wishes.
Advanced
Skills
Discuss treatment options with a patient or relatives before ICU admission
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)

1.5 Assesses and provides initial management of the trauma patient
Basic
Knowledge
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
Principles of emergency airway management (*see 5.3*)
Indications for and methods of ventilatory support
Management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders
Methods for assessing neurological function e.g. Glasgow Coma Scale
Principles, including indications, limitations and therapeutic modalities of: Basic radiological methods, CT scanning, ultrasound
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
Skills
Conduct a primary survey: obtain relevant information rapidly and accurately
Assess and document Glasgow Coma Scale (GCS)
Obtain vascular access sufficient to manage acute haemorrhage, rapid fluid infusion and monitor cardiovascular variables
Implement emergency airway management and ventilation under direct supervision
Perform a comprehensive secondary survey; integrate history with clinical examination to form a differential diagnosis.
Review and refine diagnosis according to new information and the patient's response to treatment.
Assess conscious level, status of airway and cervical spine, and conduct careful systems review
Assess, predict and manage circulatory shock
Monitor vital physiological functions as indicated

Demonstrate emergency relief of tension pneumothorax
Prescribe appropriate analgesia
Intermediate
Knowledge
Principles, including indications, limitations and therapeutic modalities of: MRI, ultrasound, angiography and radionucleotide studies) in the critically ill patient
Performance and interpretation of a primary and secondary survey
Environmental hazards and 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; extra-dural and sub-dural haematomas; 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 and compartment syndromes; maxillofacial injuries
Relevance of mechanism of injury to clinical presentation
Secondary insults that potentiate the primary injury
Immediate specific treatment of life-threatening injury
Triage and management of competing priorities
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
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
Skills
Prioritise the order of investigations and interventions for individual injuries according to their threat to life
Protect a potentially unstable cervical spine
Implement emergency airway management and ventilation
Advanced
Skills
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)

1.6 Assesses and provides initial management of the patient with burns
Basic
Knowledge
Causes, recognition and management of shock states
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
Causes and recognition of acute airway obstruction
Indications for and methods of ventilatory support
Recognition and management of acute disturbances in thermoregulation
Skills
Conduct a primary survey: obtain relevant information rapidly and accurately/
Assess conscious level, status of airway and cervical spine, and conduct careful systems review
Monitor vital physiological functions as indicated
Causes and recognition of acute airway obstruction
Implement emergency airway management and ventilation under direct supervision
Obtain vascular access sufficient to manage acute haemorrhage, rapid fluid infusion and monitor cardiovascular variables
Assess, predict and manage circulatory shock
Prescribe appropriate analgesia
Intermediate
Knowledge
Triage and management of competing priorities

Performance and interpretation of a primary and secondary survey
Environmental hazards and 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 and fluid resuscitation in the burned patient
Treatment strategies for abnormalities of fluid, electrolyte, acid-base and glucose balance
Signs, symptoms and causes of renal failure including acute kidney injury / chronic / acute on chronic) and indications for intervention
Respiratory complications of burn injuries (smoke inhalation, airway burns) - detection and management
Management of difficult or failed airway management (see 5.4)
The environmental control necessary for optimal care of the burned patient
Prevention of infection in the burned patient
Burn-related compartment syndrome and escharotomy
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
Skills
Implement emergency airway management and ventilation
Assess burn severity and prescribe initial fluid resuscitation
Describe the endpoints of burn resuscitation and preferred fluids
Recognise the potential for airway compromise in the burned patient
Identification and management of carbon monoxide poisoning
Advanced
Skills
Estimate burn wound mortality from published data tables
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)

1.7 Describes the management of mass casualties
Basic
Knowledge
Psychological support for patients and relatives
Intermediate
Knowledge
Local major incident plan - the role of the ICU in hospital/community disaster plans
Triage and management of competing priorities
Triage methods in use locally
Relevance of mechanism of injury to clinical presentation
Environmental hazards and injuries: hypo- and hyperthermia, near-drowning, electrocution, radiations, chemical injuries, electrical safety/micro shock
Principles of crisis management, conflict resolution, negotiation and debriefing
Advanced
Knowledge
Organisational principles for the coordination and management of mass casualties
Communication tasks and personal role in major incident / accident plan
Characteristics and clinical presentations associated with major incidents caused by natural or civilian disasters, infection, epidemics or terrorist attack
Decontamination procedures
Management of public relations and information
Alternative forms of external communication

Domain 2: Diagnosis, Assessment, Investigation, Monitoring and Data Interpretation

General Principles

It is very easy to acquire large amounts of data in modern medical practice. The challenge is to acquire

appropriate data and convert it into information, essential steps on the pathway to diagnosis and treatment. Monitoring devices combine the functions of clinical investigation with surveillance.

Clinical investigations are forms of hypothesis testing; they bring burdens and occasional risks for patients, as well as additional costs and work for the investigating clinician and laboratory staff. Their utility, safety and accuracy must be balanced against these factors.

Features of competent performance may include:

- Recognition of clinical signs and symptoms
- Planning and prioritisation of investigations and monitoring – appropriate; timely
- Safe use of equipment / devices
- Obtain data effectively
- Interpret data in clinical context
- Effective clinical decision making supported by critical thinking and reflection
- Accurate differential diagnosis on basis of information available: review in light of clinical changes
- Effective team-working: planning and interpretation of investigations
- Appropriate referral / consultation / further investigation
- Recognition of limitations (self and others)
- Attention to patient safety

Domain 2: *Competencies*

Competence	*Description*	*IBTICM level*	*Assessment methods*	*GMP*
2.1	Obtains a history and performs and accurate clinical examination	Basic	I, M	1
2.2	Undertakes timely and appropriate investigations	Basic	I, C, M	1
2.3	Performs electrocardiography (ECG / EKG) and interprets the results	Basic	D, I, C	1
2.4	Obtains appropriate microbiological samples and interprets results	Basic	D, C	1
2.5	Obtains and interprets the results from blood gas samples	Basic	D, C	1
2.6	Interprets imaging studies	Basic	I, C	1
2.7	Monitors and responds to trends in physiological variables	Basic	I, T	1
2.8	Integrates clinical findings with laboratory investigations to form a differential diagnosis	Basic	I, C, T	1

Domain 2: *Syllabus*

Knowledge, skills and attitudes common to all competencies
Knowledge
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
Skills
Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
Document investigations undertaken, results and action taken
Order and prioritise appropriate investigations
Develop a working, and limited differential diagnosis based on presenting clinical features
Professional and reassuring approach - generates confidence and trust in patients and their relatives
Lead, delegate and supervise others appropriately according to experience and role
Consults, communicates and collaborates effectively with patients, relatives and the health care team
Attitudes

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

2.1 Obtains a history and performs an accurate clinical examination
Basic
Knowledge
Clinical signs associated with critical illness, their relative importance and interpretation
Importance and principles of obtaining an accurate history of the current condition, co-morbidities 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
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.
Review notes, investigations and prior events to confirm or refute working diagnosis.
Listen effectively
Recognise impending organ system dysfunction
Integrate history with clinical examination to create a diagnostic and therapeutic plan

2.2 Undertakes timely and appropriate investigations
Basic
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 • Diagnostic bronchoscopy • Diagnostic ECG (EKG) • Echocardiography • Electroencephalogram (EEG) and evoked potentials • Intra-abdominal pressure monitoring • Intrathoracic pressure (oesophageal pressure) measurements

• Fluid input-output monitoring
Principles, including indications, limitations and therapeutic modalities of: Basic radiological methods, CT scanning, ultrasound
Risks to patient and staff of radiological procedures and precautions to minimise risk
Skills
Recognise impending organ system dysfunction
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)
Undertake further consultation / investigation when indicated
Intermediate
Knowledge
Principles, including indications, limitations and therapeutic modalities of: MRI, ultrasound, angiography and radionucleotide studies in the critically ill patient
Invasive and non-invasive systems available for measuring cardiac output and derived haemodynamic variables, the principles involved and the type and site of placement of the monitoring device

2.3 Performs electrocardiography (ECG / EKG) and interprets the results
Basic
Knowledge
Obtain and interpret data from ECG (3- and 12-lead)
Principles of ECG monitoring (heart rate, rhythm, conduction, ST segment change and QT interval) – indications, limitations and techniques. Advantages and disadvantages of different lead configurations
Sensitivity and specificity of the investigation as related to a specific disease
Skills
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 and respond appropriately

2.4 Obtains appropriate microbiological samples and interprets results
Basic
Knowledge
Types of organisms – emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between contamination, colonisation and infection
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
Appropriate use of laboratory tests to confirm or refute a clinical diagnosis
Indications for and contraindications to lumbar puncture and CSF sampling; laboratory analysis of CSF samples
Skills
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
Undertake further consultation / investigation when indicated
Intermediate
Knowledge
Epidemiology and prevention of infection in the ICU
Local patterns of bacterial resistance and antibiotic policy
Requirements for microbiological surveillance and clinical sampling
Skills
Assemble clinical and laboratory data, logically compare all potential solutions to the patient's problems, prioritise them and establish a clinical management plan

2.5 Obtains and interprets the results from blood gas samples
Basic
Knowledge
Indications for and interpretation of arterial blood gas samples
Methods and routes of obtaining samples - associated indications and complications
Pre-analytical errors of arterial blood gas sampling (choice of sample site, sampling device, heparin, mixing, storage and transport)
Clinical measurement: • B(pH, pCO_2, pO_2, SaO_2, FiO_2) • I(CO_2 production, oxygen consumption, respiratory quotient)
Sensitivity and specificity of the investigation as related to a specific disease
Skills
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

2.6 Interprets imaging studies
Basic
Knowledge
Principles, including indications, limitations and therapeutic modalities of: Basic radiological methods, CT scanning, ultrasound
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
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
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
Skills
Interpret chest x-rays in a variety of clinical contexts
Identify abnormalities requiring urgent intervention
Identify deviations from normal and interpret these in the context of the clinical circumstances
Undertake further consultation / investigation when indicated
Intermediate
Knowledge
Principles, including indications, limitations and therapeutic modalities of: MRI, ultrasound, angiography and radionucleotide studies in the critically ill patient
Basic interpretation of imaging investigations: • 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 kinetic or dyskentic segments, pericardial effusion with or without evidence of tamponade)
Skills
Communicate effectively with radiological colleagues to plan, perform and interpret test results

2.7 Monitors and responds to trends in physiological variables
Basic
Knowledge
Indications, contraindications and complications associated with monitoring and monitoring devices; advantages and

disadvantages of different monitoring systems / modalities taking into account their accuracy, convenience, reliability, safety, cost and relevance to the patient's condition
Interpretation of information from monitoring devices, and identification of common causes of error; principles of monitoring trends of change and their significance
Hazards of inappropriate monitoring including misuse of alarms; principles of disconnection monitors
Principles of invasive pressure monitoring devices: components and functions of an electromanometer system (catheter, tubing, transducer, amplifier and display unit); zero and calibration techniques; dynamics of the system - natural frequency and damping
Methods for measuring temperature
Principles, indications and limitations of pulse oximetry
Principles of ECG monitoring (heart rate, rhythm, conduction, ST segment change and 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
Physical principles, indications and limitations of end tidal CO_2 monitoring
Principles of fluid input-output monitoring
Methods for assessing pain and sedation
Methods for assessing neurological function e.g. Glasgow Coma Scale
Skills
Monitor vital physiological functions as indicated
Obtain and accurately record data from monitors
Differentiate real change from artefact and 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
Obtain and interpret data from: • invasive and non-invasive arterial blood pressure measurement • ECG / EKG (3 and 12 lead) • central venous catheters • pulse oximetry • FVC, spirometry and peak flow measurement
Set monitor alarms appropriately
Interpret data from scoring or scaling systems to assess pain and sedation
Assess and document Glasgow Coma Scale (GCS)
Intermediate
Knowledge
Relationship between end tidal CO_2 and arterial pCO_2 in various clinical circumstances
Principles of haemodynamic monitoring - invasive and 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, the principles involved and the type and site of placement of the monitoring device
Interpretation of, relationships between, sources of error and limitations of measured and derived cardiovascular variables including pressure, flow, volume and gas transport
Principles of monitoring ventilation: relationship between mode of ventilation and choice of parameters monitored; airflow and airway pressure waveforms
Principles, indications and limitations of intra-abdominal pressure monitoring
Skills
Obtain and interpret data from: • pulmonary artery catheter or oesophageal Doppler • inspired and expired gas monitoring for O_2, CO_2 and NO • intracranial pressure monitoring
Recognise changes in intracranial pressure and cerebral perfusion pressure which are life threatening
Advanced
Knowledge
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
Skills
Obtain and interpret data from: • Jugular bulb catheters and $SjvO_2$ monitoring

2.8 Integrates clinical findings with laboratory investigations to form a differential diagnosis
Basic
Knowledge
Sensitivity and specificity of the investigation as related to a specific disease
Appropriate use of laboratory tests to confirm or refute a clinical diagnosis
Interpretation of information from monitoring devices, and identification of common causes of error; principles of monitoring trends of change and their significance
Skills
Obtain relevant information from the patient, relatives and other secondary sources
Examine patients, elicit and interpret clinical signs (or relevant absence of clinical signs) in the ICU environment
Integrate clinical findings with results of investigations
Interpret laboratory results in the context of the patient's condition
Identify abnormalities requiring urgent intervention
Communicate and collaborate effectively with all laboratory staff
Intermediate
Skills
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
Assemble clinical and laboratory data, logically compare all potential solutions to the patient's problems, prioritise them and establish a clinical management plan

Domain 3: Disease Management

General Principles

Diagnostic accuracy determines therapeutic specificity. Although in the early phases of managing an acutely ill patient, physiological safety and support are the main issues, making the correct diagnosis and providing the right treatment will determine the patient's outcome. Disease management therefore requires skills in integrating clinical information with laboratory data, and applying 'best practice' guidelines promptly and effectively. It also involves regular clinical review with revision of diagnostic possibilities and modification of treatment according to patient response. The possibility of incomplete, partial or incorrect diagnosis should be borne in mind when reviewing and particularly if the patient is deteriorating alternative diagnoses should be sought.

Features of competent performance may include:

- Recognition of clinical signs and symptoms
- Identification of main acute complications and management
- Planning and prioritisation of investigations and monitoring – appropriate; timely
- Appropriate differential diagnosis with regular review and update
- Clear decision making and plan of management (including application of relevant protocols / guidelines / care bundles)
- Effective team-working: collaboration, communication and continuity of care
- Professional relationship with patient and relatives: communication; interpersonal skills; attention to patient comfort; ethical principles
- Appropriate referral / consultation
- Recognition of limitations (self and others)

Domain 3: *Competencies*

Competence	*Description*	*IBTICM level*	*Assessment methods*	*GMP*
3.1	Manages the care of the critically ill patient with specific acute mental conditions	Basic	D, I, C, M, T	1
3.2	Identifies the implications of chronic and co-morbid disease in the acutely ill patient	Basic	C	1
3.3	Recognises and manages the patient with circulatory failure	Basic	I, C, T	1
3.4	Recognises and manages the patient with, or at risk of, acute kidney injury	Basic	I, C, T	1
3.5	Recognises and manages the patient with, or at risk of, acute liver failure	Basic	I, C, T	1
3.6	Recognises and manages the patient with neurological impairment	Basic	I, C, T	1
3.7	Recognises and manages the patient with acute gastrointestinal failure	Basic	I, C, T	1
3.8	Recognises and manages the patient with acute lung injury syndromes (ALI / ARDS)	Basic	I, C, T	1
3.9	Recognises and manages the septic patient	Basic	I, C, T	1
3.10	Recognises and manages the patient following intoxication with drugs or environmental toxins	Basic	I, C	1
3.11	Recognises life-threatening maternal peripartum complications and manages care under	Intermediate	I, C	1

Domain 3: *Syllabus*

Knowledge, skills and attitudes common to all competencies
Knowledge
Impact of occupational and environmental exposures, socio-economic factors, and life style factors on critical illness
Recognises the importance of timely institution of organ-system support
Recognises the differences between organ system support and specific treatment
Skills
Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
Order and prioritise appropriate investigations
Develop a working, and limited differential diagnosis based on presenting clinical features
Prioritise therapy according to the patient's needs
Define targets of therapy and review efficacy at regular intervals
Consider modifying diagnosis and/or therapy if goals are not achieved or in light of new information
Recognise and manage emergencies; seek assistance appropriately
Critically appraise the evidence for and against specific therapeutic interventions or treatments
Lead, delegate and supervise others appropriately according to experience and role

Consults, communicates and collaborates effectively with patients, relatives and the health care team
Attitudes
Adopts a problem solving approach
Demonstrates compassionate care of patients and relatives
Demonstrates desire to minimise patient distress
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Enquiring mind, undertakes critical analysis of published literature

3.1 Manages the care of the critically ill patient with specific acute medical conditions
Basic
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, pneumothorax (simple and tension), pulmonary embolus, pleural effusion
Cardiovascular disorders: Common arrhythmias and conduction disturbances, shock states (anaphylactic, cardiogenic, hypovolaemic, septic); crescendo or unstable angina; acute myocardial infarction; left ventricular failure; hypotension and hypertension
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
Renal and genito-urinary disorders: Urological sepsis; acute kidney injury; chronic renal failure; nephrotoxic drugs and monitoring
Gastrointestinal disorders: peptic/stress ulceration; upper GI haemorrhage; diarrhoea and vomiting;
Haematological and oncological disorders: Disseminated intravascular coagulation (DIC) and other coagulation disorders, Massive blood transfusion, acute and chronic anemia
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)
Metabolic disorders: Electrolyte disorders; acid-base disorders; fluid-balance disorders; thermoregulation and associated disorders
Endocrine disorders: critical illness-induced hyperglycaemia; diabetes mellitus; hypoadrenalism
Treatment algorithms for common medical emergencies
Multisystem effects of acute medical conditions and implications for clinical management
Therapies available for the treatment of commonly encountered medical conditions, their efficacy and potential side-effects
Skills
Recognise impending organ system dysfunction
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
Intermediate
Knowledge
Pathophysiology, diagnosis and management of commonly encountered acute medical conditions including:
Respiratory Disorders: Acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) and their causative factors; pulmonary haemorrhage, upper and lower airway obstruction including epiglottitis
Cardiovascular disorders: Valvular heart disease; vaso-occlusive diseases; pulmonary hypertension; right ventricular failure; cor pulmonale; malignant hypertension; cardiac tamponade; pacing box failure
Neurological disorders: 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: Renal manifestations of systemic disease including vasculitides; rhabdomyolysis
Gastrointestinal disorders:

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 and pseudo-obstruction; abdominal trauma; intra-abdominal hypertension and compartment syndrome; short-bowel syndrome; rupture of liver or spleen.
Haematological disorders: Haemolytic syndromes, immune disorders. Lymphoproliferative disorders. High risk groups: the immunosuppressed or immunoincompetent patient, chemotherapy, agranulocytosis and bone marrow transplant patients.
Infections: Organisms causing specific infections: Gram positive and Gram negative bacteria, fungi, protozoa, viruses; nosocomial infections, pyometria; septic abortion
Endocrine disorders: Over- and under-activity of thyroid; adrenal and pituitary disorders; sepsis-induced relative adrenal insufficiency; endocrine 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
Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
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
Identify and manage chronic co-morbid disease
Advanced
Knowledge
Respiratory muscle disorders
Cardiomyopathies

3.2 Identifies the implications of chronic and co-morbid disease in the acutely ill patient
Basic
Skills
Pathophysiology, diagnosis and management of commonly encountered chronic medical conditions including:
Respiratory disorders: Asthma; chronic obstructive airways disease; pulmonary fibrosis; pulmonary thromboembolic disease; respiratory muscle disorders
Cardiovascular disorders: Hypertension; angina; chronic heart failure (LVF / RVF); veno-occlusive disorders; cardiomyopathies; valvular heart disease and prosthetic valves; pulmonary hypertension; cor pulmonale; common arrhythmias and conduction disturbances; peripheral vascular disease
Neurological disorders: Cerebro-vascular accidents (CVA / stroke); epilepsy; dementia; neuropathy and myopathy
Renal disorders: chronic renal failure; renal manifestations of systemic disease including vasculitides; nephrotoxic drugs
Gastrointestinal disorders: chronic pancreatitis; chronic liver failure; cirrhosis; inflammatory bowel diseases
Endocrine disorders: Diabetes; thyroid, adrenal and pituitary disorders
Consider potential interactions when prescribing drugs and therapies
Intermediate
Knowledge
Haematological and oncological disorders: Coagulation disorders, hemolytic syndromes, platelet disorders; chronic anemia, immune disorders, malignancy including complications of chemotherapy and radiotherapy
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
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
Skills
Identify and manage chronic co-morbid disease
Identify and evaluate requirements for continuation of chronic treatments during and after the acute illness
Evaluate the impact of chronic disease and prior health on outcomes
Take chronic health factors into account when determining suitability for intensive care
Advanced
Knowledge
Implications of acute illness in patients with chronic respiratory failure requiring long term home ventilation
Use of home ventilators, cough assist devices and other aids to respiratory care in the community

3.3 Recognises and manages the patient with circulatory failure
Basic
Knowledge
Risk factors, recognition and assessment of circulatory failure
Cardiovascular disorders: Cardiac arrest; common arrhythmias and conduction disturbances, shock states (anaphylactic, cardiogenic, hypovolaemic, septic); crescendo or unstable angina; acute myocardial infarction; left ventricular failure; hypotension and hypertension; circulatory effects of pulmonary embolism & tension pneumothorax
Cardiopulmonary resuscitation
Skills
Identify patients at risk of developing circulatory failure
Assess, predict and manage circulatory shock
Establish a management plan based on clinical and laboratory information
Use fluids and vasoactive / inotropic drugs to support the circulation (*see 4.4*)
Consider potential interactions when prescribing drugs and therapies
Intermediate
Knowledge
Valvular heart disease; vaso-occlusive diseases; pulmonary hypertension; right ventricular failure; cor pulmonale; malignant hypertension; cardiac tamponade; pacing box failure
Effect of circulatory failure and its treatment on other organ systems
Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
Complications of specific therapies, their incidence and management
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
Skills
Measure and interpret haemodynamic variables (including derived variables)
Optimise myocardial function
Advanced
Knowledge
Cardiomyopathies
Use of mechanical assist devices to support the circulation (*see 4.4*)

3.4 Recognises and manages the patient with, or at risk of, acute renal failure
Basic
Knowledge
Renal and genito-urinary disorders: Oliguria and anuria; polyuria; urological sepsis; acute renal failure; chronic renal failure; nephrotoxic drugs and monitoring
Metabolic disorders: electrolyte disorders; acid-base disorders; fluid balance disorders
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
Range of therapeutic interventions available to support organ function and treat the underlying causes

Nephrotoxic drugs and adjustment of drug doses in renal impairment/failure
Indications for and basic interpretation of drug concentrations in blood or plasma
Urinary catheterisation techniques: transurethral and suprapubic
Skills
Identify patients at risk of developing renal failure
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
Perform aseptic urinary catheterisation: male and female (*see 5.24*)
Intermediate
Knowledge
Renal manifestations of systemic disease including vasculitides; rhabdomyolysis
Symptoms, signs and causes of renal failure including acutekidney injury / chronic / acute on chronic) and indications for intervention
Electrolyte disorders notably hyperkalaemia; acid-base disorders; fluid-balance
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
Indications, complications and selection of renal replacement therapies (continuous and intermittent)
Effect of renal failure and its treatment on other organ systems
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
Skills
Identify and avoid factors contributing to impaired renal function
Initiate, manage and wean patients from renal replacement therapy (see 4.7)

3.5 Recognises and manages the patient with, or at risk of, acute liver failure
Basic
Knowledge
Symptoms and signs of acute liver failure and assessment of severity
Investigation of impaired hepatic function
Causes and complications of acute and acute-on-chronic liver failure, their prevention and management
Causes, recognition and management of associated disorders:
Metabolic disorders: Electrolyte disorders; acid-base disorders; fluid-balance disorders; thermoregulation and associated disorders
Haematological disorders: Coagulation and fibrinolytic pathways and their associated disorders; disseminated intravascular coagulation (DIC); hemolytic syndromes, acute anaemia; complications of massive blood transfusion
Pathogenesis of multiple organ dysfunction (MODS) and the inflammatory response in relation to organ system dysfunction
Methods for assessing neurological function e.g. Glasgow Coma Scale
Indications for and basic interpretation of drug concentrationss in blood or plasma
Principles of blood glucose control: indications, methods, monitoring of safety and efficacy
Skills
Identify patients at risk of developing acute liver failure
Interpret laboratory tests of liver function
Recognise impending organ system dysfunction
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
Assess and document Glasgow Coma Scale (GCS)
Identify and manage coagulopathies
Prevent, identify and manage hyper / hypoglycaemia
Intermediate
Knowledge
Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
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
Principles of cerebral perfusion pressure, cerebral oxygen delivery and the methods by which they may be optimised
Factors and therapies which may influence intracranial pressure and cerebral perfusion pressure
Hepatotoxic drugs and adjustment of drug doses in hepatic impairment / failure
Principles and techniques for insertion of gastro-oesophageal balloon tamponade tube (e.g. Sengstaken-Blakemore)
Causes, recognition and management of HELLP syndrome
Effect of liver failure and its treatment on other organ systems
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
Skills
Examine and plan care for the confused patient
Take prompt action to reduce acutely elevated intracranial pressure
Manage cardiorespiratory physiology to minimise rises in intracranial pressure
Prevent, identify and treat hyponatraemia
Advanced
Knowledge
Supportive therapy for the failing liver including extracorporeal liver support and indications for emergency liver transplantation
Principles of measurement of jugular venous saturation, cerebral Doppler velocities and cerebral blood flow.
Indications for transcutaneous and transjugular liver biopsies and transjugular intrahepatic portosystemic shunt (TIPSS)
Skills
Obtain and interpret data from intracranial pressure monitoring
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)
Basic Science
Knowledge
Functions of the liver - biosynthetic, immunologic, and detoxification

3.6 Recognises and manages the patient with neurological impairment
Basic
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)
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
Causes, recognition and management of associated disorders:
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, contraindications and complications of lumbar puncture (see 5.15)
Skills
Assess and document Glasgow Coma Scale (GCS)
Establish a management plan based on clinical and laboratory information
Perform a lumbar puncture under supervision (*see 5.15*)
Consider potential interactions when prescribing drugs and therapies
Intermediate
Knowledge
Neurological disorders: 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

Indications for urgent imaging of the brain and neurosurgical consultation
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
Principles of cerebral perfusion pressure, cerebral oxygen delivery and the methods by which they may be optimised
Factors and therapies which may influence intracranial and cerebral perfusion pressure
Aetiology and management of raised intracranial pressure (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
Application of techniques to treat or induce hypo/hyperthermia
Principles, indications and limitations of electroencephalogram (EEG) and evoked potentials
Effect of impaired neurological function and its support and treatment on other organ systems
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
Skills
Identify patients at risk of neurological impairment
Identify and avoid factors contributing to neurological impairment
Examine and plan care for the confused patient
Recognise changes in intracranial pressureand 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
Advanced
Knowledge
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 measurement of jugular venous saturation, cerebral Doppler velocities and cerebral blood flow.
Skills
Undertake or assist in the insertion and maintenance of an intracranial pressure monitor
Obtain and interpret data from intracranial pressure monitoring
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)
3.7 Recognises and manages the patient with acute gastrointestinal failure
Basic
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
Gastrointestinal disorders: Abdominal pain and distension; stress/peptic ulceration and upper GI haemorrhage; lower GI bleeding; diarrhoea and vomiting
Causes, recognition and management of associated disorders:
Metabolic disorders: Electrolyte disorders; acid-base disorders; fluid-balance disorders; thermoregulation and associated disorders
Indications for urgent imaging and surgical consultation
Factors and therapies which may influence intra-abdominal pressure; aetiology and management of raised intra-abdominal pressure
Effects of impaired gastrointestinal function and its treatment on other organ systems
Principles of nutritional assessment and support (*see 4.9*)
Skills
Identify and avoid factors contributing to gastrointestinal dysfunction
Identify patients at risk of gastrointestinal dysfunction
Prevent, identify and manage hyper / hypoglycaemia
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
Intermediate
Knowledge
Pancreatitis; jaundice; cholecystitis; inflammatory bowel diseases; peritonitis; mesenteric infarction; perforated viscus; bowel obstruction; ascites; intra-abdominal hypertension & compartment syndrome; short-bowel syndrome, GI fistulae.

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
Principles and techniques for insertion of gastro-oesophageal balloon tamponade tube (e.g. Sengstaken-Blakemore)
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome

3.8 Recognises and manages the patient with acute lung injury syndromes (ALI / ARDS)
Basic
Knowledge
Symptoms and signs of acute airway insufficiency and acute respiratory failure, and indications for intervention
Causes of respiratory failure, their prevention and management
Respiratory disorders: Tachypnoea, dyspnoea, pneumonia, lung or lobar collapse, pulmonary oedema, pulmonary embolus, pleural effusion, pneumothorax (simple and tension)
Pathogenesis of acute lung injury (ALI / ARDS)
Pathogenesis of multiple organ dysfunction (MODS) and the inflammatory response in relation to organ system dysfunction
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
Initial set-up 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
Detection and management of haemo/pneumothorax (simple and tension)
Lung protective ventilation for acute lung injury (ALI)
Principles of weaning from mechanical ventilation and factors which may inhibit weaning
Skills
Identify patients at risk of acute lung injury (ALI / ARDS)
Implement emergency airway management and ventilation under direct supervision
Identify and avoid factors contributing to acute lung injury
Perform thoracocentesis and manage intercostal drains (*see 5.7*)
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
Intermediate
Knowledge
Acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) and their causative factors; pulmonary haemorrhage, near-drowning
Modification of ventilator settings according to the condition or response of the patient
Modes of mechanical ventilation - indications, contraindications and expected results of each mode (CMV, IRV, PRVC, HFOV, SIMV, PS, CPAP, BiPAP, NIV)
Ventilator associated pneumonia: definition, pathogenesis and prevention
Concept of risk : benefit ratio and cost effectiveness of therapies
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
Skills
Implement emergency airway management and ventilation
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
Advanced
Knowledge
Pharmacological and non-pharmacological adjunct therapies for ALI
Principles of extra-corporeal membrane oxygenation (ECMO)

3.9 Recognises and manages the septic patient
Basic
Knowledge

Pathogenesis, definitions and diagnostic criteria of sepsis, severe sepsis, septic shock and systemic inflammatory response syndrome (SIRS)
Causes, recognition and management of sepsis-induced organ dysfunction; multisystem effects of sepsis and their impact on clinical management
Pathogenesis of multiple organ dysfunction (MODS) and the inflammatory response in relation to organ system dysfunction
Infection and its relation to the inflammatory response
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)
Techniques for effective fluid resuscitation
Use of fluids and vasoactive / inotropic / anti-arrhythmic drugs to support the circulation (*see 4.4*)
Indications, complications, interactions, selection, monitoring, and efficacy of common antimicrobial drugs (antibacterial, antifungal, antiviral, antiprotozoal, antihelmintics)
Principles of blood glucose control: indications, methods, monitoring of safety and efficacy
Skills
Assess, predict and manage circulatory shock
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*)
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
Prevent, identify and manage hyper / hypoglycaemia
Intermediate
Knowledge
Infections: Organisms causing specific infections: Gram positive and Gram negative bacteria, fungi, protozoa, viruses; nosocomial infections, pyometra; septic abortion
Occult indicators of sepsis
Sepsis mediators
Local patterns of bacterial resistance and antibiotic policy
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
Detection and management of adrenocortical dysfunction
Concept of risk : benefit ratio and cost effectiveness of therapies
Prognostic implications of multiple systems dysfunction or failure
Advanced
Knowledge
Safe use of therapies which modify the inflammatory response

3.10 Recognises and manages the patient following intoxication with drugs or environmental toxins
Basic
Knowledge
Symptoms and signs of acute intoxication associated with common intoxicants
Cardiovascular disorders: drug induced arrhythmias and conduction disturbances
Neurological disorders: drug induced neurological impairment
Haematology: drug induced coagulopathy
Multisystem 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): risks and benefits
Pharmacology of common intoxicants
Indications for and basic interpretation of drug concentrations in blood or plasma
Aware of and know how to contact National Poisons Information Bureau/Toxbase
Services available to patients and families to provide emotional or psychiatric support
Skills

Establish a management plan based on clinical and laboratory information
Interpret laboratory tests of liver function
Consider potential interactions when prescribing drugs and therapies
Assess and document Glasgow Coma Scale (GCS)
Implement emergency airway management and ventilation under direct supervision
Identify patients at risk of developing renal failure
Identify patients at risk of developing acute liver failure
Identify and manage coagulopathies
Intermediate
Knowledge
Respiratory disorders: smoke, inhalation or burned airway damage; carbon monoxide poisoning
Renal disorders: nephrotoxic drugs - monitoring & adjustment of drug doses in renal impairment / failure; rhabdomyolysis
Gastrointestinal disorders: drug induced liver injury; hepatotoxic drugs and adjustment of drug doses in hepatic impairment / failure; fulminant hepatic failure
Management of acute liver failure (*see 3.5*)
Implement emergency airway management and ventilation
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
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
Skills
Examine and plan care for the confused patient
Advanced
Knowledge
Indications and complications of hyperbaric oxygenation
Skills
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)

3.11 Recognises life-threatening maternal peripartum complications and manages care under supervision
Basic
Knowledge
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
Skills
Identify and manage coagulopathies
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
Intermediate
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; peripartum cardiomyopathy.
Risks and avoidance of pulmonary aspiration in pregnant patients
Risk factors, identification and management of venous thromboembolism in the pregnant patient
Methods of avoiding aorto-caval compression
Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
Cardiovascular disorders: peripartum cardiomyopathy; pulmonary hypertension
Effects of concomitant treatment and/or co-morbid conditions on an individual patient's response to treatment
Management of critical illness in woman with concurrent pregnancy
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

Liaise with obstetric, midwifery and neonatal services
Manage pregnancy induced hypertension
Seek appropriate support and supervision in order to provide optimal patient care

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

General Principles

Skilled organ-system support including appropriate therapeutic interventions is the 'housekeeping' of intensive care practice, a necessary – but in itself insufficient – requirement for promoting survival from critical illness. The practical procedures associated with organ system support are considered in the next section.

Features of competent performance may include:

- Awareness of relevant applied anatomy, physiology and pharmacology
- Consider indications and contraindications of therapeutic intervention
- Consider alternative modes, methods and techniques
- Safe use of equipment / device / drugs
- Complications: prevention; identification; management; awareness of interactions between different forms of organ system support
- Clearly defined therapeutic strategy / care plan and goals of therapy
- Evaluation and modification of therapy according to clinical response
- Appropriate referral / consultation
- Recognition of limitations (self and others)
- Attention to patient safety

Domain 4: *Competencies*

Competence	*Description*	*IBTICM level*	*Assessment methods*	*GMP*

4.1	Prescribes drugs and therapies safely	Basic	D, C, M	1
4.2	Manages antimicrobial drug therapy	Basic	I, C, M	1
4.3	Administers blood and blood products safely	Basic	D, C, M	1
4.4	Uses fluids and vasoactive / inotropic drugs to support the circulation	Basic	I, C	1
4.5	Describes the uses of mechanical assist devices to support the circulation	Advanced	C	1
4.6	Initiates, manages, and weans patients from invasive and non-invasive ventilatory support	Basic	D, C, T	1
4.7	Initiates, manages and weans patients from renal replacement therapy	Intermediate	D, I, C, T	1, 4
4.8	Recognises and manages electrolyte, glucose and acid-base disturbances	Basic	I, C, T	1
4.9	Co-ordinates and provides nutritional assessment and support	Basic	I, C, T	1

Domain 4: *Syllabus*

Knowledge, skills and attitudes common to all competencies
Knowledge
Understand the roles of regulatory agencies involved in drug use, monitoring and licensing e.g. National Institute for Clinical Excellence (NICE), Committee on Safety of Medicines (CSM) Medicines and Healthcare Products Regulatory Agency (MHRA) and hospital formulary committees
Skills
Prioritise therapy according to the patient's needs
Recognise and manage emergencies; seek assistance appropriately
Define targets of therapy and review efficacy at regular intervals
Recognises the importance of resources when prescribing, including the role of a Drug Formulary and electronic prescribing systems
Consider modifying diagnosis and/or therapy if goals are not achieved
Obtain informed consent/assent from the patient where appropriate
Critically appraise the evidence for and against specific therapeutic interventions or treatments
Lead, delegate and supervise others appropriately according to experience and role
Attitudes
Responds rapidly to acute changes in monitored variables
Consults, communicates and collaborates effectively with patients, relatives and the health care team skill
Desire to minimise patient distress
Demonstrates compassionate care of patients and relatives
Respects the expressed wishes of competent patients, even when in conflict with the views of the physician
Appreciates the differences between organ system support and specific treatment
Appreciates the importance of timely institution of organ-system support
Respects the ideas and beliefs of the patient and their family and their impact on decision making (does not impose own views)
Recognises the need for supportive care for all organ systems whether failing / injured or not
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Participates in adverse drug event reporting mechanisms
Remains up to date with therapeutic alerts, and responds appropriately

4.1 Prescribes drugs and therapies safely
Basic
Knowledge
Mode of action of drugs (*see Basic Sciences*)
Pharmacokinetics and pharmacodynamics (*see Basic Sciences*)
Systemic pharmacology: indications, contraindications, effects and interactions of commonly used drugs including: • hypnotics, sedatives and intravenous anaesthetic agents • drugs used to treat delirium • simple and opioid analgesics; opioid antagonists

• non-steroidal anti-inflammatory agents • neuromuscular blocking agents (depolarising and non-depolarising) and 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 and motility; antiemetic agents • local anaesthetic agents • immunosuppressants • antihistamines
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 concentrationss in blood or plasma
Impact of drug therapy on organ-system function
Principles of blood glucose control: indications, methods, monitoring of safety and efficacy
Theoretical advantages and disadvantages of crystalloid and colloid solutions
Distinguishing features of acute versus chronic respiratory failure and implications for management
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
Skills
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
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)
Prescribe and manage anticoagulation therapy
Prescribe an appropriate standard enteral feeding regimen
Intermediate
Knowledge
Thrombolytic and anti-thrombolytic agents
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
Treatment strategies for abnormalities of fluid, electrolyte, acid-base and glucose balance
Methods to assess and monitor intravascular volume and state of hydration using clinical signs and technology
Fluid therapies: components, physical properties, distribution and clearance of commonly used fluids; indications, contraindications and complications of their administration
Hepatotoxic drugs and adjustment of drug doses in hepatic impairment / failure
The pathogenesis and management of anaemia, thrombocytopenia, neutropenia and pancytopaenia
Nutritional formulations: indications, complications and their management
Skills
Set realistic goals for therapy (independently or in collaboration with other teams)
Identify and avoid factors contributing to impaired renal function
Advanced
Skills
Consider risk-benefit and cost-benefit of alternative drugs and therapies
Recognise when treatment is unnecessary or futile
Basic Science
Knowledge

Physiology of fluid, electrolyte, acid-base and glucose control

Science

Types of intermolecular bonds
Laws of diffusion. Diffusion of molecules through membranes
Solubility and partition coefficients
Ionization of drugs
Drug isomerism
Protein binding
Oxidation and reduction

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

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

4.2 Manages antimicrobial drug therapy

Basic

Knowledge

Types of organisms - emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between contamination, colonisation and infection

Indications, complications, interactions, selection, monitoring, and efficacy of common antimicrobial drugs (antibacterial, antifungal, antiviral, antiprotozoal, antihelmintics)
Indications for and basic interpretation of drug concentrations in blood or plasma
Impact of drug therapy on organ-system function
Skills
Collaborate with microbiologists / infectious diseases clinicians to link clinical, laboratory and local (hospital / regional / national) microbiological data
Establish a management plan based on clinical and laboratory information
Prescribe appropriate antimicrobial therapy based on history, examination and preliminary investigations
Administer intravenous drugs (prepare, select route and mode of administration and document)
Intermediate
Knowledge
Local patterns of bacterial resistance and antibiotic policy
Principles of prescribing initial empirical therapy and modification / refinement with further clinical and microbiological information
Epidemiology and prevention of infection in the ICU
Risk factors for nosocomial infection and infection control measures to limit its occurrence
Ventilator associated pneumonia: definition, pathogenesis and prevention
Risks of inappropriate antimicrobial therapy on the patient and the environment
Requirements for microbiological surveillance and clinical sampling
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
Concept of gastrointestinal microbial translocation
Skills
Set realistic goals for therapy (independently or in collaboration with other teams)
Advanced
Knowledge
Safe use of therapies which modify the inflammatory response
Skills
Recognise when treatment is unnecessary or futile

4.3 Administers blood and blood products safely
Basic
Knowledge
Risks of inappropriate antimicrobial therapy on the patient and the environment
Indications for and basic interpretation of haematological tests (including coagulation and sickle tests)
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 and 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
Recognition and management of serious adverse reactions and anaphylaxis
Skills
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
Intermediate
Knowledge
The pathogenesis and management of anaemia, thrombocytopenia, neutropenia and pancytopaenia
Thrombolytic and anti-thrombolytic agents
Advanced
Knowledge
Principles and practise of plasma exchange
Skills

Recognise when treatment is unnecessary or futile

4.4 Uses fluids and vasoactive / inotropic drugs to support the circulation
Basic
Knowledge
Physiology and pathophysiology of the heart and circulation
Pathophysiological effects of altered intravascular volume
Pathophysiology and treatment of cardiac failure
Theoretical advantages and disadvantages of crystalloid and colloid solutions
Indications for, contraindication, risks and alternatives to blood transfusion
Pathophysiology, detection and management of shock states according to aetiology and in response to physiological data
Skills
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
Administer intravenous drugs (prepare, select route and mode of administration and document)
Use infusion pumps to administer drugs and fluids
Intermediate
Knowledge
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
Indications and contraindications, limitations and complications of inotropic / vasoactive drug therapy
Interactions between inotropic agents and concomitant therapies and/or co-morbid diseases (eg. ischaemic heart disease)
Principles of haemodynamic monitoring - invasive and 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, the principles involved and the type and site of placement of the monitoring device
Indications and limitations of transthoracic / transoesophageal echocardiography in shocked patient
Indications, limitations and complications of techniques of measurement of cardiac output (e.g. pulmonary artery catheter, 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)
Skills
Measure and interpret haemodynamic variables (including derived variables)
Select an appropriate inotrope / vasopressor - dose, physiological endpoint, rate and route of administration

4.5 Describes the use of mechanical assist devices to support the circulation
Basic
Knowledge
Pathophysiology and treatment of cardiac failure
Principles and techniques of cardiac pacing
Pathophysiology, detection and management of shock states according to aetiology and in response to physiological data
Intermediate
Knowledge
Prophylactic therapies and indications for their use
Principles of haemodynamic monitoring – invasive and 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, the principles involved and the type and site of placement of the monitoring device
Integration of data from clinical examination and haemodynamic monitoring to characterise haemodynamic derangements

Advanced
Knowledge
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)

4.6 Initiates, manages, and weans patients from invasive and non-invasive ventilatory support
Basic
Knowledge
Causes of respiratory failure, their prevention and management
Symptoms and signs 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 oxygen therapy and use of oxygen administration devices (*see 5.1*)
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 and PEEP delivery systems
Principles of emergency airway management (*see 5.3*)
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 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
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
Safe prescribing of oxygen; manifestations of pulmonary oxygen toxicity
Principles of weaning from mechanical ventilation and factors which may inhibit weaning
Management of and complications associated with tracheostomy tubes
Skills
Establish a management plan based on clinical and laboratory information
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)
Interpret data from an arterial blood gas sample
Confirm adequate oxygenation and control of $PaCO_2$ and pH
Set and interpret data from ventilator alarms
Intermediate
Knowledge
Modification of ventilator settings according to the condition or response of the patient
Modes of mechanical ventilation - indications, contraindications and expected results of each mode (CMV, IRV, PRVC, HFOV, SIMV, PS, CPAP, BiPAP, NIV)
Principles of monitoring ventilation: relationship between mode of ventilation and choice of parameters monitored; airflow and airway pressure waveforms
Measures of adequacy of tissue oxygenation, eg base deficit, lactate, central venous saturation
Measurement and interpretation of pulmonary mechanics during mechanical ventilation
Concept of gastrointestinal microbial translocation
Prophylactic therapies and indications for their use
Causes of lung injury in ventilated patients; effects and clinical manifestations of pulmonary barotrauma
Ventilator associated pneumonia: definition, pathogenesis and prevention
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
Indications and contraindications to tracheostomy (percutaneous and surgical) and minitracheostomy
Skills
Select the appropriate type and mode of ventilation for an individual patient
Stabilise a patient on a positive pressure ventilator
Construct, monitor and review a weaning plan
Advanced
Knowledge

Principles of extra-corporeal membrane oxygenation (ECMO)

4.7 Initiates, manages, and weans patients from renal replacement therapy
Basic
Knowledge
Investigation of impaired renal function
Distinguishing features of acute versus chronic renal failure and implications for management
Placement and management of invasive devices necessary for renal replacement therapy (e.g. temporary haemodialysis catheter)
Indications for and interpretation of fluid balance charts
Effect of renal failure and its treatment on other organ systems
Nephrotoxic drugs and adjustment of drug doses in renal impairment/failure
Skills
Establish a management plan based on clinical and laboratory information
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
Intermediate
Knowledge
Symptoms, signs and causes of renal failure including acute kidney injury / chronic / acute on chronic and indications for intervention
Indications, complications and selection of renal replacement therapies (continuous and intermittent)
Principles of haemofiltration, haemodialysis, peritoneal dialysis
Function and operation of continuous haemodiafiltration devices (key components and 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
Skills
Set realistic goals for therapy (independently or in collaboration with other teams)
Supervise the provision of continuous renal replacement therapy
Set appropriate exchange parameters and fluid balances for renal replacement therapies
Identify and avoid factors contributing to impaired renal function
Advanced
Skills
Haemoperfusion and plasmapheresis
Consider risk-benefit and cost-benefit of alternative drugs and therapies
Recognise when treatment is unnecessary or futile
Basic Science
Knowledge
Physiology of fluid, electrolyte, acid-base and glucose control

4.8 Recognises and manages electrolyte, glucose and acid-base disturbances
Basic
Knowledge
Principles of blood glucose control: indications, methods, monitoring of safety and efficacy
Skills
Establish a management plan based on clinical and laboratory information
Correct electrolyte disorders (e.g. hyperkalaemia, hyponatraemia)
Institute and manage a regimen to control blood glucose within safe limits
Confirm adequate oxygenation and control of $PaCO_2$ and pH
Identify and treat underlying causes for a metabolic acidosis
Intermediate
Knowledge
Effect of critical illness upon homeostatic mechanisms and causes of homeostatic disturbances
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
Symptoms, signs and causes of renal failure (acute / chronic / acute on chronic) and indications for intervention
Patterns of nutritional impairment; consequences of starvation and malnutrition
Fluid therapies: components, physical properties, distribution and clearance of commonly used fluids; indications, contraindications and complications of their administration
Skills
Identify and avoid factors contributing to impaired renal function
Advanced
Skills
Recognise when treatment is unnecessary or futile
Basic Science
Knowledge
Physiology of fluid, electrolyte, acid-base and glucose control

4.9 Co-ordinates and provides nutritional assessment and support
Basic
Knowledge
Indications, limitations, methods, and complications of enteral and parenteral nutritional techniques
Principles of nasogastric cannulation in the intubated and non-intubated patient
Prevention of stress ulceration
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
Prevention and management of constipation and diarrhoea
Principles of blood glucose control: indications, methods, monitoring of safety and efficacy
Skills
Prescribe an appropriate standard enteral feeding regimen
Identify surgical and other contraindications to enteral feeding
Institute and manage a regimen to control blood glucose within safe limits
Intermediate
Knowledge
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, malnutrition and refeeding
Fluid and caloric requirements in the critically ill patient including electrolytes, vitamins, trace elements and principles of immunonutrition
Nutritional formulations: indications, complications and their management
Alternative routes for enteral feeding: indications, contraindications and complications of post-pyloric and percutaneous feeding tube placement
Gut motility: effects of drugs, therapy and disease
Prokinetics: indications, contraindications, complications and selection
Antiemetics: indications, contraindications, complications and selection
Concept of gastrointestinal microbial translocation
Skills
Establish a management plan (independently or in collaboration with the clinical dietician)
Prescribe and supervise safe administration of a standard / customized parenteral (TPN) preparation
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
Liaise with clinical dieticians / medical team to plan feeding regimens after discharge from the ICU
Basic Science
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
Gastrointestinal physiology: gastric function; secretions; gut motility, sphincters and reflex control; nausea and vomiting; digestive functions

Domain 5: Practical procedures

General Principles

Practical procedures underpin all forms of organ system support.

Features of competent performance may include:

- Sound decision making in when to perform a practical procedure and when to avoid it
- Prior planning and preparation of patient (including consent), staff and equipment
- Prioritisation of tasks (patients and procedures)
- Consider comfort of the patient
- Awareness of relevant applied anatomy and physiology
- Correct placement / insertion technique - alternative modes and methods
- Attention to safety: safe use of equipment, infection control, confirmation of correct placement, prevention / management of complications
- Maintenance and safe use of devices - troubleshooting
- Consider duration of placement, discontinuation and removal
- Appropriate referral / consultation
- Recognition of limitations (self and others)
- Indications for specific monitoring to ensure patient safety during an intervention / procedure
- Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.
- Consider the use of local anaesthetics as the norm

Domain 5: *Competencies*

Competence	*Description*	*IBTICM level*	*Assessment methods*	*GMP*
5.1	Administers oxygen using a variety of administration devices	Basic	D	1
5.2	Performs emergency airway management	Basic	D	1
5.3	Performs difficult and failed airway management according to local protocols	Intermediate	D	1, 4
5.4	Performs endotracheal suction	Basic	D	1, 4
5.5	Performs fibreoptic bronchoscopy and BAL in the intubated patient under supervision	Intermediate	D, M	1, 4
5.6	Performs percutaneous tracheostomy	Advanced	D, M	1, 4
5.7	Performs chest drain insertion	Basic	D	1, 4
5.8	Performs arterial catheterisation	Basic	D, C	1, 4
5.9	Performs ultrasound techniques for vascular localisation	Basic	C	1, 4
5.10	Performs central venous catheterisation	Basic	D, C	1, 4
5.11	Performs defibrillation and cardioversion	Basic	D, C	1, 4

5.12	Performs transthoracic cardiac pacing describes transvenous	Intermediate	D, C	1, 4
5.13	Describes how to perform pericardiocentesis	Intermediate	C	1, 4
5.14	Demonstrates a method for measuring cardiac output and derived haemodynamic variables	Basic	D, C	1
5.15	Performs lumbar puncture (intradural / 'spinal') under supervision	Basic	D	1, 4
5.16	Manages the administration of analgesia via an epidural catheter	Intermediate	I	1, 4
5.17	Performs abdominal paracentesis	Intermediate	D	1, 4
5.18	Describes Sengstaken tube (or equivalent) placement	Intermediate	C	1, 4
5.19	Performs nasogastric tube placement in the intubated patient	Basic	D	1
5.20	Performs urinary catheterisation	Basic	D	1

Domain 5: *Syllabus*

Knowledge, skills and attitudes common to all competencies
Knowledge
Seek appropriate supervision - discuss the patient and procedure with supervisor prior to undertaking it
Patient selection - indications, contraindications and potential complications of the procedure / intervention
Methods and routes of insertion - associated indications and complications
Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
Principles of aseptic technique and aseptic handling of invasive medical devices
Indications for specific monitoring to ensure patient safety during an intervention / procedure
Detection of potential physiological alterations during the procedure
Appropriate use of drugs to facilitate the procedure
Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)
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
Prioritise tasks and procedures,
Exhibit sound decision making
Obtain informed consent/assent from the patient where appropriate
Select appropriate equipment or device and 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
Use drugs as indicated to facilitate the procedure
Perform the procedure in a manner which minimises the risks of complications
Undertake appropriate investigation to confirm correct placement of device or exclude complications
Recognise and manage emergencies; seek assistance appropriately
Sterilise, clean or dispose of equipment appropriately
Lead, delegate and supervise others appropriately according to experience and role
Attitudes
Considers patient comfort during procedures / investigations
Demonstrates desire to minimise patient distress
Promotes respect for patient privacy, dignity and confidentiality
Supports other staff in the correct use of devices
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Accepts personal responsibility for the prevention of cross infection and self infection

5.1 Administers oxygen using a variety of administration devices
Basic

Knowledge
Symptoms, signs and causes of acute airway insufficiency and indications for intervention
Methods of maintaining a clear airway
Principles of emergency airway management (*see 5.3*)
Indications, contraindications and complications of oxygen therapy
Indications for and operation of fixed and variable performance oxygen therapy equipment, humidification and nebulising devices
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
Skills
Check pipelines; check and change portable cylinders
Select appropriate equipment or device to deliver oxygen therapy
Recognise and institute appropriate oxygen therapy in the management of medical emergencies; seek assistance as appropriate
Support ventilation using bag and mask
Advanced
Knowledge
Indications for and complications of hyperbaric oxygenation
Basic Science
Knowledge
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; respiratory muscle oxygen consumption and work of breathing.
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 nebulisers, pressure regulators, flowmeters, vaporizers and breathing systems

5.2 Performs emergency airway management
Basic
Knowledge
Principles of emergency airway management (see 5.3)
Symptoms , signs and causes of acute airway insufficiency and indications for intervention
Methods of maintaining a clear airway
Indications, selection and insertion of oral (Guedel) airways, nasopharyngeal airways and laryngeal mask airways (LMA)
Tracheal intubation: selection of tube type, diameter and 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
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
Cricoid pressure: indications and safe provision
Principles of endotracheal suctioning (*see 5.5*)
Select appropriate tracheal tube type, size and length under direct supervision
Skills
Choose a safe environment to undertake airway management (or optimise environment as circumstances allow)
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
Perform intubation and verify correct placement of tube under direct supervision
Manage and minimise cardiovascular and respiratory changes during and after intubation under direct supervision
Demonstrate rapid sequence induction of anaesthesia / cricoid pressure under direct supervision
Apply an end-tidal CO_2 detector post-intubation and interpret a capnograph trace
Prepare the patient for and perform extubation
Change an orotracheal tube
Select appropriate tracheal tube type, size and length under direct supervision
Intermediate

Knowledge
Bronchoscopic appearance of the upper and lower airways
Bronchoscopic appearance of the upper and lower airways
Management of difficult or failed airway (*see 5.4*)
Airway management in special circumstances including but not limited to : head injury, full stomach, upper airway obstruction, shock, cervical spine injury, laryngectomy
Skills
Perform intubation and verify correct placement of tube
Manage and minimise cardiovascular and respiratory changes during and after intubation
Demonstrate rapid sequence induction of anaesthesia / cricoid pressure
Select appropriate tracheal tube type, size and length
Management of complications of tracheostomy including but not limited to: blockage, displacement

5.3 Performs difficult and failed airway management according to local protocols
Basic
Skills
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
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)
Support ventilation using bag and mask
Accurately assess the airway for potential difficulties with airway management
Appropriate use of drugs to facilitate airway control
Prepare equipment for difficult or failed intubation under direct supervision
Intermediate
Knowledge
Bronchoscopic appearance of the upper and lower airways
Airway management in special circumstances, (head injury, full stomach, upper airway obstruction, shock, cervical spine injury)
Management of difficult intubation and failed intubation (local algorithm or protocol)
Indications and methods of securing an emergency surgical airway
Anatomical landmarks for cricothyrotomy/tracheostomy/mini-tracheotomy
Indications and techniques for needle and surgical crycothyroidotomy
Indications and contraindications to tracheostomy (percutaneous and surgical) and minitracheostomy
Skills
Prepare equipment for difficult or failed intubation
Demonstrate failed intubation drill (according to local algorithm or protocol)
Demonstrate minitracheotomy or needle crico-thyoidotomy

5.4 Performs endotracheal suction
Basic
Knowledge
Symptoms, signs and causes of acute airway insufficiency and indications for intervention
Methods of maintaining a clear airway
Principles of endotracheal suctioning
Consequences of the procedure during ventilation
Skills
Perform endotracheal suction (via oral / nasal / tracheostomy tube)
Intermediate
Knowledge
Bronchoscopic appearance of the upper and lower airways

5.5 Performs fibreoptic bronchoscopy and BAL in the intubated patient under supervision
Basic
Knowledge
Symptoms, signs and causes of acute airway insufficiency and indications for intervention
Detection and management of haemo/pneumothorax (simple and tension)

Skills
Undertake bronchoscopy to assess tube position under direct supervision
Intermediate
Knowledge
Bronchoscopic appearance of the upper and lower airways
Method of bronchoscopy via an endotracheal tube
Methods of broncho-alveolar lavage (BAL) in an intubated patient
Safety and maintenance of flexible fibreoptic endoscopes
Skills
Undertake bronchoscopy to assess tube position
Undertake theraputic bronchoscopy for sputum clearance

5.6 Performs percutaneous tracheostomy
Basic
Knowledge
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
Management of and complications associated with tracheostomy tubes
Skills
Manage and minimise cardiovascular and respiratory changes during and after intubation under direct supervision
Select appropriate tracheal tube type, size and length under direct supervision
Intermediate
Knowledge
Indications and contraindications to tracheostomy (percutaneous and surgical) and minitracheostomy
Anatomical landmarks for cricothyrotomy/tracheostomy/mini-tracheotomy
Techniques for percutaneous and surgical tracheotomy
Select appropriate tracheal tube type, size and length
Skills
Manage and minimise cardiovascular and respiratory changes during and after intubation
Select appropriate tracheal tube type, size and length
Change a tracheostomy tube electively
Advanced
Skills
Identify patients requiring tracheostomy; discuss indications and contraindications for percutaneous tracheostomy
Manage anaesthesia and control the airway during planned tracheostomy tube insertion in the intensive care unit (ICU)

5.7 Performs chest drain insertion
Basic
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
Consequences of the procedure during ventilation
Skills
Demonstrate emergency relief of tension pneumothorax
Demonstrate aseptic insertion of an intrapleural chest drain and connection to a one-way seal device

5.8 Performs arterial catheterisation
Basic
Knowledge
Principles of arterial catheterisation
Surface anatomy: arteries of the arms and legs
Allens test - application and limitations
Ultrasound techniques for vascular localisation (*see 5.9*)
Recognition and management of inadvertent intra-arterial injection of harmful substances
Skills
Insert arterial catheters by different routes

Minimise blood loss related to clinical investigations and procedures

5.9 Describes ultrasound techniques for vascular localisation
Basic
Knowledge
Basic principles of ultrasound and the Doppler effect
Methods for securing vascular access rapidly
Principles, routes and techniques of peripheral and central venous cannulation
Principles of arterial catheterisation
Basic Science
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

5.10 Performs central venous catheterisation
Basic
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 central venous cannulation
Chest x-ray interpretation (*see 2.6*)
Ultrasound techniques for vascular localisation (*see 5.9*)
Methods for securing vascular access rapidly
Detection and management of haemo/pneumothorax (simple and tension)
Skills
Insert central venous catheters by different routes
Minimise blood loss related to clinical investigations and procedures
Intermediate
Skills
Describe a method for tunnelled intravenous catheterisation(e.g. for parenteral nutrition)

5.11 Performs defibrillation and cardioversion
Basic
Knowledge
Principles of ECG monitoring (heart rate, rhythm, conduction, ST segment change and QT interval) – indications, limitations and techniques. Advantages and disadvantages of different lead configurations
Basic and complex cardiac arrhythmias - recognition and management (pharmacological and electrical)
Treatment (algorithm) of patients in ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT)
Defibrillation: principles of monophasic and biphasic defibrillators; mechanism, indications, complications, modes and methods (manual and automated external defibrillators (AED))
Principles of emergency airway management (*see 5.3*)
Skills
Obtain and interpret data from ECG (3- and 12-lead)
Use manual external defibrillators
Use automated external defibrillators (AED)
Basic Science
Knowledge
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.

5.12 Performs transthoracic cardiac pacing, describes transvenous
Basic

Knowledge
Principles and techniques of cardiac pacing
Principles of ECG monitoring (heart rate, rhythm, conduction, ST segment change and QT interval) – indications, limitations and techniques. Advantages and disadvantages of different lead configurations
Methods for securing vascular access rapidly
Principles, routes and techniques of peripheral and central venous cannulation
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
Detection and acute management of cardiac tamponade
Principles of emergency airway management (*see 5.3*)
Detection and management of haemo/pneumothorax (simple and tension)
Insertion and management of chest drains and air exclusion devices
Skills
Demonstrate emergency relief of tension pneumothorax
Intermediate
Skills
Principles of defibrillation and cardioversion (*see 5.11*)
Demonstrate emergency percutaneous pericardial aspiration
Advanced
Skills
Insert a temporary pacing wire
Establish and review pacing box settings

5.13 Describes how to perform pericardiocentesis
Basic
Knowledge
Detection and acute management of cardiac tamponade
Anatomical landmarks and technique for percutaneous pericardial aspiration
Principles of ECG monitoring (heart rate, rhythm, conduction, ST segment change and QT interval) – indications, limitations and techniques. Advantages and disadvantages of different lead configurations
Treatment (algorithm) of patients in ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT)
Principles of emergency airway management (*see 5.3*)
Principles of defibrillation and cardioversion (*see 5.11*)

5.14 Demonstrates a method for measuring cardiac output and derives haemodynamic variables
Basic
Knowledge
Zero and calibration techniques for invasive pressure monitoring
Skills
Obtain and interpret data from central venous catheters
Prepare equipment for intravascular pressure monitoring
Intermediate
Knowledge
Principles of haemodynamic monitoring - invasive and 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, the principles involved and the type and site of placement of the monitoring device
Interpretation of, relationships between, sources of error and limitations of measured and derived cardiovascular variables including pressure, flow, volume and gas transport
Indications, limitations and complications of techniques of measurement of cardiac output (e.g. pulmonary artery catheter, oesophageal Doppler, PiCCO, LiDCO) and action to prevent them
Skills
Obtain and interpret data from a cardiac output measurement technique
Measure and interpret haemodynamic variables (including derived variables)

5.15 Performs lumbar puncture (intradural / 'spinal') under supervision

Basic
Knowledge
Indications for and contraindications of lumbar puncture and CSF sampling; laboratory analysis of CSF samples
Performs lumbar puncture under supervision

5.16 Manages the administration of analgesia via an epidural catheter
Basic
Knowledge
Physiological effects of pain and anxiety
Recognition and methods of assessment of pain
Indications, contraindications and complications of epidural infusion / injection; principles of safe epidural drug administration
Skills
Select an appropriate epidural infusion regimen and titrate safely
Select and determine adequacy and route of administration of analgesia
Manage an established epidural infusion
Administer bolus analgesia via an epidural catheter
Minimise complications associated with opioid and non-opioid analgesics
Intermediate
Knowledge
Indications, contraindications, methods and complications of epidural catheterisation
Contraindications, methods and complications of epidural catheter removal
Basic Science
Knowledge
Pharmakokinetics, pharmacodynamics, indications and complications of opiates and local anaesthetic agents

5.17 Performs abdominal paracentesis
Intermediate
Knowledge
Anatomy of the abdominal wall; landmarks for abdominal paracentesis and abdominal drainage catheters
Indications, contraindications, complications and technique of abdominal paracentesis
Skills
Insert an abdominal drain

5.18 Describes Sengstaken tube (or equivalent) placement
Intermediate
Knowledge
Principles and techniques for insertion of gastro-oesophageal balloon tamponade tube (e.g. Sengstaken-Blakemore)

5.19 Performs nasogastric tube placement
Basic
Knowledge
Principles of nasogastric cannulation in the intubated and non-intubated patient
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
Skills
Insert a nasogastric tube in an intubated and non-intubated patient

5.20 Performs urinary catheterisation
Basic
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
Skills
Perform aseptic urinary catheterisation: male and female

Confirm correct placement and exclude complications

Domain 6: Perioperative care

General Principles

Acutely ill patients may present with medical, or surgical problems, or both. The complications of critical illness do not respect speciality boundaries. Perioperative care requires multidisciplinary collaboration, and often provides opportunities for preventative intensive care.

Features of competent performance may include:

- Attention to physiological optimisation and monitoring
- Consider the surgical and anaesthetic procedure in relation to plan of management (including critical decision making, application of relevant protocols / guidelines / care bundles)
- Awareness of main acute complications and their prevention / management
- Attention to patient comfort
- Effective team-working: collaboration, communication and continuity of care
- Professional relationship with patient and relatives: communication; interpersonal skills.
- Appropriate referral / consultation
- Recognition of limitations (self and others)
- Attention to patient safety

Domain 6: *Competencies*

Competence	*Description*	*IBTICM level*	*Assessment methods*	*GMP*
6.1	Manages the pre- and post-operative care of the high risk surgical patient	Basic	C, M, T	1
6.2	Manages the care of the patient following cardiac surgery under supervision	Advanced	C,	1
6.3	Manages the care of the patient following craniotomy under supervision	Advanced	C, T	1
6.4	Manages the care of the patient following solid organ transplantation under supervision	Advanced	C	1
6.5	Manages the pre- and post-operative care of the trauma patient under supervision	Intermediate	C. T	1

Domain 6: *Syllabus*

Knowledge, skills and attitudes common to all sections
Skills
Lead, delegate and supervise others appropriately according to experience and role
Attitudes
Demonstates desire to minimise patient distress
Attention to and control of pain
Consults, communicates and collaborates effectively with anaesthetist, surgeon, nursing staff, other professionals, patients and relatives where appropriate
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

6.1 Manages the pre- and post-operative care of the high risk surgical patient
Basic
Knowledge
Factors determining perioperative risk
Importance of preoperative health status on postoperative outcomes including cardiopulmonary exercise testing
Indications for, and interpretation of pre-operative investigations
Dangers of emergency anaesthesia and surgery
Effect of gastric contents and volume depletion on perioperative risk
Anaesthetic risk factors complicating recovery: suxamethonium apnoea, anaphylaxis, malignant hyperpyrexia, difficult airway
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 and 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.
Triggered reevaluation of the patient if pain worsens days after surgery eg anastomotic dehiscence
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 and 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 and oedema; pneumonia, collapse or consolidation
Cardiovascular: Interpretation of symptoms and signs of cardiovascular insufficiency in the surgical patient; recognition of bleeding; management of hypo/hypertension; pulmonary embolus
Renal: Causes of perioperative oliguria and anuria; prevention and management of acute renal failure
Haematology and oncology: 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; ; perioperative management of electrolyte disorders.
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;
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; Clostridium difficile
Skills
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
Assess conscious level and conduct a careful systems review
Select and determine adequacy and route of administration of analgesia
Document, monitor and manage fluid balance, circulating volume, drains, systemic oxygen supply
Establish a plan for postoperative management
Identify life-threatening cardiorespiratory complications; manage hypovolaemia and impaired oxygen delivery
Manage post-operative hypo and hypertension
Differentiate and manage tension pneumothorax, cardiac tamponade and pulmonary embolus
Manage post-operative stridor
Recognise and manage perioperative emergencies and seek assistance appropriately
Intermediate
Knowledge

Respiratory: pulmonary infiltrates including acute lung injury (ALI) and the acute respiratory distress syndrome (ARDS) and their causative factors; TRALI; pulmonary oedema; pleural effusion, haemo/pneumothorax (simple and tension); use of chest drains; factors affecting patients following thoracotomy, lung resection, oesophagectomy and oro facial surgery
Cardiovascular: operative risk factors in patients with ischaemic heart disease, significant valvular disease
Renal: rhabdomyolysis; consequences of nephrectomy, ileal conduits; management post-renal transplantation
Haematology and oncology: Care of the immunosuppressed or immunoincompetent patient
Metabolic and hormonal: Hypo- and hyperadrenalism, surgery to thyroid, adrenal and pituitary glands
Methods of optimising high risk surgical patients: ERAS?
Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
Plastic Surgery: management of vascular skin grafts
Neurological: causes of post-operative confusion and delirium, stroke (CVA), coma and raised intracranial pressure; determinants of cerebral perfusion and oxygen delivery; prevention of secondary brain injury; perioperative management of patients with neuropathies and myo opathies; intracranial pressure monitoring; extra-dural and sub-dural haematoma; intracerebral haemorrhage; spinal cord injury and ischaemia; brachial plexus injury; complications of neuromuscular blockade
Musculo-skeletal: principles and management of external fixators and casts; perioperative positioning; pressure area care; compartment syndromes and pressure monitoring; patients; on muscle relaxants; principles of salvage surgery
Optimise high-risk surgical patients before surgery: consider site of care and management plan
Communicate the risk of surgery to patients and family
Interpret pre-operative investigations, intra-operative findings and events/complications, and respond to them appropriately
Advanced
Knowledge
Cardiovascular: 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
Haematology and oncology: Complications of chemotherapy and radiotherapy
Gastrointestinal: management of the pre- and post-liver transplant patient; perioperative nutrition; post operative nausea and vomiting

6.2 Manages the care of the patient following cardiac surgery under supervision
Basic
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 and surgery
Perioperative implications of current drug therapy
Implications for postoperative care of common acute and chronic medical conditions (see 3.1 and 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
Recognition, assessment and management of acute pain
Indications for and methods of perioperative anti-thrombotic treatment
Skills
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
Assess conscious level and conduct a careful systems review
Select and 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 and pulmonary embolus
Recognise and manage perioperative emergencies and seek assistance appropriately
Intermediate
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))
Neurological: stroke (CVA); causes of post-operative confusion.
Haematology: management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies.
Metabolic & Hormonal: Blood glucose control; perioperative management of electrolyte disorders
Sepsis and Infection: fever and hypothermia; postoperative hypoperfusion and impaired oxygen delivery; wound infection; opportunistic and nosocomial infection; perioperative infection risk and prophylactic antibiotics; intestinal ischaemia; antibiotic selection and prescribing
Skills
Seek appropriate support and supervision in order to provide optimal patient care
Interpret pre-operative investigations, intra-operative findings and events/complications, and respond to them appropriately
Advanced
Knowledge
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; principles of cardiac pacing
Renal: Causes of perioperative oliguria and anuria; prevention and management of acute renal failure
Management of cyanosis, hypo- and hypertension, hypothermia and shivering
Gastrointestinal: post-operative alterations in gut motility; perioperative nutrition; post operative nausea and vomiting
Surgical interventions in patients with cardiac disease, perioperative management of the cardiovascular surgery patient and potential complications occurring within 24 hours of cardiac surgery

6.3 Manages the care of the patient following craniotomy under supervision
Basic
Knowledge
Factors determining perioperative risk
Importance of preoperative health status on postoperative outcomes
Indications for, and interpretation of pre-operative investigations
Perioperative implications of current drug therapy
Implications for postoperative care of common acute and chronic medical conditions (*see 3.1 and 3.2*)
Implications of type of anaesthesia (general/regional/local) for perioperative care
Recognition, assessment and management of acute pain
Indications for and methods of perioperative anti-thrombotic treatment
Skills
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
Assess conscious level and conduct a careful systems review
Select and 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
Intermediate

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))
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
Metabolic & Hormonal: blood glucose control; perioperative management of electrolyte disorders
Sepsis and Infection: fever and hypothermia; postoperative hypoperfusion and impaired oxygen delivery; wound infection; opportunistic and nosocomial infection; perioperative infection risk and prophylactic antibiotics; intestinal ischaemia; antibiotic selection and prescribing
Skills
Seek appropriate support and supervision in order to provide optimal patient care
Interpret pre-operative investigations, intra-operative findings and events/complications, and respond to them appropriately
Advanced
Knowledge
Cardiovascular: Interpretation of symptoms and signs of cardiovascular insufficiency in the surgical patient; management of hypo/hypertension
Respiratory: Interpretation of symptoms and signs of respiratory insufficiency in the surgical patient
Renal: Causes of perioperative oliguria and anuria; prevention and management of acute renal failure
Gastrointestinal: post-operative alterations in gut motility; perioperative nutrition; post operative nausea & vomiting
Major neurosurgical procedures, peri-operative management of the patient undergoing major neurosurgery, and potential complications occurring within 24 hours of surgery
Skills
Monitor and manipulate cerebral perfusion pressure (CPP)

6.4 Manages the care of the patient following solid organ transplant under supervision
Basic
Knowledge
Factors determining perioperative risk
Importance of preoperative health status on postoperative outcomes
Indications for, and interpretation of pre-operative investigations
Perioperative implications of current drug therapy
Implications for postoperative care of common acute and chronic medical conditions (see 3.1 and 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
Indications for and methods of perioperative anti-thrombotic treatment
Recognition, assessment and management of acute pain
Assessment and management of commonly encountered perioperative conditions and complications including:
Haematology and oncology: Management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies.
Skills
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
Assess conscious level and conduct a careful systems review
Select and determine adequacy and route of administration of analgesia
Document, monitor and manage fluid balance, circulating volume, drains
Establish a plan for postoperative management
Identify life-threatening cardiorespiratory complications; manage hypovolaemia and impaired oxygen delivery
Recognise and manage perioperative emergencies and seek assistance appropriately
Intermediate
Knowledge
Metabolic & Hormonal: blood glucose control; perioperative management of electrolyte disorders

Sepsis and Infection: fever and hypothermia; postoperative hypoperfusion and impaired oxygen delivery; wound infection; opportunistic and nosocomial infection; perioperative infection risk and prophylactic antibiotics; intestinal ischaemia; antibiotic selection and prescribing
Assessment and management of commonly encountered perioperative conditions and complications including:
Haematology and oncology: Care of the immunosuppressed or immunoincompetent patient
Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
Skills
Interpret pre-operative investigations, intra-operative findings and events/complications, and respond to them appropriately
Seek appropriate support and supervision in order to provide optimal patient care
Advanced
Knowledge
Haematology and oncology: Complications of chemotherapy
Solid organ-specific transplantation (heart-lung, liver, renal): peri-operative considerations, pharmacological management, post operative care and potential complications
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 and vomiting; management of the post-liver transplant patient.
Immunosuppression and rejection
Skills
Review and monitor perioperative immunosuppressive therapy

6.5 Manages the care of the patient for surgery for trauma under supervision
Basic
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 and surgery
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 and 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
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
Skills
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
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
Intermediate
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))
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
Renal: Causes of perioperative oliguria and anuria; rhabdomyelosis; prevention and management of acute renal failure
Neurological: causes of post-operative confusion, stroke (CVA), coma and raised intracranial pressure; determinants of cerebral perfusion and oxygenation; prevention of secondary brain injury; intracranial pressure monitoring; therapeutic correction of raised intracranial pressure; intracerebral haemorrhage, contusion and oedema
Gastrointestinal: Interpretation of abdominal pain and distension; intestinal ischaemia; abdominal hypertension; risk factors, monitoring and management of abdominal compartment syndrome; perioperative nutrition; post operative nausea and vomiting
Haematology: management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies.
Metabolic & Hormonal: Blood glucose control; perioperative management of electrolyte disorders
Musculo-skeletal: principles and management of external fixators and casts; perioperative positioning; pressure area care; compartment syndromes; paralysed
Skills
Communicate the risk of surgery to patients and family
Interpret pre-operative investigations, intra-operative findings and events/complications, and respond to them appropriately
Describe the risk period for use of depolarizing neuromuscular blocking agents in patients undergoing repeated surgical procedures
Seek appropriate support and supervision in order to provide optimal patient care
Conduct a secondary survey following ATLS (or equivalent) principles
Establish a plan for postoperative management including plans for further surgery

Domain 7: Comfort and recovery

General Principles

The compassionate care of patients and families is a fundamental duty of any clinician, which is given particular emphasis by the special circumstances of critical illness. The process of rehabilitation starts in

intensive care and is continued for many months – sometimes years – following discharge from hospital. This journey to recovery requires attention to both the physical and the psychological consequences of critical illness.

Features of competent performance may include:

- Awareness of impact of ICU environment on patient and relatives
- Effective communication and interpersonal skills - patients, family and staff
- Attention to patient comfort (physical and psychosocial)
- Awareness of relevant applied physiology and pharmacology
- Consider indications, contraindications and complications of intervention - alternative modes, methods and techniques
- Clearly defined therapeutic strategy / care plan for immediate and longer term care
- Evaluation and modification of therapy according to clinical response
- Safe use of equipment / device / drugs
- Effective team-working: promote collaboration, communication and continuity of care
- Appropriate referral / consultation
- Recognition of limitations (self and others)
- Attention to patient safety

Domain 7: *Competencies*

Competence	*Description*	*IBTICM level*	*Assessment methods*	*GMP*
7.1	Identifies and attempts to minimise the physical and psychosocial consequences of critical illness for patients and families	Basic	M, C	1, 3
7.2	Manages the assessment, prevention and treatment of pain and delirium	Basic	D, I, C, M, T	1
7.3	Manages sedation and neuromuscular blockade	Basic	D, I, C, M, T	1
7.4	Communicates the continuing care requirements of patients at ICU discharge to health care professionals, patients and relatives	Basic	M, T	3
7.5	Manages the safe and timely discharge of patients from the ICU	Intermediate	M, T	1, 3

Domain 7: *Syllabus*

Knowledge, skills and attitudes common to all competencies
Basic
Skills
Lead, delegate and supervise others appropriately according to experience and role
Communicate effectively with relatives who may be, in denial, anxious, angry, confused, or litigious
Attitudes
Desire to minimise patient distress
Regards each patient as an individual
Establishes trusting relationships with and demonstrates compassionate care of patients and their relatives
Willingness to communicate with and support families / significant others
Respects the religious beliefs of the patient and offers to liaise with a religious representative if this is the wish of the patient or family
Acknowledges the consequences of the language used to impart information
Fosters effective communication and relationships with medical and nursing staff in other wards / departments
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

Recognises that intensive care is a continuum within the 'patient journey'
Intermediate
Attitudes
Promotes appropriate and timely discharge from ICU
Appreciates that physical and psychological consequences of critical illness can have a significant and long lasting effect for both patients and their relatives
Advanced
Attitudes
Early planning for rehabilitation
Seeks to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff

7.1 Identifies and attempts to minimise the physical and psychosocial consequences of critical illness for patients and families
Basic
Knowledge
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
Pharmakokinetics, pharmacodynamics, indications and complications of commonly used analgesic, hypnotic, and neuromuscular blocking drugs in patients with normal and abnormal organ system function
Causes and management of acute confusional states
Sensory deprivation / sensory overload
Environmental and drug-related psychopathology associated with critical illness (e.g. anxiety, sleep disorders, hallucinations, drug withdrawal)
Impact of staff-patient contact and environmental factors on patient stress
Methods of communicating with patients who are unable to speak
Relevance and methods to care for skin, mouth, eyes and bowels, and to maintain mobility and muscle strength in critically ill patients
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 and management of pressure sores
Resources available to patients and relatives for education and support (e.g. societies, local groups, publications, referral to allied health care professionals)
Common risk factors for post-ICU mortality or re-admission and their minimisation
Skills
Identify complications associated with critical illness
Work with colleagues and relatives to minimise patient distress
Anticipate the development of pain and/or anxiety and adopt strategies for its prevention or minimisation
Use analgesic, hypnotic and neuromuscular blocking drugs appropriately and safely
Propose and implement a plan to provide adequate sleep and rest in ICU patients
Participate in the education of patients/families
Appropriate and timely referral to specialists / allied health professionals
Intermediate
Knowledge
Common symptomatology following critical illness
Sleep deprivation and its consequences
Post-traumatic stress disorders
Fluid and 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 to minimise potential psychological trauma to the patient and their family of transfer from the ICU (especially with regard to long term ICU patients)

The implications for relatives of adopting a role as a carer at home
Impact of chronic illness post-ICU on socialisation and employment
Skills
Take decisions to admit, discharge or transfer patients
Follow-up patients after discharge to the ward
Participate in follow-up clinics / services where available

7.2 Manages the assessment, prevention and treatment of pain and delirium
Basic
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
Pharmakokinetics, 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
Relevance and methods to care for skin, mouth, eyes and bowels, and to maintain mobility and muscle strength in critically ill patients
Skills
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 and 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
Intermediate
Knowledge
Sleep deprivation and its consequences
Potential long term consequences of acute delirium

7.3 Manages sedation and neuromuscular blockade
Basic
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
Pharmakokinetics, 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; sedation holds
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 and management of pressure sores
Skills
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
Intermediate
Knowledge
Sleep deprivation and its consequences
Post-traumatic stress disorders

7.4 Communicates the continuing care requirements of patients at ICU discharge to health care professionals, patients and relatives
Basic
Knowledge
Common risk factors for post-ICU mortality or re-admission and their minimisation
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
Methods of communicating with patients who are unable to speak
Causes and methods of minimising distress in patients
Resources available to patients and relatives for education and support (eg societies, local groups, publications, referral to allied health care professionals)
Management of tracheostomy care and avoidance of complications outside the ICU
Persistent vegetative state; locked in syndromes
Skills
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
Participate in the education of patients/families
Intermediate
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
Post-traumatic stress disorders
Fluid and 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
Supportive services integral to the long term rehabilitation of critically ill patients (physiotherapy, occupational therapy, orthotics, social services).
The implications for relatives of adopting a role as a carer at home
Impact of chronic illness post-ICU on socialisation and employment
Methods for assessing or measuring quality of life
Methods to minimise potential psychological trauma to the patient and their family of transfer from the ICU (especially with regard to long term ICU patients)
Long-term ventilation outside the ICU environment (e.g. home ventilation)
Skills
Follow-up patients after discharge to the ward

7.5 Manages the safe and timely discharge of patients from the ICU
Basic
Knowledge

The role of patient's relatives and their contribution to care
Common risk factors for post-ICU mortality or re-admission and their minimisation
Management of tracheostomy:care and avoidance of complications outside the ICU
Skills
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
Intermediate
Knowledge
Common symptomatology following critical illness
Criteria for admission to, and discharge from ICU – factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
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)
Long-term ventilation outside the ICU environment (e.g. home ventilation)
Skills
Identify discharge criteria for individual patients
Take decisions to admit, discharge or transfer patients
Follow-up patients after discharge to the ward
Change a tracheostomy tube electively
Identify discharge criteria for individual patients
Advanced
Knowledge
Potential psychological impact of inter-hospital transfer and family dislocation

Domain 8: End of life care

General Principles

Death is inevitably a managed, not a 'natural' process in intensive care. The manner in which it is conducted may affect the survivors – family and staff – for the rest of their lives. Treatment limitation or withdrawal does not mean denial of care; patients should not suffer, and, where possible, their wishes should be ascertained and respected.

Features of competent performance may include:

- Assessment of severity of illness and prognosis
- Awareness of relevant ethical / legal / religious / cultural issues

- Effective communication and interpersonal skills - patient / family / staff
- Effective team-working: promote collaboration, communication and continuity
- Effective, clear collaborative decision making resulting in an agreed plan of management
- Attempt to minimize distress - patient / family / staff
- Appropriate referral / consultation - in particular the importance of palliative care specialists
- Recognition of limitations (self and others)
- Attention to patient safety

Domain 8: *Competencies*

Competence	*Description*	*IBTICM level*	*Assessment methods*	*GMP*
8.1	Manages the process of withholding or withdrawing treatment with the multidisciplinary team	Intermediate	C, M	1, 3, 4
8.2	Discusses end of life care with patients and their families / surrogates	Basic	C, M, D	3, 4
8.3	Manages palliative care of the critically ill patient	Intermediate	C, M, T	1, 3, 4
8.4	Performs brain-stem death testing	Intermediate	D	1
8.5	Manages the physiological support of the organ donor	Intermediate	I, C	1
8.6	Manages non heart beating organ donation	Advanced	C, T	1 3 4

Domain 8: *Syllabus*

Knowledge, skills and attitudes common to all competencies
Knowledge
Bereavement: anticipating and responding to grief
Define the standards of practice defined by the GMC when deciding to withhold or withdraw life-prolonging treatment
Know the role and legal standing of advance directives
Outline the principles of the Mental Capacity Act
Skills
Communicate effectively with relatives who may be, in denial, anxious, angry, confused, or litigious
Attitudes
Appreciates that the decision to withhold or withdraw treatment does not imply the termination of care
Desire to support patient, family, and other staff members appropriately during treatment withdrawal
Establishes trusting relationships with and demonstrates compassionate care of patients and their relatives
Offers psychological, social and spiritual support to patients, their relatives or colleagues as required
Respects the ideas and beliefs of the patient and their family and their impact on decision making (does not impose own views)
Respects the religious beliefs of the patient and is willing to liaise with a religious representative if requested by patient or family
Willingness to communicate with and support families / significant others
Acknowledges the consequences of the language used to impart information
Integrity, honesty and respect for the truth underpin relationships with patients, relatives and colleagues
Values clear decision-making and communication
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

8.1 Manages the process of withholding or withdrawing treatment with the multidisciplinary team
Basic
Knowledge
Principles of delivering bad news to patients and families
Principles of pain and symptom management
The value of autopsy (post-mortem) examination.
Procedure for pronouncing life extinct and subsequently completion of death certification
Skills

Participate in timely discussion and regular review of 'do not attempt resuscitation' orders and treatment limitation decisions
Intermediate
Knowledge
Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Ethical and legal issues in decision-making for the incompetent patient: incapacity
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
Local resources available to support dying patients and their families, and how to access them
Cultural and religious practices of relevance when caring for dying patients and their families
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
Skills
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
Relieve distress in the dying patient
Aware of the emotional needs of self and others; seeks and offers support appropriately
Advanced
Knowledge
The limitations of intensive care medicine – expectations of what can and cannot be achieved
Skills
Recognise when treatment is unnecessary or futile
Discuss treatment options with a patient or relatives before ICU admission
Withdraw life sustaining treatment or organ support

8.2 Discusses end of life care with patients and their families / surrogates
Basic
Knowledge
Principles of delivering bad news to patients and families
Principles of pain and symptom management
The value of autopsy (post-mortem) examination.
Procedure for completion of death certification
Skills
Participate in timely discussion and regular review of 'do not attempt resuscitation' orders and treatment limitation decisions
Intermediate
Knowledge
Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Ethical and legal issues in decision-making for the incompetent patient: incapacity
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
Local resources available to support dying patients and their families, and how to access them
Cultural and religious practices of relevance when caring for dying patients and their families
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
Skills
Willing and able to communicate and discuss issues pertaining to end of life with patients and relatives
Differentiate competent from incompetent statements by patients
Participate in discussions with relatives about treatment limitation or withdrawal
Explain the concept and practicalities of brain stem death and organ donation clearly

Advanced
Knowledge
The limitations of intensive care medicine - expectations of what can and cannot be achieved
Skills
Recognise when treatment is unnecessary or futile
Discuss treatment options with a patient or relatives before ICU admission
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

8.3 Manages palliative care of the critically ill patient
Basic
Knowledge
Principles of delivering bad news to patients and families
Principles of pain and symptom management
Skills
Participate in timely discussion and regular review of 'do not attempt resuscitation' orders and treatment limitation decisions
Intermediate
Knowledge
Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Ethical and legal issues in decision-making for the incompetent patient: incapacity
Difference between euthanasia and allowing death to occur: doctrine of double effect
Local resources available to support dying patients and their families, and how to access them
Cultural and religious practices of relevance when caring for dying patients and their families
Skills
Willing and able to communicate and discuss issues pertaining to end of life with patients and relatives
Differentiate competent from incompetent statements by patients
Participate in discussions with relatives about treatment limitation or withdrawal
Relieve distress in the dying patient
Aware of the emotional needs of self and others; seeks and offers support appropriately
Advanced
Skills
Recognise when treatment is unnecessary or futile
Discuss treatment options with a patient or relatives before ICU admission
Lead a discussion about end of life goals, preferences and decisions with a patient and/or their relatives

8.4 Performs brain-stem death testing
Intermediate
Knowledge
Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Causes of brain stem death
Legal aspects of brain stem death diagnosis
Applied anatomy and physiology of the brain and nervous system including cerebral blood supply, base of skull, autonomic nervous system and cranial nerves
Physiological changes associated with brain stem death
Preconditions and exclusions for the diagnosis of brain stem death
Clinical, imaging and electrophysiologic tests to diagnose brain death: applicability
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
Consult and confirm findings of brain stem function tests with colleagues as required by local / national policy or as indicated
Document pre-conditions and exclusions to brain stem death testing
Advanced
Skills
Perform and document tests of brain stem function

8.5 Manages the physiological support of the organ donor
Basic
Knowledge
Role of national organ/tissue procurement authority and procedures for referral
Skills
Monitor vital physiological functions as indicated
Recognise and rapidly respond to adverse trends in monitored parameters
Intermediate
Knowledge
Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Causes of brain stem death
Physiological changes associated with brain stem death
Principles of management of the organ donor (according to national / local policy)
Common investigations and procedures undertaken in the ICU prior to organ donation
Responsibilities and activities of transplant co-ordinators
Skills
Explain the concept and practicalities of brain stem death and organ donation clearly
Aware of the emotional needs of self and others; seeks and offers support appropriately
Advanced
Skills
Obtain consent/assent for treatment, research, autopsy or organ donation
Liaise with transplant co-ordinators (local organ donation authority) to plan management of the organ donor

8.6 Manages non heart beating organ donation
Advanced
Knowledge
Legal and ethical framework for decision making
Role of national organ/tissue procurement authority and procedures for referral
Transplant team members and their roles
Common investigations and procedures undertaken in the ICU prior to organ donation
Responsibilities and activities of transplant co-ordinators

Domain 9: Paediatric care

General Principles

These competencies are those expected of a practitioner of adult intensive care medicine, not a paediatric intensivist or neonatologist. Adult intensivists may be called upon to provide immediate care for the acutely ill child while awaiting transfer to a paediatric centre.

Features of competent performance may include:

- Recognition of presenting signs and symptoms
- Identification and rapid response to life-threatening complications
- Awareness of patho-physiological differences between adult and child
- Prioritise investigations and monitoring – appropriate; timely
- Appropriate differential diagnosis
- Clear decision making and immediate management strategies (including application of relevant protocols / guidelines)
- Effective multidisciplinary team-working and leadership - clear communication and instructions
- Timely and appropriate referral / consultation
- Recognition of limitations (self and others) – maintain patient safety

Domain 9: *Competencies*

Competence	*Description*	*IBTICM level*	*Assessment methods*	*GMP*
9.1	Describes the recognition of the acutely ill child and initial management of paediatric emergencies	Intermediate	I, C	1
9.2	Describes national legislation and guidelines relating to child protection and their relevance to critical care	Intermediate	C	1

Domain 9: *Syllabus*

Knowledge, skills and attitudes common to all competencies
Knowledge
Impact of occupational and environmental exposures, socio-economic factors, and life style factors on critical illness
Attitudes
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

9.1 Describes the recognition of the acutely ill child and initial management of paediatric emergencies
Basic
Knowledge
Intraosseous cannulation
Intermediate
Knowledge
Major anatomical and physiological differences between adults and children
Key stages of physical and psychological development
Paediatric management of conditions common to both children and adults (e.g. acute severe asthma, renal failure, trauma)
Paediatric resuscitation and the differences between adult and paediatric resuscitation
Principles of paediatric airway management: methods and techniques; calculation of tube sizes; selection of masks and airways
Principles of mechanical ventilation in a child
Preparation for and methods of securing venous access
Estimation of blood volume, replacement of fluid loss
Paediatric dosing of common emergency drugs
General principles for stabilising the critically ill or injured child until senior or more experienced help arrives
Operation of local paediatric referral /retrieval services
Principles of communication (verbal and non verbal) with children of different ages; awareness of the consequences of the language used to impart information
Issues of consent in children
Skills
Paediatric resuscitation at advanced life support level (APLS, PALS or equivalent)
Prepare equipment and drugs for paediatric intubation
Demonstrate paediatric tracheal intubation
Secure venous access (including local anaesthesia pre-medication)
Communicate effectively with, and attempt to reassure the child and parents
Recognise and manage paediatric emergencies until senior or more experienced help arrives
Advanced
Knowledge
Pathophysiology and principles of management of disorders which are life-threatening to paediatric patients (determined by national case mix, but may include: acute respiratory failure, cardiac failure, trauma, severe infections including meningitis and epiglottitis, intoxications, metabolic disorders, seizures, croup, diarrhoea)
Skills
Manage mechanical ventilation in a critically ill child
Manage and stabilise the injured child until senior or more experienced help arrives

9.2 Describes the national legislation and guidelines relating to child protection and their relevance to

critical care
Intermediate
Knowledge
Key stages of physical and psychological development
Principles of communication (verbal and non verbal) with children of different ages; awareness of the consequences of the language used to impart information
Legal and ethical aspects of caring for children
Issues of consent in children
National child protection guidelines
Operation of local paediatric referral / retrieval services

Domain 10: Transport

General Principles

Critically ill patients may require intra- or inter-hospital transfer for clinical reasons. The principles are the same for both circumstances. Competence in aero-medical transfers is not a specific requirement though they may be used for competence acquisition and assessment if local circumstances permit.

Features of competent performance may include:

- Considering alternative strategies to transfer
- Considering alternative modes and methods of transport
- Effective preparation: planning and communication tasks
- Attention to safety: anticipation and minimisation of risks; prevention of adverse events; safe use of equipment
- Maintaining effective monitoring during transportation
- Identification, prevention, and management of complications
- Continuation of care plans
- Effective hand-over and documentation
- Recognition of limitations (self and others)

Domain 10: *Competencies*

Competence	*Description*	*IBTICM level*	*Assessment methods*	*GMP*
10.1	Undertakes transport of the mechanically ventilated critically ill patient outside the ICU	Intermediate	D, I, C, M	1, 3

Domain 10*: Syllabus*

Knowledge, skills and attitudes common to all competencies
Skills
Lead, delegate and supervise others appropriately according to experience and role
Attitudes
Anticipates and prevents problems during transfer
Appreciates the importance of communication between referring, transporting and receiving staff
Desire to minimise patient distress
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)

10.1 Undertakes the transport of the mechanically ventilated critically ill patient outside the ICU
Intermediate
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 and equipment
Ethical issues surrounding transfer
Strategies to avoid transfer-use of other facilities
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
Homeostatic interaction between patient and environment (e.g. thermoregulation, posture / positioning)
Communication prior to and during transport
Operation of locally available retrieval services
Skills
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 and implements pre-transfer 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
Advanced
Knowledge
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
Physiology associated with air transport

Potential psychological impact of inter-hospital transfer and family dislocation
Skills
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)

Domain 11: Patient safety and health systems management

General Principles

Error in healthcare often creates two victims – the patient, and the clinician who is usually the terminal component in an unsafe healthcare system. Creating safer systems may require changes in structures and resources, but always involves improvements in processes and organisation of care.

Features of competent performance may include:

- Professional approach - professional relationships and self governance
- Attention to sound decision making processes
- Attention to safety: identification and minimisation of risks; prevention / reporting of adverse events; safe use of equipment
- Attention to monitoring
- Appropriate prescribing and application of therapeutics
- Attention to communication and documentation tasks
- Development of collaborative care plans
- Effective multidisciplinary team-working and leadership – clear communication and promote continuity
- Timely and appropriate referral / consultation
- Recognition of limitations (self and others)

Domain 11: *Competencies*

Competence	*Description*	*IBTICM level*	*Assessment methods*	*GMP*
11.1	Leads a daily multidisciplinary ward round	Intermediate	M	1, 2, 3, 4
11.2	Complies with local infection control measures	Generic	C, M	2
11.3	Identifies environmental hazards and promotes safety for patients and staff	Generic	C, M	2
11.4	Identifies and minimises risk of critical incidents and adverse events, including complications of critical illness	Basic	C, M	2
11.5	Organises a case conference	Intermediate	C, M	3
11.6	Critically appraises and applies guidelines, protocols and care bundles	Basic	C	1
11.7	Describes commonly used scoring systems for assessment of severity of illness, case mix and workload	Basic	C	1
11.8	Demonstrates an understanding of the managerial and administrative responsibilities of the ICM specialist	Advanced	C, M	1, 3

Domain 11: *Syllabus*

Knowledge, skills and attitudes common to all competencies
Basic
Knowledge
Purpose and process of quality improvement activities such as evidence based practice, best practice guidelines and benchmarking and change management
Understand: • the factors involved in clinical decision making such as knowledge, experience, biases, emotions, uncertainty, context • the critical relationship between CDM and patient safety • the ways in which we process decision making: dual process theory: system 1 and system 2 • the place of algorithms, guidelines, protocols in supporting decision making and potential pitfalls in their use • the pivotal decisions in diagnosis, differential diagnosis, handing over and receiving diagnoses and the need to review evidence for diagnosis at these times
Confidentiality and data protection - legal and ethical issues
Principles of risk prevention
Critical incident or error monitoring and reporting
Professional responsibility and duty of care to patients placed at risk by the actions of fellow clinicians
Methods of effective communication of information (written; verbal etc)
Electronic methods of accessing medical literature and learning modalities
Principles of aseptic technique and aseptic handling of invasive medical devices
Methods of sterilisation and cleaning or disposal of equipment
Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)
Understand the role of Notification of diseases within the UK and identify the principle notifiable diseases for UK and international purposes
Define local and national 'significant event reporting systems' relevant to specialty
Keep abreast of national patient safety initiatives including NPSA, NCEPOD reports, NICE guidelines etc
Skills
Professional and reassuring approach - generates confidence and trust in patients and their relatives
Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
Consults and takes into account the views of referring clinicians; promotes their participation in decision making where appropriate
Inform colleagues, patients and relatives as applicable, of medical errors or adverse events in an honest and appropriate manner
Manage inter-personal conflicts which arise between different sectors of the organisation, professionals, patients or relatives
Maximise safety in everyday practice

Document adverse incidents in a timely, detailed and appropriate manner
Collaborate with other team members to achieve common goals
Use electronic retrieval tools (e.g. PubMed) to access information from the medical and scientific literature
Demonstrate an interest in quality control, audit and reflective practice
Lead, delegate and supervise others appropriately according to experience and role
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
Attitudes
Desire to minimise patient distress
Consults, communicates and collaborates effectively with patients, relatives and the health care team
Ensures effective information transfer
Adopts a problem solving approach
Enquiring mind, undertakes critical analysis of published literature
Recognises impaired performance (limitations) in self and colleagues and takes appropriate action
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Accepts responsibility for patient care and staff supervision
Intermediate
Knowledge
Principles of crisis management, conflict resolution, negotiation and debriefing
Attitudes
Establishes collaborative relations with other health care providers to promote continuity of patient care as appropriate
Advanced
Attitudes
Seeks to modify the stresses which the intensive care environment places upon patients, their relatives and members of staff

11.1 Leads a daily multidisciplinary ward round
Basic
Knowledge
Roles of different members of the multidisciplinary team and local referral practices
Skills
Demonstrate initiative in problem solving
Confirm accuracy of clinical information provided by members of the health care team with particular emphasis on that information which is handed over at admission and at shift changes
Summarise a case history
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
Listen effectively
Intermediate
Knowledge
Triage and management of competing priorities
Principles of crisis management, conflict resolution, negotiation and debriefing
Skills
Assemble clinical and laboratory data, logically compare all potential solutions to the patient's problems, prioritise them and establish a clinical management plan
Advanced
Skills
Consider risk-benefit and cost-benefit of alternative drugs and therapies
Organise multidisciplinary care for groups of patients in the ICU

11.2 Complies with local infection control measures
Basic
Knowledge

Types of organisms – emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between contamination, colonisation and infection
Risk of colonisation with potentially pathogenic micro-organisms and the factors associated with patient, staff, equipment and environmental colonisation
Autogenous infection: routes and methods of prevention
Cross infection: modes of transfer and common agents
Infections from contaminated blood / body fluids; strategy if contaminated (e.g. needle stick injury)
Local policies and procedures relevant to practice
Skills
Accept personal responsibility for the prevention of cross infection and self infection
Apply methods to prevent autogenous infection (e.g. posture, mouth hygiene)
Implement prophylactic regimens appropriately
Prescribe antibiotics safely and appropriately
Intermediate
Knowledge
Recognition of patient groups at high risk of developing infectious complications
Epidemiology and prevention of infection in the ICU
Ventilator associated pneumonia: definition, pathogenesis and prevention
Local patterns of bacterial resistance and antibiotic policy
Requirements for microbiological surveillance and clinical sampling
Benefits and risks of different prophylactic antibiotic regimens
Published standards of care at local, national and international level (including consensus statements and care bundles). Has a critical approach to bundles and their component parts.

11.3 Identifies environmental hazards and promotes safety for patients and staff
Basic
Knowledge
Staff safety: susceptibility to harmful physical, chemical and infectious hazards in the ICU
Hazards associated with ionising radiation and methods to limit these in the ICU
Local policies and procedures relevant to practice
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 and infection
Cross infection: modes of transfer and common agents
Infections from contaminated blood / body fluids; strategy if contaminated (e.g. needle stick injury)
Intermediate
Knowledge
Published standards of care at local, national and international level (including consensus statements and care bundles)
Epidemiology and prevention of infection in the ICU
Requirements for microbiological surveillance and clinical sampling
Benefits and risks of different prophylactic antibiotic regimens
Advanced
Knowledge
Physical requirements of ICU design
Equipment requirements and selection: clinical need and priority; accuracy, reliability, safety and practical issues (ease of use, acceptance by staff)
Identification and critical appraisal of literature; integration of findings into local clinical practice
Skills
Seek expert help to ensure all equipment in the ICU conforms with and is maintained to the relevant safety standard
Basic Science
Knowledge
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

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.

11.4 Identifies and minimises risk of critical incidents and adverse events, including complications of critical illness
Basic
Knowledge
Common sources of error and factors which contribute to critical incidents / adverse events (ICU environment, personnel, equipment, therapy and patient factors)
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
Types of organisms - emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between contamination, colonisation and infection
Autogenous infection: routes and methods of prevention
Staff safety: susceptibility to harmful physical, chemical and infectious hazards in the ICU; psychological?
Local policies and procedures relevant to practice
Purpose and methods of clinical audit (e.g. mortality reviews, complication rates, National Audits)
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
Consider potential interactions when prescribing drugs and therapies
Record relevant clinical information accurately
Confirm accuracy of clinical information provided by members of the health care team
Accept personal responsibility for the prevention of cross infection and self infection
Participate in the processes of clinical audit, peer review and continuing medical education
Intermediate
Knowledge
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/volutrauma • pulmonary oxygen toxicity • thromboembolism (venous, arterial, pulmonary, intracardiac) • stress ulceration • pain • malnutrition; refeeding syndromes • critical illness poly-neuropathy, motor-neuropathy and myopathy
Recognition of patient groups at high risk for developing complications
Epidemiology and prevention of infection in the ICU
Local patterns of bacterial resistance and antibiotic policy
Requirements for microbiological surveillance and clinical sampling
Benefits and risks of different prophylactic antibiotic regimens
Principles of crisis management, conflict resolution, negotiation and debriefing
Published standards of care at local, national and international level (including consensus statements and care bundles)
Skills
Assemble clinical and laboratory data, logically compare all potential solutions to the patient's problems, prioritise them and establish a clinical management plan
Monitor complications of critical illness
Aware of relevant guidelines and consensus statements and apply these effectively in every day practice under local conditions
Advanced
Knowledge
Factors that determine the optimum staff establishment for specialist and junior medical staff, nurses and allied professional and non-clinical ICU staff
Equipment requirements and selection: clinical need and priority; accuracy, reliability, safety and practical issues (ease of use, acceptance by staff)
Local process for ordering consumables and maintaining equipment

Identification and critical appraisal of literature; integration of findings into local clinical practice
Skills
Implement and evaluate protocols and guidelines

11.5 Organises a case conference
Basic
Knowledge
Roles of different members of the multidisciplinary team and local referral practices
Skills
Summarise a case history
Intermediate
Knowledge
Principles of crisis management, conflict resolution, negotiation and debriefing
Skills
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:
Discuss technical, cognitive, affective, contextual and non-technical factors in relation to the case in question
Advanced
Skills
Plan long-term multidisciplinary care for patients in the ICU

11.6 Critically appraises and applies guidelines, protocols and care bundles
Basic
Knowledge
Purpose and methods of clinical audit (e.g. mortality reviews, complication rates)
Local policies and procedures relevant to practice
Treatment algorithms for common medical emergencies
Skills
Participate in the processes of clinical audit, peer review and continuing medical education
Recognise the need for clinical audit and quality improvement activities to be non-threatening and non-punitive to individuals
Intermediate
Knowledge
Published standards of care at local, national and international level (including consensus statements and care bundles)
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 and economic analyses)
Principles of applied research and epidemiology necessary to evaluate new guidelines / forms of therapy
Skills
Aware of relevant guidelines and consensus statements and apply these effectively in every day practice under local conditions
Use a systematic approach to locate, appraise, and assimilate evidence from scientific studies relevant to a patient's health problem
Advanced
Knowledge
Identification and critical appraisal of literature; integration of findings into local clinical practice; critical appraisal of whether this evidence is relevant to this particular patient.
Skills
Implement and evaluate protocols and guidelines
Propose realistic initiatives / projects to promote improvement
Manage resistance to change in the ICU / hospital environment in order to optimize the outcome of a task

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

Intermediate
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
Advanced
Knowledge
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

11.8 Demonstrates an understanding of the managerial and administrative responsibilities of the ICM specialist
Basic
Knowledge
Purpose and methods of clinical audit (e.g. mortality reviews, complication rates)
Local policies and procedures relevant to practice
Skills
Contribute to departmental / ICU activities
Respect, acknowledge and encourage the work of others
Intermediate
Knowledge
Concept of risk : benefit ratio and cost effectiveness of therapies
Principles of crisis management, conflict resolution, negotiation and debriefing
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 and economic analyses)
Published standards of care at local, national and international level (including consensus statements and care bundles)
Advanced
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
Difference between absolute requirement and possible benefit when applying expensive technology to critically ill patients
Equipment requirements and selection: clinical need and priority; accuracy, reliability, safety and practical issues (ease of use, acceptance by staff)
Local process for ordering consumables and maintaining equipment
Principles of health economics, departmental budgeting, financial management and preparation of a business plan
Factors that determine the optimum staff establishment for specialist and junior medical staff, nurses and allied professional and non-clinical ICU staff
Principles of workforce planning
Practical application of equal opportunities legislation
Principles of national / local health care legislation applicable to ICM practice
Identification and critical appraisal of literature; integration of findings into local clinical practice
Skills
Propose realistic initiatives / projects to promote improvement
Manage resistance to change in the ICU / hospital environment in order to optimize the outcome of a task

Domain 12: Professionalism

General Principles

A professional is someone with special expertise who gains the privilege of self-regulation through vocation and service, high ethical standards, critical self-appraisal, and personal development. Professionalism includes the capacity for clinical judgement (the translation of data into knowledge and knowledge into appropriate actions). These distinguishing attitudes and behaviours can be evaluated in terms of communication skills, professional relationships, and personal governance (personal standards, self-development, insight and self-control).

Domain 12: *Competencies*

Competence	*Description*	*IBTICM level*	*Assessment methods*	*GMP*
12.1	Communicates effectively with patients and relatives	Basic	D, M, T	3
12.2	Communicates effectively with members of the health care team	Basic	D, M	3
12.3	Maintains accurate and legible records / documentation	Basic	D, M, T	1
12.4	Involves patients (or their surrogates if applicable) in decisions about care and treatment	Intermediate	C, M, T	3, 4
12.5	Demonstrates respect of cultural and religious beliefs and an awareness of their impact on decision making	Intermediate	C, M, T	3, 4
12.6	Respects privacy, dignity, confidentiality and legal constraints on the use of patient data	Basic	C, M, E	1, 4
12.7	Collaborates and consults; promotes team-working	Basic	M	3
12.8	Ensures continuity of care through effective hand-over of clinical information	Basic	C, M, T	1
12.9	Supports clinical staff outside the ICU to enable the delivery of effective care	Intermediate	C, M, T	1
12.10	Appropriately supervises	Intermediate	C, M, T	1
12.11	Takes responsibility for safe patient care	Basic	D, C, M, T	1, 3

12.12	Formulates clinical decisions with respect for ethical and legal principles	Advanced	C, M, T	1
12.13	Seeks learning opportunities and integrates new knowledge into clinical practice	Basic	M	1
12.14	Participates in multidisciplinary teaching	Basic	M	1
12.15	Participates in research or audit under supervision	Basic	M	1, 4

Domain 12: *Syllabus*

Knowledge, skills and attitudes common to all competencies
Knowledge
Methods of effective communication of information (written; verbal etc)
Confidentiality and data protection - legal and ethical issues
Outline and follow the guidance given by the GMC on confidentiality
Purpose and process of quality improvement activities such as evidence based practice, best practice guidelines and benchmarking and change management
Impact of occupational and environmental exposures, socio-economic factors, and life style factors on critical illness
Electronic methods of accessing medical literature
Methods of effective communication of information (written; verbal etc)
Aware that how bad news is delivered to a patient can affect them for the rest of their lives in terms of emotions, perception of the condition and their ability to cope. It also irretrievably affects the subsequent relationship with the patient
Aware that 'breaking' bad news can be extremely stressful for the professional involved
Understand the legislative framework within which healthcare is provided in the UK and/or devolved administrations, in particular – death certification and the role of the Coroner/Procurator Fiscal; child protection legislation; mental health legislation (including powers to detain a patient and giving emergency treatment against a patient's will under common law); advanced directives and living Wills; withdrawing and withholding treatment; decisions regarding resuscitation of patients; surrogate decision making; organ donation and retention; communicable disease notification; medical risk and driving; Data Protection Act and Freedom of Information Act; provision of continuing care and community nursing care by a local authorities
Outline the relevance of professional bodies e.g. Royal Colleges, NHSMEE , GMC, Postgraduate Dean, BMA, specialist societies, medical defence societies etc
Skills
Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
Professional and reassuring approach - generates confidence and trust in patients and their relatives
Communicate effectively with relatives who may be anxious, angry, confused, or litigious
In preparing to break bad news: • Sets aside sufficient uninterrupted time • Chooses an appropriate private environment and ensures that there will be no unplanned disturbances • Has sufficient information regarding prognosis and treatment • Ensures the individual has appropriate support if desired • Structures the interview • Is honest, factual, realistic and empathic • Aware of relevant guidance documents
Collaborate with other team members to achieve common goals
Lead, delegate and supervise others appropriately according to experience and role
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 organisation, professionals, patients or relatives
Maximise safety in everyday practice in part by good quality decision making sustained by critical thinking, reflection and metacognition
Use electronic retrieval tools (e.g. PubMed) to access information from the medical and scientific literature
Attitudes
Consults, communicates and collaborates effectively with patients, relatives and the health care team
Acknowledges the consequences of the language used to impart information
Recognises that communication is a two-way process
Sensitive to the reactions and emotional needs of others
Remains calm in stressful or high pressure situations and adopts a timely, rational approach

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

A.	**Communication**
12.1	**Communicates effectively with patients and relatives**
12.2	**Communicates effectively with members of the health care team**
12.3	**Maintains accurate and legible records / documentation**
Basic	
Knowledge	
Consent and assent in the competent and non-competent patient	
Outline the guidance given by the GMC on consent, in particular: • Understand that consent is a process that may culminate in, but is not limited to, the completion of a consent form • Understand the particular importance of considering the patient's level of understanding and mental state (and also that of the relatives/carers where relevant) and how this may impair their capacity for informed consent	
Principles of delivering bad news to patients and families	
Skills	
Communicate with patients and relatives - give accurate information and re-iterate to ensure comprehension; clarify ambiguities	
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
Listen effectively
Intermediate
Knowledge
Principles of crisis management, conflict resolution, negotiation and debriefing
Skills
Differentiate competent from incompetent statements by patients
Advanced
Skills
Discuss treatment options with a patient or relatives before ICU admission
Obtain consent/assent for treatment, research, autopsy or organ donation

B.	**Professional relationships with patients and relatives**
12.4	**Involves patients (or their surrogates if applicable) in decisions about care and treatment**
12.5	**Demonstrates respect of cultural and religious beliefs and an awareness of their impact on decision making**
12.6	**Respects privacy, dignity, confidentiality and legal constraints on the use of patient data**
Basic	
Knowledge	
Consent and assent in the competent and non-competent patient	
Principles of delivering bad news to patients and families	
Skills	
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 when appropriate	
Listen effectively	
Intermediate	
Knowledge	
Basic ethical principles: autonomy, beneficence, non-maleficence, justice	
Ethical and legal issues in decision-making for the incompetent patient	
Principles of crisis management, conflict resolution, negotiation and debriefing	
Skills	
Differentiate competent from incompetent statements by patients	
Advanced	
Knowledge	
Sources of information about different cultural and religious attitudes and beliefs to life threatening illness and death available to health care professionals.	
Skills	
Discuss treatment options with a patient or relatives before ICU admission	
Obtain consent/assent for treatment, research, autopsy or organ donation	

C.	**Professional relationships with members of the health care team**
12.7	**Collaborates and consults; promotes team-working**
12.8	**Ensures continuity of care through effective hand-over of clinical information**
12.9	**Supports clinical staff outside the ICU to enable the delivery of effective care**
12.10	**Appropriately supervises, and delegates to others, the delivery of patient care**
Basic	
Knowledge	
Management of information	
Skills	
Act appropriately as a member or leader of the team (according to skills and experience)	
Communicate effectively with professional colleagues to obtain accurate information and plan care	

Liaise with medical and nursing staff in other departments to ensure optimal communication and continuing care after ICU discharge
Listen effectively
Respect, acknowledge and encourage the work of others
Intermediate
Knowledge
Principles of crisis management, conflict resolution, negotiation and debriefing
Skills
Consult and take into account the views of referring clinicians; promote their participation in decision making where appropriate
Contribute to professional meetings - understand their rules, structure and etiquette
Advanced
Knowledge
Principles of professional appraisal and constructive feedback

D. Self governance
12.11 Takes responsibility for safe patient care **12.12 Formulates clinical decisions with respect for ethical and legal principles** **12.13 Seeks learning opportunities and integrates new knowledge into clinical practice** **12.14 Participates in multidisciplinary teaching** **12.15 Participates in research or audit under supervision**
Basic
Knowledge
Management of information
Principles of adult education and factors that promote learning
Skills
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
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
Demonstrate initiative in problem solving
Listen effectively
Intermediate
Knowledge
Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Ethical and legal issues in decision-making for the incompetent patient
Principles of crisis management, conflict resolution, negotiation and debriefing
Principles of appraisal of evidence: levels of evidence; interventions; diagnostic tests; prognosis; integrative literature (meta-analyses, practice guidelines, decision and economic analyses)
Principles of applied research and epidemiology necessary to evaluate new guidelines / forms of therapy
Requirements of ICM training at local and national level
Skills
Use a systematic approach to locate, appraise, and assimilate evidence from scientific studies relevant to a patient's health problem and make an individual assessment of whether this evidence is relevant to this patient.
Advanced
Knowledge
Principles of professional appraisal and constructive feedback
Methods of audit and translating findings into sustained change in practice
Use of information technology to optimize patient care and life-long learning
Identification and critical appraisal of literature; integration of findings into local clinical practice
Principles of medical research: research questions; protocol design; power analysis, data collection, data analysis and interpretation of results; manuscript preparation and publication rules.
Ethical principles involved in conducting research (including subject protection, consent, confidentiality and competing interests) and national ethical approval processes
Ethical management of relationships with industry

Skills
Propose realistic initiatives / projects to promote improvement