2021

Rawalpindi Medical University
Department of Critical Care Medicine

PROGRAM REQUIREMENT
MD CRITICAL CARE MEDICINE

PREFACE

The horizons of *Medical Education* are widening & there has been a steady rise of global interest in *Post Graduate Medical Education*, an increased awareness of the necessity for experience in education skills for all healthcare professionals and the need for some formal recognition of postgraduate training in Critical Care Medicine

We are seeing a rise in the uptake of places on postgraduate courses in medical education, more frequent issues of medical education journals and the further development of e-journals and other new online resources. There is therefore a need to provide active support in *Post Graduate Medical Education* for a larger, national group of colleagues in all specialties and at all stages of their personal professional development. If we were to formulate a statement of intent to explain the purpose of this curriculum we might simply say that our aim is to help clinical colleagues to teach and to help students to learn in a better and advanced way. This book is a state of the art book with representation of all activities of the MD Critical Care Medicine program at RMU. Curriculum is incorporated in the book for convenience of supervisors and residents. MD curriculum is based on six Core Competencies of ACGME ***(Accreditation Council for Graduate Medical Education)*** including ***Patient Care, Medical Knowledge, System Based Practice, Practice Based Learning, Professionalism, Interpersonal and Communication Skills***. The mission of Rawalpindi Medical University is to improve the health of the communities and we serve through education, biomedical research and health care. As an integral part of this mission, importance of research culture and establishment of a comprehensive research structure and research curriculum for the residents has been formulated and provided in this book.

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INTRODUCTION

The Critical Care Residency Program is a unique structural postgraduate training program that will help fulfil the current critical national need for trained physicians in this field.

This program is designed to prepare physicians for practicing competently and independently in Critical Care Medicine. Specifically, it teaches the fundamental skills, knowledge, and humanistic qualities inherent to Critical Care Medicine practice and provides progressive responsibility for and experience in the application of these principles to enable effective management of clinical problems.

Equal opportunity must be provided to Residents, under the guidance and supervision of qualified faculty, to develop a satisfactory level of clinical maturity, judgment, and technical skill. Upon completion of this program, Residents should be capable of practicing Critical Care Medicine, learning new skills and knowledge during their careers, and monitoring both their own physical and mental well-being and that of others.

International bodies including **ACGME (USA)** & **GMC (UK)** under the supervision of **Society of Critical Care Medicine** (SCCM, USA), **Faculty of Intesive Care Medicine** (FICM, UK) and **European Society of Intensive Care Medicine** (ESICM) have established well developed Critical Care Medicine Programs. This curriculum for MD Critical Care Medicine Program at Rawalpindi Medical University takes its precedent from these highly esteemed international educational bodies.

MISSION STATEMENT

- To set the educational standards for training and certification in the field of adult Critical Care Medicine.
- To evaluate and accredit training centres in adult Critical Care Medicine.

STATUTES

NOMENCLATURE:

Nomenclature of the Proposed Course The name of degree programme shall be MD Critical Care Medicine. This name is well recognized and established worldwide.

COURSE TITLE:

MD Critical Care Medicine

TRAINING CENTRES:

Departments of Critical Care Medicine at Rawalpindi Medical University (RMU).

DURATION OF COURSE:

The duration of MD Critical Care Medicine course shall be 2 years with structured training in a recognized departments under the guidance of an approved supervisor.

PROGRAM STRUCTURE

The course structure includes

1. Clinical Training of 24 months
2. Research and Thesis writing.

The candidate shall undergo clinical training to achieve educational objectives of M.D. Critical Care Medicine along with rotations in the relevant fields.The clinical training shall be competency based. There shall be generic and specialty specific competencies and shall be assessed by continuous Internal Assessment.

Research Component and thesis writing shall be completed over the two years duration of the course. Research can be done as one block or it can be done in the form of regular periodic rotation over two years as long as total research time is equivalent six months.

TRAINING ROTATIONS

Trainees will do the 24 months training rotations as follows

Rotations	
Mandatory Rotations (7 Compulsory Rotations)	**Total Duration = 20 Months**
Medical ICU	10 months
Surgical ICU (Tracheostomy, Chest tube)	3 months
General Anaesthesia (Pre & Post Op care, Emergency Induction)	2 months
Pulmonology (fibre optic bronchoscopy/BAL)	2 months
Radiology (ultrasound guided procedures/imaging)	1 month
Cardiothoracic Intensive Care (Echo, arterial Catheterization/PPM)	1 month
Nephrology	1 month
Elective Rotations (2-4 Rotations of Trainee's interest)	**Total Duration = 4 Months**
Transplant Intensive Care	2 months
Neuro anaesthesia	1 month
Neurocritical Care	2 months
Cardiothoracic Anaesthesia	1 month
Critical Care Echocardiography	1 month
Emergency Medicine	2 months
Trauma	2 months
Pain Medicine	1 month
Critical Care Radiology	1 month

ADMISSION CRITERIA

Applications for admission to MD Training Programs will be invited through advertisement in print and electronic media mentioning closing date of applications and date of Entry Examination.

Eligibility: The applicant on the last date of submission of applications for admission must possess the:

i. Basic Medical Qualification of MBBS or equivalent medical qualification recognized by Pakistan Medical & Dental Council.

ii. Higher Specialist Qualification such as MD/ Diplomate American Board/ MRCP/ FCPS in Medicine, Surgery, Anaesthesia, Pulmonology or Nephrology or equivalent qualification.

iii. Valid certificate of permanent registration with Pakistan Medical & Dental Council with up-to-date qualification details.

REGISTRATION AND ENROLMENT

i. As per policy of Pakistan Medical & Dental Council the number of PG Trainees/ Students per supervisor shall be maximum O5 per annum for all PG programmes including minor programmes (if any)

ii. Beds to trainee ratio at the approved teaching site shall be at least 5 beds per trainee.

iii. The University will approve supervisors for MD courses.

iv. Candidates selected for the courses: after their enrolment at the relevant institutions shall be registered with UHS as per prescribed Registration Regulations.

SPECIFIC OBJECTIVES

i. The doctor will be able to function successfully within any organisational and management systems whilst adhering to the appropriate legal and ethical framework.

ii. The doctor will be focused on patient safety and will deliver effective quality improvement, whilst practising within established legal and ethical frameworks.

iii. A Critical Care Medicine specialist will know how to undertake medical research including the ethical considerations, methodology and how to manage and interpret data appropriately.

iv. To ensure development of the future medical workforce, a doctor working as a specialist in Critical Care Medicine will be an effective clinical teacher and will be able to provide educational and clinical supervision.

v. Doctors specialising in Critical Care Medicine can identify, resuscitate and stabilise a critically ill patient, as well as undertake their safe intra-hospital or inter-hospital transfer to an appropriately staffed and equipped facility.

vi. Critical Care Medicine specialists will have the knowledge and skills to initiate, request and interpret appropriate investigations and advanced monitoring techniques, to aid the diagnosis and management of patients with organ systems failure. They will be able to provide and manage the subsequent advanced organ system support therapies. This will include both pharmacological and mechanical interventions.

vii. Specialists in Critical Care Medicine can provide pre-operative resuscitation and optimisation of patients, deliver post-operative clinical care including optimising their physiological status, provide advanced organ system support and manage their pain relief.

viii. Doctors specialising in Critical Care Medicine will understand and manage the physical and psychosocial consequences of critical illness for patients and their families, including providing pain relief, treating delirium and arranging ongoing care and rehabilitation. They will

also manage the withholding or withdrawal of life-sustaining treatment, discussing end of life care with patients and their families and facilitating organ donation where appropriate.

ix. Critical Care Medicine specialists will have the skillset and competence to lead and manage a critical care service, including the multidisciplinary clinical team and providing contemporaneous care to a number of critically ill patients.

x. Critical Care Medicine specialists will have developed the necessary skills of induction of anaesthesia, airway control, care of the unconscious patient and understanding of surgery and its physiological impact on the patient.

xi. In order to manage acutely ill patients outside the Intensive Care Unit, a Critical Care Medicine specialist will have the diagnostic, investigational and patient management skills required to care for ward-based patients whose condition commonly requires admission to the intensive care unit.

xii. Doctors specialising in Critical Care Medicine understand the special needs of, and are competent to manage patients with neurological diseases, both medical and those requiring surgery, which will include the management of raised intracranial pressure, central nervous system infections and neuromuscular disorders.

xiii. A specialist in adult Critical Care Medicine is competent to recognise, provide initial stabilisation and manage common paediatric emergencies until expert advice or specialist assistance is available. They are familiar with legislation regarding safeguarding children in the context of Critical Care Medicine practice.

xiv. Critical Care Medicine specialists recognise the special needs of, and are competent to provide the perioperative care to, patients who have undergone cardiothoracic surgery including providing pain relief and advanced organ system support utilising specialised techniques available to support the cardiovascular system.

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COMPETENCIES

COMPETENCIES

Professionalism

- Residents are expected to demonstrate behaviours that reflect a commitment to continuous professional developmental, ethical practice, an understanding and sensitivity to diversity and a responsible attitude toward their patients, their profession, and society.
- Demonstrate respect, compassion, integrity, and altruism in relationships with patients, families, and colleagues.
- Demonstrate sensitivity and responsiveness to the gender, age, culture, religion, sexual preference, socioeconomic status, beliefs, behaviour and disabilities of patients and professional colleagues.
- Adhere to principles of confidentiality, scientific/academic integrity, and informed consent.
- Recognize and identify deficiencies in peer performance.
- Understand and demonstrate the skill and art of end of life care.

Patient Care and Procedural Skills

- Residents are expected to provide patient care that is compassionate, appropriate and effective for the promotion of health, prevention of illness, treatment of disease and at the end of life.
- Gather accurate, essential information from all sources, including medical interviews, physical examinations, medical records and diagnostic/therapeutic procedures.
- Make informed recommendations about preventive, diagnostic and therapeutic options and interventions based on clinical judgment, scientific evidence, and patient preference.
- Develop, negotiate and implement effective patient management plans and integration of patient care.
- Perform competently the diagnostic and therapeutic procedures considered essential to the practice of Critical Care Medicine.

Medical Knowledge

- The development of a basic understanding of core Critical Care Medicine concepts.
- Etiology, clinical manifestation, disease course and prognosis, investigation and management of common diseases.
- Scientific basis and recent advances in pathophysiology, diagnosis and management of diseases.
- Spectrum of clinical manifestations and interaction of multiple medical diseases in the same patient.
- Psychological and social aspects of illnesses.
- Effective use and interpretation of investigation and special diagnostic procedures.
- Critical analysis of the efficacy, cost-effectiveness and cost-utility of treatment modalities.
- Patient safety and risk management
- Medical audit and quality assurance
- Ethical principles and medico legal issues related to illnesses.
- Updated knowledge on evidenced-based medicine and its implications for diagnosis and treatment of patients.
- Familiarity with different care approaches and types of health care facilities towards the patients care with illnesses, including convalescence, rehabilitation, palliation, long term care, and medical ethics.
- Knowledge on patient safety and clinical risk management.
- Awareness and concern for the cost-effectiveness and risk-benefits of various advanced treatment modalities.
- Familiarity with the concepts of administration and management and overall forward planning for an Intensive Care Unit

System-based Practice

- Residents are expected to demonstrate both an understanding of the contexts and systems in which health care is provided, and the ability to apply this knowledge to improve and optimize health care.
- Understands accesses and utilizes the resources, providers and systems necessary to provide optimal care.
- Understand the limitations and opportunities inherent in various practice types and delivery systems, and develop strategies to optimize care for the individual patient.
- Apply evidence-based, cost-conscious strategies to prevention, diagnosis, and disease management.

- Collaborate with other members of the health care team to assist patients in dealing effectively with complex systems and to improve systematic processes of care.

Interpersonal and Communication Skills

- Residents are expected to demonstrate interpersonal and communication skills that enable them to establish and maintain professional relationships with patients, families, and other members of health care teams.
- Provide effective and professional consultation to other physicians and health care professionals and sustain therapeutic and ethically sound professional relationships with patients, their families, and colleagues.
- Use effective listening, nonverbal, questioning, and narrative skills to communicate with patients and families.
- Interact with consultants in a respectful, appropriate manner. Maintain comprehensive, timely, and legible medical records

Practice based learning & Improvement

- Residents are expected to be able to use scientific evidence and methods to investigate, evaluate, and improve patient care practices.
- Identify areas for improvement and implement strategies to enhance knowledge, skills, attitudes and processes of care.
- Analyse and evaluate practice experiences and implement strategies to continually improve the quality of patient practice.
- Develop and maintain a willingness to learn from errors and use errors to improve the system or processes of care.
- Use information of technology or other available methodologies to access and manage information, support patient care decisions and enhance both patient and physician education.

Research

- With advent of Evidence Based Practice over last two to three decades in medical science, merging the best research evidence with good clinical expertise and patient values is inevitable in decision making process for patient care. Therefore apart from receiving per excellence knowledge of the essential principles of medicine and necessary skills of

clinical procedures, the trainees should also be well versed and skilful in research methodologies. So the training in research being imperative is integrated longitudinally in 2 years training tenure of the trainees.

All the above core competencies except Research are based on the ACGME program requirements guidelines for Critical Care Medicine, December 2020. These competencies are divided in 12 domains for implementation in the local setup of Rawalpindi Medical University and Allied Hospitals for training in Critical Care Medicine. These domains are

Domain 1. Resuscitation and management of the acutely ill patient
1.1 Adopts a structured and timely approach to the recognition, assessment and stabilisation of the acutely ill patient with disordered physiology
1.2 Manages cardiopulmonary resuscitation - ALS recommended
1.3 Manages the patient post resuscitation
1.4 Triages and prioritises patients appropriately, including timely admission to ICU
1.5 Assesses and provides initial management of the trauma patient
1.6 Assesses and provides initial management of the patient with burns
1.7 Describes the management of mass casualties
Domain 2: Diagnosis, Assessment, Investigation, Monitoring and Data Interpretation
2.1 Obtains a history and performs an accurate clinical examination
2.2 Undertakes timely and appropriate investigations
2.3 Performs electrocardiography (ECG / EKG) and interprets the results
2.4 Obtains appropriate microbiological samples and interprets results
2.5 Obtains and interprets the results from blood gas samples
2.6 Interprets imaging studies
2.7 Monitors and responds to trends in physiological variables
2.8 Integrates clinical findings with laboratory investigations to form a differential diagnosis
Domain 3: Disease Management
Acute Disease
3.1 Manages the care of the critically ill patient with specific acute medical conditions
Chronic Disease
3.2 Identifies the implications of chronic and co-morbid disease in the acutely ill patient
Organ System Failure
3.3 Recognises and manages the patient with circulatory failure
3.4 Recognises and manages the patient with, or at risk of, acute renal failure

3.5 Recognises and manages the patient with, or at risk of, acute liver failure
3.6 Recognises and manages the patient with neurological impairment
3.7 Recognises and manages the patient with acute gastrointestinal failure
3.8 Recognises and manages the patient with severe acute respiratory failure/acute lung injury syndromes (ALI/ARDS)
3.9 Recognises and manages the septic patient
3.10 Recognises and manages the patient following intoxication with drugs or environmental toxins
3.11 Recognises life-threatening maternal peripartum complications and manages care
Domain 4: Therapeutic interventions / Organ support in single or multiple organ failure
4. 1 Prescribes drugs and therapies safely
4.2 Manages antimicrobial drug therapy
4.3 Administers blood and blood products safely
4.4 Uses fluids and vasoactive /inotropic drugs to support the circulation
4.5 Describes the use of mechanical assist devices to support the circulation
4.6 Initiates, manages, and weans patients from invasive and non invasive ventilator support
4.7 Initiates, manages and weans patients from renal replacement therapy
4.8 Recognises and manages electrolyte, glucose and acid-base disturbances
4.9 Co-ordinates and provides nutritional assessment and support
Domain 5: Practical procedures
Respiratory System
5.1 Administers oxygen using a variety of administration devices
5.2 Performs emergency airway management
5.3 Performs difficult and failed airway management according to local protocols
5.4 Performs endotracheal suction
5.5 Performs fibreoptic bronchoscopy and BAL in the intubated patient
5.6 Performs percutaneous tracheostomy
5.7 Performs chest drain insertion
Cardiovascular System
5.8 Performs arterial catheterisation
5.9 Performs ultrasound techniques for vascular localisation
5.10 Performs central venous catheterisation
5.11 Performs defibrillation and cardioversion
5.12 Performs transthoracic cardiac pacing, describes transvenous
5.13 Describes how to perform pericardiocentesis

5.14 Demonstrates a method for measuring cardiac output and derived haemodynamic variables
Central Nervous System
5.15 Performs lumbar puncture (intradural / 'spinal') under supervision
5.16 Manages the administration of analgesia via an epidural catheter
Gastrointestinal System
5.17 Performs abdominal paracentesis
5.18 Describes Sengstaken tube (orequivalent) placement
5.19 Performs nasogastric tubeplacement
Genitourinary System
5.20 Performs urinary catheterisation
Domain 6: Perioperative care
6.1 Manages the pre and post operative care of the high risk surgical patient
6.2 Manages the care of the patient following cardiac surgery
6.3 Manages the care of the patient following craniotomy
6.4 Manages the care of the patient following solid organ transplantation
6.5 Manages the pre- and post operative care of the trauma patient under supervision
Domain 7: Comfort and recovery
7.1 Identifies and attempts to minimise the physical and psychosocial consequences of critical illness for patients and families
7.2 Manages the assessment, prevention and treatment of pain and delirium
7.3 Manages sedation and neuromuscular blockade
7.4 Communicates the care requirements of patients, including rehabilitation, at ICU discharge to health care professionals, patients and relatives
7.5 Manages the safe and timely discharge of patients from the ICU
Domain 8: End of life care
8.1 Manages the process of withholding or withdrawing treatment with the multi-disciplinary team
8.2 Discusses end of life care with patients and their families /surrogates
8.3 Manages palliative care of the critically ill patient
8.4 Performs brain-stem death testing
8.5 Manages the physiological support of the organ
8.6 Manages donation following cardiac death
Domain 9: Paediatric care
9.1 Describes the recognition of the acutely ill child and initial management of paediatric emergencies
9.2 Describes national legislation and guidelines relating to child protection and their relevance to critical care
Domain 10: Transport

10.1 Undertakes transport of the mechanically ventilated critically ill patient outside the ICU
Domain 11: Patient safety and health systems management
11.1 Leads a daily multidisciplinary ward round
11.2 Complies with local infection control measures
11.3 Identifies environmental hazards and promotes safety for patients & staff
11.4 Identifies and minimises risk of critical incidents and adverse events, including complications of critical illness
11.5 Organises a case conference
11.6 Critically appraises and applies guidelines, protocols and care bundles
11.7 Describes commonly used scoring systems for assessment of severity of illness, case mix and workload
11.8 Demonstrates an understanding of the managerial & administrative responsibilities of the CCM specialist
Domain 12: Professionalism
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
Professional Relationships with patients and relatives
12.4 Involves patients (or their surrogates if applicable) in decisions about care and treatment
12.5 Demonstrates respect of cultural and religious beliefs and an awareness of their impact on decision making
12.6 Respects privacy, dignity, confidentiality and legal constraints on the use of patient data
Professional Relationships with members of the healthcare team
12.7 Collaborates and consults; promotes team-working
12.9 Supports clinical staff outside the ICU to enable the delivery of effective care
12.10 Appropriately supervises, and delegates to others, the delivery of patient care
Self Governance
12.11 Takes responsibility for safe patient care
12.12 Formulates clinical decisions with respect for ethical and legal principles
12.13 Seeks learning opportunities and integrates new knowledge into clinical practice
12.14 Participates in multidisciplinary teaching
12.15 Participates in quality improvement under supervision

Rawalpindi Medical University
Department of Critical Care Medicine

METHODS OF TEACHING & LEARNING

METHODS OF TEACHING & LEARNING DURING COURSE CONDUCTION

Inpatient Services

All residents will have rotations in intensive care, coronary care, emergency medicine, general medical wards, general medicine, ambulatory experiences etc. The required knowledge and skills pertaining to the ambulatory based training shall be demonstrated.

Emergency services

Our residents take an early and active role in patient care and obtain decision-making roles quickly. Within the Emergency Department, residents direct the initial stabilization of all critical patients, manage airway interventions, and oversee all critical care.

Electives/ Specialty Rotations:

In addition, the resident will elect rotations in a variety of electives including nutrition, nuclear medicine or any of the medicine subspecialty consultative services or clinics. They may choose electives from each medicine subspecialty and from offerings of other departments. Residents may also select electives at other institutions if the parent department does not offer the experiences they want.

Interdisciplinary Medicine

Adolescent Medicine, Dermatology, Emergency Medicine, General Surgery, Gynecology, Neurology, Occupational Medicine, Ophthalmology, Orthopedics and Sports Medicine, Otolaryngology, Physical Medicine and Rehabilitation, Urology.

Community Practice

Residents experience the practice of medicine in a non-academic, non-teaching hospital setting. The rotation may be used to try out a practice that the resident later joins, to learn the needs of referring physicians or to decide on a future career path.

Mandatory Workshops:

Residents achieve hands on training while participating in mandatory workshops of Research Methodology, Advanced Life Support, Communication Skills, Computer & Internet and Clinical Audit. Specific objectives are given in detail in the relevant section of Mandatory Workshops.

Core Faculty Lectures (CFL)

The core faculty lecture's focus on monthly themes of the variousspecialty medicine topics for eleven months of the year, i.e., Cardiology, Gastroenterology, Hematology, etc. Lectures are still an efficient way of delivering information. Good lectures can introduce new material or synthesize concepts students have through text-, web-, or field-based activities. Buzz groups can be incorporated into the lectures in order to promote more active learning.

Introductory Lecture Series (ILS)

Various introductory topics are presented by subspecialty and general medicine faculty to introduce interns to basic and essential topics in Critical Care Medicine.

Long and Short Case Presentations

Giving an oral presentation on ward rounds is an important skill for medical student to learn. It is medical reporting which is terse and rapidly moving. After collecting the data, you must then be able both to document it in a written format and transmit it clearly to other health care providers. In order to do this successfully, you need to understand the patient's medical illnesses, the psychosocial contributions to their History of Presenting Illness and their physical diagnosis findings. You then need to compress them into a concise, organized recitation of the most essential facts. The listener needs to be given all of the relevant information without the extraneous details and should be able to construct his/her own differential diagnosis as the story unfolds. Consider yourself an advocate who is attempting to persuade an informed, interested judge the merits of your argument, without distorting any of the facts. An oral case presentation is NOT a simple recitation of your write-up. It is a concise, edited presentation of the most essential information. Basic structure for oral case presentations includes Identifying information/chief complaint (ID/CC) , History of present illness (HPI) including relevant ROS (Review of systems) questions only ,Other active medical problems , Medications/allergies/substance use (note: e. The complete ROS should not be presented in oral presentations, Brief social history (current situation and major issues only). Physical examination (pertinent findings only) , One line summary & Assessment and plan

Seminar Presentation

Seminar is held in a noon conference format. Upper level residents present an in-depth review of a medical topic as well as their own research. Residents are formally critiqued by both the associate program director and their resident colleagues.

Journal Club Meeting (JC)

A resident will be assigned to present, in depth, a research article or topic of his/her choice of actual or potential broad interest and/or application. Two hours per month should be allocated to discussion of any current articles or topics introduced by any participant. Faculty or outside researchers will be invited to present outlines or results of current research activities. The article should be critically evaluated and its applicable results should be highlighted, which can be incorporated in clinical practice. Record of all such articles should be maintained in the relevant department

Small Group Discussions/ Problem based learning/ Case based learning

Traditionally small groups consist of 8- 12 participants. Small groups can take on a variety of different tasks, including problem solving, role play, discussion, brainstorming, debate, workshops and presentations. Generally, students prefer small group learning to other instructional methods. From the study of a problem students develop principles and rules and generalize their applicability to a variety of situations PBL is said to develop problem solving skills and an integrated body of knowledge. It is a student-centered approach to learning, in which students determine what and how they learn. Case studies help learners identify problems and solutions, compare options and decide how to handle a real situation.

Discussion/Debate

There are several types of discussion tasks which would be used as learning method for residents including: guided discussion, in which the facilitator poses a discussion question to the group and learners offer responses or questions to each other's contributions as a means of broadening the discussion's scope; inquiry-based discussion, in which learners are guided through a series of questions to discover some relationship or principle; exploratory discussion, in which learners examine their personal opinions, suppositions or assumptions and then visualize alternatives to these assumptions; and debate in which students argue opposing sides of a controversial topic. With thoughtful and well-designed discussion tasks, learners can practice critical inquiry and reflection, developing their individual thinking, considering alternatives and negotiating meaning with other discussants to arrive at a shared understanding of the issues at hand.

Case Conference (CC)

These sessions are held three days each week; the focus of the discussion is selected by the presenting resident. For example, some cases may be presented to discuss a differential diagnosis, while others are presented to discuss specific management issues.

Noon Conference (NC)

The noon conferences focus on monthly themes of the various specialty medicine topics for eleven months of the year, i.e., Cardiology, Gastroenterology, Hematology, etc.

Grand Rounds (GR)

The Department of Medicine hosts Grand Rounds on weekly basis. Speakers from local, regional and national medicine training programs are invited to present topics from the broad spectrum of Critical Care Medicine. All residents on inpatient floor teams, as well as those on ambulatory block rotations and electives are expected to attend.

Professionalism Curriculum (PC)

This is an organized series of recurring large and small group discussions focusing upon current issues and dilemmas in medical professionalism and ethics presented primarily by an associate program director. Lectures are usually presented in a noon conference format.

Evening Teaching Rounds

During these sign-out rounds, the inpatient Chief Resident makes a brief educational presentation on a topic related to a patient currently on service, often related to the discussion from morning report. Serious cases are mainly focused during evening rounds.

Clinico-pathological Conferences

The clinicopathological conference, popularly known as CPC primarily relies on case method of teaching medicine. It is a teaching tool that illustrates the logical, measured consideration of a differential diagnosis used to evaluate patients. The process involves case presentation, diagnostic data, discussion of differential diagnosis, logically narrowing the list to few selected probable diagnoses and eventually reaching a final diagnosis and its brief discussion. The idea was first practiced in Boston, back in 1900 by a Harvard internist, Dr. Richard C. Cabot who practiced this as an informal discussion session in his private office. Dr. Cabot incepted this from a resident, who in turn had received the idea from a roommate, primarily a law student.

Evidence Based Medicine (EBM)

Residents are presented a series of noon monthly lectures presented to allow residents to learn how to critically appraise journal articles, stay current on statistics, etc. The lectures are presented by the program director.

Clinical Audit based learning

"Clinical audit is a quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria…Where indicated, changes are implemented…and further monitoring is used to confirm improvement in healthcare delivery." Principles for Best Practice in Clinical Audit (2002, NICE/CHI)

Peer Assisted Learning

Any situation where people learn from, or with, others of a similar level of training, background or other shared characteristic.Provides opportunities to reinforce and revise their learning. Encourages responsibility and increased self-confidence. Develops teaching and verbalization skills. Enhances communication skills, and empathy. Develops appraisal skills (of self and others) including the ability to give and receive appropriate feedback. Enhance organizational and team-working skills.

Morbidity and Mortality Conference (MM)

The M&M Conference is held occasionally atnoon throughout the year. A case, with an adverse outcome, though not necessarily resulting in death, is discussed and thoroughly reviewed. Faculty members from various disciplines are invited to attend, especially if they were involved in the care of the patient. The discussion focuses on how care could have been improved.

Clinical Case Conference

Each resident, except when on vacation, will be responsible for at least one clinical case conference each month. The cases discussed may be those seen on either the consultation or clinic service or during rotations in specialty areas. The resident, with the advice of the Attending Physician on the Consultation Service, will prepare and present the case(s) and review the relevant literature

SEQ as assignments on the content areas

SEQs assignments are given to the residents on regular basis to enhance their performance during written examinations.

Skill teaching in ICU, emergency, ward settings & skill laboratory

Two hours twice a month should be assigned for learning and practicing clinical skills. List of skills to be learnt during these sessions is as follows:

- Residents must develop a comprehensive understanding of the indications, contraindications, limitations, complications, techniques, and interpretation of results of those technical procedures integral to the discipline (mentioned in the Course outlines)
- Residents must acquire knowledge of and skill in educating patients about the technique, rationale and ramifications of procedures and in obtaining procedure-specific informed consent. Faculty supervision of residents in their performance is required, and each resident's experience in such procedures must be documented by the program director
- Residents must have instruction in the evaluation of medical literature, clinical epidemiology, clinical study design, relative and absolute risks of disease, medical statistics and medical decision-making
- Training must include cultural, social, family, behavioral and economic issues, such as confidentiality of information, indications for life support systems, and allocation of limited resources
- Residents must be taught the social and economic impact of their decisions on patients, the primary care physician and society. This can be achieved by attending the bioethics lectures and becoming familiar with Project Professionalism Manual such as that of the American Board of Critical Care Medicine
- Residents should have instruction and experience with patient counseling skills and community education
- This training should emphasize effective communication techniques for diverse populations, as well as organizational resources useful for patient and community education
- Residents may attend the series of lectures on Nuclear Medicine procedures (radionuclide scanning and localization tests and therapy) presented to the Radiology residents
- Residents should have experience in the performance of clinical laboratory and radionuclide studies and basic laboratory techniques including quality control, quality assurance and proficiency standards.

Bedside teaching rounds in ward

"To study the phenomenon of disease without books is to sail an uncharted sea whilst to study books without patients is not to go to sea at all" sir william osler 1849-1919. bedside teaching is regularly included in the ward rounds.Learning activities include the physical exam, a discussion of particular medical diseases, psychosocial and ethical themes, and management issues

Directly Supervised Procedures - (DSP)

Residents learn procedures under the direct supervision of anattending or fellow during some rotations. For example, in the Medical Intensive Care Unit the Pulmonary /Critical Care attending or fellow, or the MICU attending, observe the placement of central venous and arterial lines. Specific procedures used in patient care vary by rotation.

Self-directed learning

Self-directed learning residents have primary responsibility for planning, implementing, and evaluating their effort. It is an adult learning technique that assumes that the learner knows best what their educational needs are. The facilitator's role in self-directed learning is to support learners in identifying their needs and goals for the program, to contribute to clarifying the learners' directions and objectives and to provide timely feedback. Self-directed learning can be highly motivating, especially if the learner is focusing on problems of the immediate present, a potential positive outcome is anticipated and obtained and they are not threatened by taking responsibility for their own learning.

Follow up clinics

The main aims of our clinic for patients and relatives include (a) Explanation of patient's stay in ICU or Ward settings: Many patients do not remember their ICU stay, and this lack of recall can lead to misconceptions, frustration and having unrealistic expectations of themselves during their recovery. It is therefore preferable for patients to be aware of how ill they have been and then they can understand why it is taking some time to recover.(b)Rehabilitation information and support: We discuss with patients and relatives their individualized recovery from critical illness. This includes expectations, realistic goals, change in family dynamics and coming to terms with life style changes. (c)Identifying physical, psychological or social problems Some of our patients have problems either as a result of their critical illness or because of other underlying conditions. The follow-up team will refer patients to various specialties, if appropriate. (d)Promoting a quality service: By highlighting areas which require change in nursing and medical practice, we can improve the quality of patient and relatives care. Feedback from patients and relatives about their ICU & ward experience is invaluable. It has initiated various audits and changes in clinical practice, for the benefit of patients and relatives in the future.

Core curriculum meeting: All the core topics of Medicine should be thoroughly discussed during these sessions. The duration of each session should be at least two hours once a month. It should be chaired by the chief resident (elected by the residents of the relevant discipline). Each resident should be given an opportunity to brainstorm all topics included in the course and to generate new ideas regarding the improvement of the course structure

Annual Grand Meeting

Once a year all residents enrolled for MD Critical Care Medicine should be invited to the annual meeting at RMU. One full day will be allocated to this event. All the chief residents from affiliated institutes will present their annual reports. Issues and concerns related to their relevant courses will be discussed. Feedback should be collected and suggestions should be sought in order to involve residents in decision making. The research work done by residents and their literary work may be displayed. In the evening an informal gathering and dinner can be arranged. This will help in creating a sense of belonging and ownership among students and the faculty.

Learning through maintaining log book

it is used to list the core clinical problems to be seen during the attachment and to document the student activity and learning achieved with each patient contact.

Learning through maintaining portfolio

Personal Reflection is one of the most important adult educational tools available. Many theorists have argued that without reflection, knowledge translation and thus genuine “deep” learning cannot occur. One of the Individual reflection tools maintaining portfolios, Personal Reflection allows students to take inventory of their current knowledge skills and attitudes, to integrate concepts from various experiences, to transform current ideas and experiences into new knowledge and actions and to complete the experiential learning cycle.

Task-based-learning

A list of tasks is given to the students: participate in consultation with the attending staff, interview and examine patients, review a number of new radiographs with the radiologist.

Teaching in the ambulatory care setting

A wide range of clinical conditions may be seen. There are large numbers of new and return patients. Students have the opportunity to experience a multi-professional approach to patient care. Unlike ward teaching, increased numbers of students can be accommodated without exhausting the limited No. of suitable patients.

Community Based Medical Education

CBME refers to medical education that is based outside a tertiary or large secondary level hospital. Learning in the fields of epidemiology, preventive health, public health principles, community development, and the social impact of illness and understanding how patients interact with the health care system. Also used for learning basic clinical skills, especially communication skills.

Audio visual laboratory

audio visual material for teaching skills to the residents is used specifically in teaching gastroenterology procedure details.

E-learning/web-based medical education/computer-assisted instruction

Computer technologies, including the Internet, can support a wide range of learning activities from dissemination of lectures and materials, access to live or recorded presentations, real-time discussions, self-instruction modules and virtual patient simulations. distance-independence, flexible scheduling, the creation of reusable learning materials that are easily shared and updated, the ability to individualize instruction through adaptive instruction technologies and automated record keeping for assessment purposes.

Research based learning

All residents in the categorical program are required to complete an academic outcomes-based research project during their training. This project can consist of original bench top laboratory research, clinical research or a combination of both. The research work shall be compiled in the form of a thesis which is to be submitted for evaluation by each resident before end of the training. The designated Faculty will organize and mentor the residents through the process, as well as journal clubs to teach critical appraisal of the literature.

Other teaching strategies specific for different specialties as mentioned in the relevant parts of the curriculum Some of the other teaching strategies which are specific for certain domains of Critical Care Medicine are given along with relevant modules.

Rawalpindi Medical University
Department of Critical Care Medicine

DETAILS OF DOMAINS OF COMPETENCIES

DETAILS OF DOMAINS OF CRITICAL CARE MEDICINE COMPETENCIES

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

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

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
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
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), (ICU))

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
Demonstrate emergency relief of tension pneumothorax
Assess, predict and manage circulatory shock
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.
Prescribe appropriate analgesia
Examine and plan care for the confused patient

1.2 Manages cardiopulmonary resuscitation – ALS recommended

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)
Recognise and manage choking / obstructed airway
Implement emergency airway management and ventilation
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
Protect a potentially unstable cervical spine

1.3 Manages the patient post-resuscitation

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
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

Implement emergency airway management and ventilation
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
Consider the need for and implement pre-transfer stabilisation

1.4 Triages and prioritises patients appropriately, including timely admission to ICU

Knowledge

Early warning signs of impending critical illness
Causes of cardio-respiratory arrest, identification of patients at risk and corrective treatment of reversible causes
Clinical signs associated with critical illness, their relative importance and interpretation
Clinical severity of illness and indications when organ dysfunctions or failure are an immediate threat to life
Indications for not starting resuscitation or ceasing an initiated attempt
Relevance of prior health status in determining risk of critical illness and outcomes
Triage and management of competing priorities
Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))

Skills

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.
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.
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

Knowledge

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
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, including sell salvage
Principles of emergency airway management (see 5.3)
Indications for and methods of ventilatory support
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
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, MRI, ultrasound, angiography and radionucleotide studies) in the critically ill patient
Indications for and basic interpretation of chest radiographs: range of normal features on a chest x-ray; collapse, consolidation, infiltrates (including ALI/ARDS), pneumothorax, pleural effusion, pericardial effusion, position of cannulae,
tubes or foreign bodies, airway compression, cardiac silhouette, mediastinal masses
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting outcome

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
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
Prioritise the order of investigations and interventions for individual injuries according to their threat to life
Protect a potentially unstable cervical spine
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

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
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
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 outcome

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
Implement emergency airway management and ventilation
Obtain vascular access sufficient to manage acute haemorrhage, rapid fluid infusion and monitor cardiovascular variables
Assess, predict and manage circulatory shock
Prescribe appropriate analgesia
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
Estimate burn wound mortality from published data tables
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)
Provide specialist advice before transfer to specialist cardiac or neuro ICU

1.7 Describes the management of mass casualties

Knowledge

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

Management of public relations and information
Alternative forms of external communication

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

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 cannot 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

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

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, MRI, angiography and radionucleotide studies in the critically ill patient
Risks to patient and staff of radiological procedures and precautions to minimise risk
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
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

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

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
Sensitivity and specificity of the investigation as related to a specific disease

Skills

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

2.4 Obtains appropriate microbiological samples and interprets results

Knowledge

Epidemiology and prevention of infection in the ICU
Types of organisms – emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between contamination, colonisation and infection
Requirements for microbiological surveillance and clinical sampling
Indications for microbiological sampling and interpretation of microbiological test results
Sensitivity and specificity of the investigation as related to a specific disease
Methods and routes of obtaining samples – associated indications and complications
Appropriate use of laboratory tests to confirm or refute a clinical diagnosis
Local patterns of bacterial resistance and antibiotic policy
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
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

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: pH, pCO2, pO2, SaO2, FiO2 CO2 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 PaCO2 and pH
Undertake further consultation / investigation when indicated

2.6 Interprets imaging studies

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
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
Principles, including indications, limitations and therapeutic modalities of:
MRI, ultrasound, angiography and radionucleotide studies in the critically ill patient

Skills

Interpret chest x-rays in a variety of clinical contexts
Basic interpretation of radiological investigations:

- neck and thoracic inlet films
- x-rays of abdominal fluid levels / free air

x-rays of long bone, skull; vertebral and rib fractures

- CT or MRI scans of head demonstrating fractures, haemorrhage, critically raised ICP and hydrocephalus
- 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)

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

2.7 Monitors and responds to trends in physiological variables

Knowledge

Indications, contraindications and complications associated with monitoring and monitoring devices; advantages and disadvantages of different monitoring systems / modalities taking into account their accuracy, convenience, reliability,
safety, cost and relevance to the patient's condition
Interpretation of information from monitoring devices, and identification of common causes of error; principles of
monitoring trends of change and their significance
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
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
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, relationship between mode of
ventilation and choice of parameters monitored; airflow and airway pressure waveforms

Physical principles, indications and limitations of end tidal CO 2 monitoring. Relationship between end tidal CO 2 and arterial pCO 2 in various clinical circumstances
Principles of fluid input-output monitoring
Methods for assessing pain and sedation
Methods for assessing neurological function e.g. Glasgow Coma Scale
Principles, indications and limitations of intra-abdominal pressure monitoring
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

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 pulmonary artery catheter or oesophageal Doppler inspired and expired gas monitoring for O2, CO2 and NO
intracranial pressure monitoring
Jugular bulb catheters and SjvO2 monitoring
Set monitor alarms appropriately
Interpret data from scoring or scaling systems to assess pain and sedation
Assess and document Glasgow Coma Scale (GCS)
Recognise changes in intracranial pressure and cerebral perfusion pressure which are life threatening

2.8 Integrates clinical findings with laboratory investigations to form a differential diagnosis

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
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

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

Acute Disease

3.1 Manages the care of the critically ill patient with specific acute medical conditions

Knowledge

Pathophysiology, diagnosis and management of commonly encountered acute medical conditions including:

Respiratory disorders:

The unprotected airway; pneumonia, lung or lobar collapse, asthma, chronic obstructive airways disease, pulmonary oedema, pneumothorax (simple and tension), pulmonary embolus, pleural effusion, acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) and their causative factors; pulmonary haemorrhage, upper and lower airway obstruction including epiglottitis; respiratory muscle disorders

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, valvular heart disease; vaso-occlusive diseases; pulmonary hypertension; right ventricular failure; cor pulmonale; malignant hypertension; cardiac tamponade; pacing box failure, cardiomyopathies

Neurological disorders:

Acute confusional states and coma; post-anoxic brain damage; intracranial haemorrhage and infarction; sub-arachnoid haemorrhage; cerebro-vascular accidents (CVA / stroke); convulsions and status epilepticus; meningitis and encephalitis, Medical causes of raised intracranial pressure; acute neuromuscular diseases causing respiratory difficulty (e.g. Guillain- Barre, myasthenia gravis, malignant hyperpyrexia); critical illness polyneuropathy, motor neuropathy and myopathy

Renal and genito-urinary disorders:

Urological sepsis; acute kidney injury; chronic renal failure; nephrotoxic drugs and monitoring, renal manifestations of systemic disease including vasculitides; rhabdomyolysis

Gastrointestinal disorders:

peptic/stress ulceration; upper GI haemorrhage; diarrhoea and vomiting; acute pancreatitis; cholecystitis; jaundice; acute and chronic liver failure; fulminant hepatic failure; paracetamol (acetaminophen)-induced liver injury; inflammatory bowel diseases; peritonitis; ascites; mesenteric infarction; perforated viscus; bowel obstruction and pseudo-obstruction; abdominal trauma; intra-abdominal hypertension and compartment syndrome; short-bowel syndrome; rupture of liver or spleen.

Haematological and oncological disorders:

Disseminated intravascular coagulation (DIC) and other coagulation disorders, Massive blood transfusion, acute and chronic anemia; 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, pyrexia and hypothermia; organ-specific signs of infection including haematogenous (venous catheterrelated, endocarditis, meningococcal disease), urological, pulmonary, abdominal (peritonitis, diarrhoea), skeletal (septic arthritis) , nosocomial infections, pyometria; septic abortion

Metabolic disorders:

Electrolyte disorders; acid-base disorders; fluid-balance disorders; thermoregulation and associated disorders

Endocrine disorders:

Diabetes mellitus, critical illness-induced hyperglycaemia, over- and under-activity of thyroid; adrenal and pituitary disorders; sepsis-induced relative adrenal insufficiency; endocrine emergencies;

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

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 outcome

Long term effects of acute medical conditions and late complications

Risk factors, recognition and assessment of single or multiple organ failure

Define the steps of diagnostic reasoning

Conceptualise the clinical problem

Develop problem list and action plan

Skills

Recognise and diagnose commonly encountered acute medical conditions

Recognise impending organ system dysfunction

Establish a management plan based on clinical and laboratory information

Consider potential interactions when prescribing drugs and therapies

Identify and manage chronic co-morbid disease

Chronic Disease

3.2 Identifies the implications of chronic and co-morbid disease in the acutely ill patient

Knowledge

Pathophysiology, diagnosis and management of commonly encountered chronic medical conditions including:

Respiratory disorders:

Asthma; chronic obstructive airways disease; pulmonary fibrosis; pulmonary thromboembolic disease; respiratory muscle disorders

Cardiovascular disorders:

Hypertension; angina; chronic heart failure (LVF / RVF); veno-occlusive disorders; cardiomyopathies; valvular heart disease and prosthetic valves; pulmonary hypertension; cor pulmonale; common arrhythmias and conduction disturbances; peripheral vascular disease

Neurological disorders:

Cerebro-vascular accidents (CVA / stroke); epilepsy; dementia; neuropathy and myopathy

Renal disorders:

chronic renal failure; renal manifestations of systemic disease including vasculitides; nephrotoxic drugs

Gastrointestinal disorders:

chronic pancreatitis; chronic liver failure; cirrhosis; inflammatory bowel diseases

Haematological and oncological disorders:

Coagulation disorders, hemolytic syndromes, platelet disorders; chronic anemia, immune disorders, malignancy including complications of chemotherapy and radiotherapy

Endocrine disorders:

Diabetes; thyroid, adrenal and pituitary disorders

Psychiatric disorders: depression; psychosis

Causes and consequences of decompensation in chronic organ failure; diagnosis and management of acute-on-chronic organ failure

Effects of concomitant treatment and/or co-morbid conditions on an individual patient's response to treatment

Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting outcome

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

Skills

Identify and manage chronic co-morbid disease

Consider potential interactions when prescribing drugs and therapies

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

Recognise the wide range of acute and long-term presentations involving use of alcohol and other drugs (e.g. trauma, depression, hypertension)

Organ System Failure

3.3 Recognises and manages the patient with circulatory failure

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; valvular heart disease; vaso- occlusive diseases; pulmonary hypertension; right ventricular failure; cor pulmonale; malignant hypertension; cardiac tamponade; pacing box failure; cardiomyopathies

Cardiopulmonary resuscitation

Effect of circulatory failure and its treatment on other organ systems

Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile

Use of fluids and vasoactive / inotropic / anti-arrhythmic drugs to support the circulation

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 outcome

Use of mechanical assist devices to support the circulation

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

Consider potential interactions when prescribing drugs and therapies

Measure and interpret haemodynamic variables (including derived variables)

Optimise myocardial function

3.4 Recognises and manages the patient with, or at risk of, acute renal failure

Knowledge

Symptoms, signs and causes of renal failure including acute kidney injury / chronic / acute on chronic) and indications for intervention

Distinguishing features of acute versus chronic renal failure and implications for management

Causes and complications of renal failure - methods to prevent or treat these

Renal and genito-urinary disorders:
Oliguria and anuria; polyuria; urological sepsis; acute renal failure; chronic renal failure; nephrotoxic drugs and monitoring, renal manifestations of systemic disease including vasculitides; rhabdomyolysis
Metabolic disorders: electrolyte disorders (notably hyperkalaemia) ; acid-base disorders; fluid balance disorders
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
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 outcome

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
Identify and avoid factors contributing to impaired renal function
Initiate, manage and wean patients from renal replacement therapy

3.5 Recognises and manages the patient with, or at risk of, acute liver failure

Knowledge

Functions of the liver - biosynthetic, immunologic, and detoxification
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:
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.

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

Neurological disorders: acute confusional states and coma; post-anoxic brain damage; convulsions; encephalopathy; raised intracranial pressure

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 concentrations in blood or plasma

Principles of blood glucose control: indications, methods, monitoring of safety and efficacy

Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile

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 outcome

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)

Effects, common presentations and potential for harm of alcohol and other drugs.

Range of interventions, treatments and prognoses for use of alcohol and other drugs.

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
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
Make an assessment of alcohol and other drug use, including taking a history and using validated tools.

3.6 Recognises and manages the patient with neurological impairment

Knowledge

Signs and symptoms of neurological impairment
The toxic, metabolic, structural, and infectious causes of altered consciousness
Investigation of impaired neurological function; methods for assessing neurological function (e.g. Glasgow Coma Scale)
Neurological disorders:
acute confusional states and coma; post-anoxic brain damage; intracranial haemorrhage and infarction; sub-arachnoid haemorrhage; cerebro-vascular accidents (CVA / stroke); convulsions and status epilepticus; meningitis and encephalitis; medical causes of raised intracranial pressure; acute neuromuscular diseases causing respiratory difficulty (e.g. Guillain Barre, myasthenia gravis, malignant hyperpyrexia); critical illness polyneuropathy, motor neuropathy and myopathy
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
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 including indications for decompressive craniectomy
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 outcome
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 (lumbar drain and extraventricular drain)
Principles of measurement of jugular venous saturation, cerebral Doppler velocities and cerebral blood flow.
Indications for plasmapheresis or immunoglobulins in Guillain Barre and myasthenic patients
Use of thiopentone infusions to induce deep coma

Skills

Identify patients at risk of neurological impairment
Identify and avoid factors contributing to neurological impairment
Assess and document Glasgow Coma Scale (GCS)
Establish a management plan based on clinical and laboratory information
Perform a lumbar puncture
Examine and plan care for the confused patient
Recognise changes in intracranial pressure and cerebral perfusion pressure which are life threatening
Take prompt action to reduce acutely elevated intracranial pressure
Manage cardiorespiratory physiology to minimise rises in intracranial pressure
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)
Consider potential interactions when prescribing drugs and therapies

3.7 Recognises and manages the patient with acute gastrointestinal failure

Knowledge

Signs and symptoms of gastrointestinal dysfunction (obstruction, ischemia, perforation, dysmotility)
Causes and complications of gastrointestinal failure
Effects of critical illness and treatments on gastric emptying
Investigation of acute gastrointestinal dysfunction
Gastrointestinal disorders: Abdominal pain and distension; stress/peptic ulceration and upper GI haemorrhage; lower GI bleeding; diarrhoea and vomiting; Pancreatitis; jaundice; cholecystitis; inflammatory bowel diseases; peritonitis; mesenteric infarction; perforated viscus; bowel obstruction; ascites; intra-abdominal hypertension & compartment syndrome; short-bowel syndrome, GI fistulae.

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
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 outcome

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

3.8 Recognises and manages the patient with acute lung injury syndromes (ALI / ARDS)

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), acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) and their causative factors; pulmonary haemorrhage, near-drowning
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 and modification of ventilator settings according to the condition or response of the patient
Potential adverse effects and complications of respiratory support and methods to minimise these
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
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 outcome
Pharmacological and non-pharmacological adjunct therapies for ALI
Principles of extra-corporeal membrane oxygenation (ECMO)

Skills

Identify patients at risk of acute lung injury (ALI / ARDS)
Implement emergency airway management and ventilation
Select the appropriate type and mode of ventilation for an individual patient
Identify and avoid factors contributing to acute lung injury
Plan, implement, review and adapt lung protective approach during mechanical ventilation
Perform thoracocentesis and manage intercostal drains
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
Plan, perform and review lung recruitment manoeuvres

3.9 Recognises and manages the septic patient

Knowledge

Pathogenesis, definitions and diagnostic criteria of sepsis, severe sepsis, septic shock and systemic inflammatory response syndrome (SIRS)
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:
Organisms causing specific infections: Gram positive and Gram negative bacteria, fungi, protozoa, viruses, pyrexia and hypothermia; organ-specific signs of infection including haematogenous (venous catheter-related, endocarditis, meningococcal disease), urological, pulmonary, abdominal (peritonitis, diarrhoea), skeletal (septic arthritis) nosocomial infections, pyometra; septic abortion
Techniques for effective fluid resuscitation
Use of fluids and vasoactive / inotropic / anti-arrhythmic drugs to support the circulation
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
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
Safe use of therapies which modify the inflammatory response

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
Obtain and interpret results of microbiological tests
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
Prevent, identify and manage hyper / hypoglycaemia

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

Knowledge

Symptoms and signs of acute intoxication associated with common intoxicants
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
Causes, recognition and management of associated disorders:
Cardiovascular disorders: drug induced arrhythmias and conduction disturbances

Respiratory disorders: smoke inhalation or burned airway damage; carbon monoxide poisoning
Neurological disorders: drug induced neurological impairment
Renal disorders: nephrotoxic drugs - monitoring & adjustment of drug doses in renal impairment / failure; rhabdomyolysis
Metabolic disorders: electrolyte disorders; acid-base disorders; fluid-balance disorders; thermoregulation and associated disorders
Gastrointestinal disorders: drug induced liver injury; hepatotoxic drugs and adjustment of drug doses in hepatic impairment / fulminant hepatic failure
Haematology: drug induced coagulopathy
Management of acute liver failure
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 outcome
Indications and complications of hyperbaric oxygenation

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
Identify patients at risk of developing renal failure
Identify patients at risk of developing acute liver failure
Identify and manage coagulopathies
Examine and plan care for the confused patient
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)

3.11 Recognises life-threatening maternal peripartum complications and manages care under supervision

Knowledge

Physiological changes associated with a normal pregnancy and delivery
Cardiopulmonary resuscitation of the pregnant patient
Pathophysiology, identification and management of peripartum complications: pre-eclampsia and eclampsia; HELLP syndrome; amniotic fluid embolism; ante-partum and post-partum haemorrhage; ectopic pregnancy; septic abortion; 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

Causes, recognition and management of associated disorders:
Cardiovascular disorders: peripartum cardiomyopathy; pulmonary hypertension
Haematological disorders: coagulation and fibrinolytic pathways and their associated disorders; disseminated intravascular coagulation (DIC); hemolytic syndromes, acute anaemia; complications of massive blood transfusion, principles of sell salvage
Metabolic disorders: electrolyte disorders; acid-base disorders; fluid-balance disorders; thermoregulation and associated disorders
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
Identify and manage coagulopathies
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
Seek appropriate support and supervision in order to provide optimal patient care

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

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 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.

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
- antidepressants
- anticoagulants
- plasma volume expanders

Adverse effects and interactions of drugs and their management
Recognition and management of serious adverse reactions and anaphylaxis
Local policies and procedures governing the prescription of drugs and therapies
Indications for and basic interpretation of drug concentrations 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
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
Recognise the importance of resources when prescribing, including the role of a Drug Formulary

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
Set realistic goals for therapy (independently or in collaboration with other teams)
Identify and avoid factors contributing to impaired renal function
Consider risk-benefit and cost-benefit of alternative drugs and therapies
Recognise when treatment is unnecessary or futile
Use IT prescribing tools where available to improve safety
Remain up to date with therapeutic alerts, and respond appropriately

Attitudes

Appreciate the role of non-medical prescribers

4.2 Manages antimicrobial drug therapy

Knowledge

Epidemiology and prevention of infection in the ICU
Types of organisms - emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between contamination, colonisation and infection
Local patterns of bacterial resistance and antibiotic policy
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
Principles of prescribing initial empirical therapy and modification / refinement with further clinical and microbiological information
Impact of drug therapy on organ-system function
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
Safe use of therapies which modify the inflammatory response

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)
Set realistic goals for therapy (independently or in collaboration with other teams)
Recognise when treatment is unnecessary or futile

4.3 Administers blood and blood products safely

Knowledge

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, including cell salvage
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
The pathogenesis and management of anaemia, thrombocytopenia, neutropenia and pancytopaenia
Thrombolytic and anti-thrombolytic agents
Principles and practise of plasma exchange (see 3.6)

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
Recognise when treatment is unnecessary or futile

4.4 Uses fluids and vasoactive / inotropic drugs to support the circulation

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
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

Establish a management plan based on clinical and laboratory information
Resuscitate a patient with septic shock using appropriate monitoring, fluid therapy and vasoactive agents
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)
Administer intravenous drugs (prepare, select route and mode of administration and document)
Use infusion pumps to administer drugs and fluids
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

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
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
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

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
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
Modes of mechanical ventilation - indications, contraindications and expected results of each mode (CMV, IRV, PRVC,HFOV, SIMV, PS, CPAP, BiPAP, NIV)
Operation of at least one positive pressure ventilator, one non-invasive ventilator, and a constant positive airway pressure (CPAP) device
A systematic approach to checking ventilator, breathing circuit and monitoring devices
Initial set-up and modification of ventilator settings according to the condition or response of the patient
Safe prescribing of oxygen; manifestations of pulmonary oxygen toxicity
Principles of monitoring ventilation:
significance of respiratory rate, tidal volume, minute volume, mean, peak, end expiratory and plateau pressure, intrinsic and extrinsic PEEP, inspired oxygen concentration, arterial blood gas and acid base status; relationship between mode of ventilation and choice of parameters monitored; airflow and airway pressure waveforms
Principles of weaning from mechanical ventilation and factors which may inhibit weaning
Measures of adequacy of tissue oxygenation, eg base deficit, lactate, central venous saturation
Measurement and interpretation of pulmonary mechanics during mechanical ventilation
Potential adverse effects and complications of respiratory support and methods to minimise these
Ventilator associated pneumonia: definition, pathogenesis and prevention
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
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
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
Management of and complications associated with tracheostomy tubes
Concept of one lung ventilation and use of double lumen endotracheal tube
Principles of extra-corporeal membrane oxygenation (ECMO)

Skills

Establish a management plan based on clinical and laboratory information

Select the appropriate type and mode of ventilation for an individual patient
Identify and correct ventilator mis-assembly and disconnections
Stabilise a patient on a constant positive airway pressure (CPAP) device
Stabilise a patient on a non-invasive ventilator (NIV)
Stabilise a patient on a positive pressure ventilator
Interpret data from an arterial blood gas sample
Confirm adequate oxygenation and control of PaCO 2 and pH
Set and interpret data from ventilator alarms
Construct, monitor and review a weaning plan
Manages one lung ventilation via double lumen endotracheal tube

4.7 Initiates, manages, and weans patients from renal replacement therapy

Basic Science

Knowledge

Physiology of fluid, electrolyte, acid-base and glucose control
Symptoms, signs and causes of renal failure including acute kidney injury / chronic / acute on chronic and indications for intervention
Investigation of impaired renal function
Distinguishing features of acute versus chronic renal failure and implications for management
Principles of haemofiltration, haemodialysis, peritoneal dialysis, haemoperfusion and plasmapheresis
Indications, complications and selection of renal replacement therapies (continuous and intermittent)
Function and operation of continuous haemodiafiltration devices (key components and trouble-shooting)
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
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

Establish a management plan based on clinical and laboratory information
Modify fluid and electrolyte therapy according to clinical features and fluid balance charts
Prevent hypokalaemia
Identify and correct haemostatic and coagulation disorders

Set realistic goals for therapy (independently or in collaboration with other teams)
Supervise the provision of continuous renal replacement therapy
Prescribe and manage anticoagulation therapy
Set appropriate exchange parameters and fluid balances for renal replacement therapies
Identify and avoid factors contributing to impaired renal function
Consider risk-benefit and cost-benefit of alternative drugs and therapies
Recognise when treatment is unnecessary or futile

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

Basic Science

Knowledge

Physiology of fluid, electrolyte, acid-base and glucose control
Pathophysiological consequences, signs and symptoms of disordered fluid, electrolyte, acid-base and glucose balance
Effect of critical illness upon homeostatic mechanisms and causes of homeostatic disturbances
Principles of blood glucose control: indications, methods, monitoring of safety and efficacy
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

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
Identify and avoid factors contributing to impaired renal function
Recognise when treatment is unnecessary or futile

4.9 Co-ordinates and provides nutritional assessment and support

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 alterations in starvation, obesity and stress response.

Gastrointestinal physiology: gastric function; secretions; gut motility, sphincters and reflex control; nausea and vomiting; digestive functions
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
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
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
Prevention and management of constipation and diarrhoea
Concept of gastrointestinal microbial translocation

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
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

Domain 5: Practical procedures

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

Respiratory System

5.1 Administers oxygen using a variety of administration devices

Basic Science

Knowledge

Symptoms, signs and causes of acute airway insufficiency and indications for intervention
Methods of maintaining a clear airway
Respiratory physiology: gaseous exchange; pulmonary ventilation: volumes, flows, dead space; mechanics of ventilation: ventilation/perfusion abnormalities; control of breathing, acute and chronic ventilatory failure, effect of oxygen therapy;
respiratory muscle oxygen consumption and work of breathing.
Indications, contraindications and complications of oxygen therapy
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
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
Principles of emergency airway management (see 5.3)
Indications for and complications of hyperbaric oxygenation

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

5.2 Performs emergency airway management

Knowledge

Symptoms , signs and causes of acute airway insufficiency and indications for intervention
Principles of emergency airway management (see 5.3)
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
Bronchoscopic appearance of the upper and lower airways
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
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
Appropriate use of double lumen endotarcheal tube for one lung isolation / ventilation

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
Select appropriate tracheal tube type, size and length
Perform intubation and verify correct placement of tube
Manage and minimise cardiovascular and respiratory changes during and after intubation
Demonstrate rapid sequence induction of anaesthesia / cricoid pressure
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

Management of complications of tracheostomy including but not limited to: blockage, displacement
Demonstrate correct placement of double lumen endotracheal tube

5.3 Performs difficult and failed airway management according to local protocols

Knowledge

Airway management in special circumstances, (head injury, full stomach, upper airway obstruction, shock, cervical spine injury)
Bronchoscopic appearance of the upper and lower airways
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

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
Principles of oxygen therapy and use of oxygen administration devices (see 5.1)
Appropriate use of drugs to facilitate airway control
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

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
Bronchoscopic appearance of the upper and lower airways

Skills

Perform endotracheal suction (via oral / nasal / tracheostomy tube)

5.5 Performs fibreoptic bronchoscopy and BAL in the intubated patient

Knowledge

Symptoms, signs and causes of acute airway insufficiency and indications for intervention

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
Detection and management of haemo/pneumothorax (simple and tension)
Safety and maintenance of flexible fibreoptic endoscopes

Skills

Undertake bronchoscopy to assess tube position including double lumen endotracheal tube
Undertake theraputic bronchoscopy for sputum clearance

5.6 Performs percutaneous tracheostomy

Knowledge

Indications and contraindications to tracheostomy (percutaneous and surgical) and minitracheostomy
Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
Anatomical landmarks for cricothyrotomy/tracheostomy/mini-tracheotomy
Techniques for percutaneous and surgical tracheotomy

Skills

Identify patients requiring tracheostomy; discuss indications and contraindications for percutaneous tracheostomy
Manage and minimise cardiovascular and respiratory changes during and after intubation
Select appropriate tracheal tube type, size and length
Perform percutaneaus tracheostomy
Manage and minimise cardiovascular and respiratory changes during and after intubation under direct supervision
Change a tracheostomy tube electively
Manage anaesthesia and control the airway during planned tracheostomy tube insertion in the intensive care unit (ICU)

5.7 Performs chest drain insertion

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

Cardiovascular System

5.8 Performs arterial catheterisation

Knowledge

Principles of arterial catheterisation
Surface anatomy: arteries of the arms and legs
Allens test - application and limitations
Ultrasound techniques for vascular localisation
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 Science

Knowledge

Basic principles of ultrasound and the Doppler effect
Surface anatomy:
structures in the antecubital fossa; large veins and anterior triangle of the neck; large veins of the leg and femoral triangle; arteries of the arms and legs
Methods for securing vascular access rapidly
Principles, routes and techniques of peripheral and central venous cannulation
Principles of arterial catheterisation

5.10 Performs central venous catheterisation

Knowledge

Surface anatomy: structures in the antecubital fossa; large veins and anterior triangle of the neck; large veins of the leg and femoral triangle
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
Describe a method for tunnelled intravenous catheterisation(e.g. for parenteral nutrition)

5.11 Performs defibrillation and cardioversion

Basic Science

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 andbmethods (manual and automated external defibrillators (AED))
Electrical safety: conditions which predispose to the occurrence of macro-shock / micro-shock; physical dangers of electrical currents; relevant standards regarding safe use of electricity in patient care; basic methods to reduce electrical hazards.
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)

5.12 Performs transthoracic cardiac pacing, describes transvenous

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
Basic and complex cardiac arrhythmias - recognition and management (pharmacological and electrical)
Principles, routes and techniques of peripheral and central venous cannulation
Surface anatomy: structures in the antecubital fossa; large veins and anterior triangle of the neck; large veins of the leg and femoral triangle
Methods for securing vascular access rapidly
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

Describe insertion of a temporary pacing wire
Demonstrate the use of transthoracic pacing
Demonstrate emergency relief of tension pneumothorax
Principles of defibrillation and cardioversion (see 5.11)

Describe emergency percutaneous pericardial aspiration
Establish and review pacing box settings

5.13 Describes how to perform pericardiocentesis

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 derived haemodynamic variables

Knowledge

Principles of haemodynamic monitoring - invasive and non invasive methods, indications and limitations, physiological parameters and waveform interpretation
Zero and calibration techniques for invasive pressure monitoring
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 central venous catheters
Prepare equipment for intravascular pressure monitoring
Obtain and interpret data from a cardiac output measurement technique
Measure and interpret haemodynamic variables (including derived variables)

Central Nervous System

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

Knowledge

Indications for and contraindications of lumbar puncture and CSF sampling; laboratory analysis of CSF samples

Skills

Performs lumbar puncture

Insert a lumbar drain for CSF drainage

5.16 Manages the administration of analgesia via an epidural catheter

Basic Science

Knowledge

Indications, contraindications, methods and complications of epidural catheterisation
Pharmakokinetics, pharmacodynamics, indications and complications of opiates and local anaesthetic agents
Indications, contraindications and complications of epidural infusion / injection; principles of safe epidural drug administration
Physiological effects of pain and anxiety
Recognition and methods of assessment of pain
Contraindications, methods and complications of epidural catheter removal

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

Gastrointestinal System

5.17 Performs abdominal paracentesis

Knowledge

Anatomy of the abdominal wall; landmarks for abdominal paracentesis and abdominal drainage catheters
Indications, contraindications, complications and technique of abdominal paracentesis

Skills

Insert an abdominal drain

5.18 Describes Sengstaken tube (or equivalent) placement

Knowledge

Principles and techniques for insertion of gastro-oesophageal balloon tamponade tube (e.g. Sengstaken-Blakemore)

5.19 Performs nasogastric tube placement

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

Genitourinary System

5.20 Performs urinary catheterisation

Knowledge

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

Skills

Perform aseptic urinary catheterisation: male and female
Confirm correct placement and exclude complications

Domain 6: Perioperative care

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

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
Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
Perioperative implications of current drug therapy
Consent and assent in the competent and non-competent patient
Implications for postoperative care of common acute and chronic medical conditions (see 3.1 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 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
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, 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:

Interpretation of symptoms and signs of cardiovascular insufficiency in the surgical patient; recognition of bleeding; management of hypo/hypertension; pulmonary embolus, operative risk factors in patients with ischaemic heart disease, significant valvular disease, cardiac tamponade; surgery for acquired and congenital cardiac disease; management of patients following cardiac surgery (coronary grafting, valve replacement) and aortic surgery (arch, thoracic, abdominal); heart and heart-lung transplantation

Renal:

Causes of perioperative oliguria and anuria; prevention and management of acute renal failure, rhabdomyolysis; consequences of nephrectomy, ileal conduits; management post-renal transplantation

Haematology and oncology:

Management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies., care of the immunosuppressed or immunoincompetent patient, complications of chemotherapy and radiotherapy

Metabolic and hormonal:

Perioperative management of patients with diabetes; blood glucose control; ; perioperative management of electrolyte disorders, hypo- and hyperadrenalism, surgery to thyroid, adrenal and pituitary glands

Gastrointestinal:

Interpretation of abdominal pain and distension; peptic ulceration and upper GI haemorrhage; diarrhoea, vomiting and ileus; peritonitis; intestinal ischaemia; perforation; abdominal hypertension; pancreatitis; jaundice; cholecystitis; Management of the pre- and post-liver transplant patient; perioperative nutrition; post-operative nausea and vomiting

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

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

Methods of optimising high risk surgical patients: ERAS?

Skills

Consider the impact of long-term and chronic treatment on acute surgical care

Communicate the risk of surgery to patients and family
Accurately assess the airway for potential difficulties with airway management
Ensure the necessary resources are available for safe post-operative care
Identify pre-operative health status and intercurrent disease, medications, allergies and their interaction with the nature of anaesthetic and surgery
Obtain relevant information from the patient, relatives and other secondary sources
Interpret pre-operative investigations, intra-operative findings and events/complications, and respond to them appropriately
Assess conscious level and conduct a careful systems review
Optimise high-risk surgical patients before surgery: consider site of care and management plan
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

6.2 Manages the care of the patient following cardiac surgery under supervision

Knowledge

Factors determining perioperative risk:
Importance of preoperative health status on postoperative outcomes
Indications for, and interpretation of pre-operative investigations
Dangers of emergency anaesthesia 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
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 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, 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
Management of bronchopleural fistula; post insertion management of tracheal and bronchial stents
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
Management of pulmonary hypertension
Renal: Causes of perioperative oliguria and anuria; prevention and management of acute renal failure
Neurological: stroke (CVA); causes of post-operative confusion.
Gastrointestinal: post-operative alterations in gut motility; perioperative nutrition; post-operative nausea and vomiting
Haematology and oncology:
Management of severe acute haemorrhage and blood transfusion, principles of cell salvage; correction of coagulation disorders and haemoglobinopathies, care of the immunosuppressed or immunoincompetent patient, complications of chemotherapy and radiotherapy
Interprets thromboelastography in post cardiac surgical patients
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
Management of cyanosis, hypo- and hypertension, hypothermia and shivering
Surgical interventions in patients with cardiac disease, perioperative management of the cardiovascular surgery patient and potential complications occurring within 24 hours of cardiac surgery

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
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
Demonstrates management of intra-aortic balloon pump in surgical and non-surgical cardiac patients

6.3 Manages the care of the patient following craniotomy under supervision

Knowledge

Factors determining perioperative risk
Importance of preoperative health status on postoperative outcomes
Indications for, and interpretation of pre-operative investigations
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
Criteria for admission to, and discharge from ICU – factors influencing intensity and site of care (ward, high dependency unit (HDU), (ICU))
Major neurosurgical procedures, peri-operative management of the patient undergoing major neurosurgery, and
potential complications occurring within 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
Cardiovascular: Interpretation of symptoms and signs of cardiovascular insufficiency in the surgical patient; management of hypo/hypertension
Renal: Causes of perioperative oliguria and anuria; prevention and management of acute renal failure
Neurological: causes of post-operative confusion, stroke (CVA), coma and raised intracranial pressure; determinants of cerebral perfusion and oxygenation; prevention of secondary brain injury; intracranial pressure monitoring; therapeutic correction of raised intracranial pressure; intracerebral haemorrhage, contusion and oedema
Gastrointestinal: post-operative alterations in gut motility; perioperative nutrition; post-operative nausea & vomiting
Metabolic & Hormonal: blood glucose control; perioperative management of electrolyte disorders
Sepsis and Infection: fever and hypothermia; postoperative hypoperfusion and impaired oxygen delivery; wound infection; opportunistic and nosocomial infection; perioperative infection risk and prophylactic antibiotics; intestinal ischaemia; antibiotic selection and prescribing

Skills

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
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
Monitor and manipulate cerebral perfusion pressure (CPP)

6.4 Manages the care of the patient following solid organ transplant under supervision

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
Solid organ-specific transplantation (heart-lung, liver, renal): peri-operative considerations, pharmacological management, post-operative care and potential complications
Immunosuppression and rejection
Implications of type / site of surgery for postoperative management and potential complications within the first 24 hours of surgery
Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
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:
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.

Haematology and oncology:
Management of severe acute haemorrhage and blood transfusion, principles of cell salvage; correction of coagulation disorders and haemoglobinopathies.
Care of the immunosuppressed or immunoincompetent patient complications of chemotherapy
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

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

6.5 Manages the pre- and post-operative care of the trauma patient under supervision

Knowledge

Factors determining perioperative risk
Importance of preoperative health status on postoperative outcomes
Indications for, and interpretation of pre-operative investigations
Dangers of emergency anaesthesia 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
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;
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, principles of cell salvage; correction of coagulation disorders and haemoglobinopathies.
Metabolic & Hormonal: Blood glucose control; perioperative management of electrolyte disorders
Sepsis and Infection: fever and hypothermia; postoperative hypoperfusion and impaired oxygen delivery; wound infection; opportunistic and nosocomial infection; perioperative infection risk and prophylactic antibiotics; necrotising fasciitis; peritonitis; intestinal ischaemia; antibiotic selection and prescribing
Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
Musculo-skeletal: principles and management of external fixators and casts; perioperative positioning; pressure area care; compartment syndromes; paralysed patients; principles of salvage surgery; managenent of vascular skin grafts

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
Interpret pre-operative investigations, intra-operative findings and events/complications, and respond to them appropriately
Conduct a secondary survey following ATLS (or equivalent) principles
Communicate the risk of surgery to patients and family
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
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
Establish a plan for postoperative management including plans for further surgery

Domain 7: Comfort and recovery

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'
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
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

Knowledge

Common symptomatology following critical illness
Causes and methods of minimising distress in patients
The role of patient's relatives and their contribution to care
Physiological effects of pain and anxiety
Stress responses
Recognition and methods of assessment of pain
Principles of acute pain management
Pharmakokinetics, pharmacodynamics, indications and complications of commonly used analgesic, hypnotic, and neuromuscular blocking drugs in patients with normal and abnormal organ system function
Sleep deprivation and its consequences
Causes and management of acute confusional states
Sensory deprivation / sensory overload
Environmental and drug-related psychopathology associated with critical illness (e.g. anxiety, sleep disorders, hallucinations, drug withdrawal)
Impact of staff-patient contact and environmental factors on patient stress
Post-traumatic stress disorders
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
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
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
Principles of rehabilitation: physical and psychological
Resources available to patients and relatives for education and support (e.g. societies, local groups, publications, referral to allied health care professionals)
Common risk factors for post-ICU mortality or re-admission and their minimisation
Methods to minimise potential psychological trauma to the patient and their family of transfer from the ICU
The implications for relatives of adopting a role as a carer at home
Impact of chronic illness post-ICU on socialisation and employment

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
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

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
Sleep deprivation and its consequences
Potential long term consequences of acute delirium

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

7.3 Manages sedation and neuromuscular blockade

Knowledge

Physiological effects of pain and anxiety
Causes and methods of minimising distress in patients
Stress responses
Causes and management of acute confusional states
Recognition and assessment of anxiety
Environmental and drug-related psychopathology associated with critical illness (e.g. anxiety, sleep disorders, hallucinations, drug withdrawal)
Sensory deprivation / sensory overload
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
Sleep deprivation and its consequences
Post-traumatic stress disorders

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

7.4 Communicates the continuing care requirements, including rehabilitation, of patients at ICU discharge to health care professionals, patients and relatives

Knowledge

Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
Common symptomatology following critical illness
Common risk factors for post-ICU mortality or re-admission and their minimisation
Post-traumatic stress disorders
Environmental and drug-related psychopathology associated with critical illness (e.g. anxiety, sleep disorders, hallucinations, drug withdrawal)
Consequences of immobilisation and mobilisation techniques (including disuse atrophy, foot-drop, ectopic calcification)
Causes, prevention and management of critical illness polyneuropathy, motor neuropathy, and myopathy
Fluid and caloric requirements in the critically ill patient including electrolytes, vitamins, trace elements and principles of immunonutrition
Principles of rehabilitation: physical and psychological
Methods of communicating with patients who are unable to speak
Causes and methods of minimising distress in patients
Resources available to patients and relatives for education and support (eg societies, local groups, publications, referral to allied health care professionals)
Supportive services integral to the long term rehabilitation of critically ill patients (physiotherapy, occupational therapy, orthotics, social services).
The implications for relatives of adopting a role as a carer at home
Management of tracheostom: care and avoidance of complications outside the ICU
Persistent vegetative state; locked in syndromes
Methods to assess nutritional status and basal energy expenditure
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)
Define the role of rehabilitation services and the multi-disciplinary team to facilitate long-term care
Understand the function of post ICU follow-up clinics, how they can be organised and what the risks/benefits are for these services
Outline the concept of patient self-care
Know, understand and be able to compare medical and social models of disability
Understand the relationship between local health, educational and social service provision including the voluntary sector

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
Communicate effectively with relatives who may be anxious, angry, confused, or litigious
Participate in the education of patients/families
Follow-up patients after discharge to the ward
Develop a self-management plan including investigation, treatments and requests/instructions to other healthcare professionals, in partnership with the patient
Support patients, parents and carers where relevant to comply with management plans
Promote and encourage involvement of patients in appropriate support networks, both to receive support and to give support to others
Recognise the impact of long term conditions on the patient, family and friends
Put patients in touch with the relevant agency including the voluntary sector from where they can procure the items as appropriate
Provide the relevant tools and devices when possible
Show willingness to facilitate access to the appropriate training and skills in order to develop the patient's confidence and competence to self care
Manage follow-up effectively
Provide brief advice on use of alcohol and other drugs
Provide management and/or referral where appropriate

Attitudes

Support patient self-management
Recognise and respect the role of family, friends and carers in the management of the patient with a long term condition
Recommend appropriate secondary prevention treatments and lifestyle changes on discharge

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

Knowledge

Common symptomatology following critical illness
The role of patient's relatives and their contribution to care
Criteria for admission to, and discharge from ICU – factors influencing intensity and site of care (ward, high dependency unit (HDU), (ICU))
Common risk factors for post-ICU mortality or re-admission and their minimisation
Management of tracheostomy:care and avoidance of complications outside the 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)
Potential psychological impact of inter-hospital transfer and family dislocation

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
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

Domain 8: End of life care

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 expressed wishes of competent patients, even when in conflict with the views of the physician
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

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
The limitations of Critical Care Medicine – expectations of what can and cannot be achieved
Principles of delivering bad news to patients and families
Local resources available to support dying patients and their families, and how to access them
Cultural and religious practices of relevance when caring for dying patients and their families
Principles of pain and symptom management
Procedure for withdrawing treatment and support
Procedure for pronouncing life extinct and subsequently completion of death certification
Responsibilities in relation to legal authorities for certifying death (e.g. coroner, procurator fiscal or equivalent), and reasons for referral
The value of autopsy (post-mortem) examination.

Skills

Recognise when treatment is unnecessary or futile
Discuss end of life decisions with members of the health care team

Willing and able to communicate and discuss issues pertaining to end of life with patients and relatives
Discuss treatment options with a patient or relatives before ICU admission
Participate in timely discussion and regular review of 'do not attempt resuscitation' orders and treatment limitation decisions
Relieve distress in the dying patient
Withdraw life sustaining treatment or organ support
Aware of the emotional needs of self and others; seeks and offers support appropriately

8.2 Discusses end of life care with patients and their families / surrogates

Knowledge

Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Ethical and legal issues in decision-making for the incompetent patient: 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
The limitations of Critical Care Medicine - expectations of what can and cannot be achieved
Principles of delivering bad news to patients and families
Local resources available to support dying patients and their families, and how to access them
Bereavement: anticipating and responding to grief
Principles of pain and symptom management
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
Procedure for for pronouncing life extinct and and subsequent completion of death certification
The value of autopsy (post-mortem) examination.

Skills

Recognise when treatment is unnecessary or futile
Willing and able to communicate and discuss issues pertaining to end of life with patients and relatives
Discuss treatment options with a patient or relatives before ICU admission
Differentiate competent from incompetent statements by patients
Participate in timely discussion and regular review of 'do not attempt resuscitation' orders and treatment limitation decisions
Participate in discussions with relatives about treatment limitation or withdrawal

Explain the concept and practicalities of brain stem death and organ donation clearly
Lead a discussion about end of life goals, preferences and decisions with a patient and/or their relatives
Obtain consent/assent for treatment, research, autopsy or organ donation

8.3 Manages palliative care of the critically ill patient

Knowledge

Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Ethical and legal issues in decision-making for the incompetent patient: incapacity
Difference between euthanasia and allowing death to occur: doctrine of double effect
Principles of delivering bad news to patients and families
Local resources available to support dying patients and their families, and how to access them
Cultural and religious practices of relevance when caring for dying patients and their families
Principles of pain and symptom management

Skills

Recognise when treatment is unnecessary or futile
Willing and able to communicate and discuss issues pertaining to end of life with patients and relatives
Discuss treatment options with a patient or relatives before ICU admission
Differentiate competent from incompetent statements by patients
Participate in timely discussion and regular review of 'do not attempt resuscitation' orders and treatment limitation decisions
Participate in discussions with relatives about treatment limitation or withdrawal
Lead a discussion about end of life goals, preferences and decisions with a patient and/or their relatives
Relieve distress in the dying patient
Aware of the emotional needs of self and others; seeks and offers support appropriately

8.4 Performs brain-stem death testing

Knowledge

Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Causes of brain stem death
Legal aspects of brain stem death diagnosis
Applied anatomy and physiology of the brain and nervous system including cerebral blood supply, base of skull, autonomic nervous system and cranial nerves
Physiological changes associated with brain stem death
Preconditions and exclusions for the diagnosis of brain stem death
Clinical, imaging and electrophysiologic tests to diagnose brain death: 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

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

8.5 Manages the physiological support of the organ donor

Knowledge

Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Causes of brain stem death
Role of national organ/tissue procurement authority and procedures for referral
Responsibilities and activities of transplant co-ordinators
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

Skills

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

8.6 Manages donation following cardiac death

Knowledge

Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Common investigations and procedures undertaken in the ICU prior to organ donation
Procedure for pronouncing life extinct and and subsequent completion of death certification
Responsibilities in relation to legal authorities for certifying death (e.g. Coroner, Procurator Fiscal or equivalent), and reasons for referral
Legal and ethical framework for decision making
Role of national organ/tissue procurement authority and procedures for referral
Transplant team members and their roles
Responsibilities and activities of transplant co-ordinators

Skills

Recognise when treatment is unnecessary or futile
Identify potential non heart beating donors
Lead a discussion about end of life goals, preferences and decisions with a patient and/or their relatives
Participate in discussions with relatives about treatment limitation or withdrawal
Liaise with transplant co-ordinators (local organ donation authority) and retrival teams to plan management of the organ donor

Domain 9: Paediatric care

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

Knowledge

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

Skills

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)
Manage mechanical ventilation in a critically ill child
Communicate effectively with, and attempt to reassure the child and parents
Recognise and manage paediatric emergencies until senior or more experienced help arrives
Manage and stabilise the injured child until senior or more experienced help arrives

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

Knowledge

Key stages of physical and psychological development
Principles of communication (verbal and non verbal) with children of different ages; awareness of the consequences of the language used to impart information
Legal and ethical aspects of caring for children
Issues of consent in children
National child protection guidelines

Domain 10: Transport

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

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)
Ethical issues surrounding transfer
Strategies to avoid transfer-use of other facilities
Strategies to manage the unique problems associated with patient transfer - limitations of space, personnel, monitoring and equipment
Advantages and disadvantages of road ambulance, fixed and rotary wing aircraft including problems associated with altitude, noise, lighting conditions, vibration, acceleration and deceleration
Selection of mode of transport based upon clinical requirements, distance, vehicle availability and environmental conditions
Determination of required number of physicians / nurses / others during transfer and the role of paramedical personnel
Selection and operation of transport equipment: size, weight, portability, power supply/battery life, oxygen availability, durability and performance under conditions of transport
Principles of monitoring under transport conditions
Homeostatic interaction between patient and environment (e.g. thermoregulation, posture / positioning)
Communication prior to and during transport
Operation of locally available retrieval services
Physiology associated with air transport
Potential psychological impact of inter-hospital transfer and family dislocation

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
Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)

Domain 11: Patient safety and health systems management

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
Act appropriately on any concerns about own or colleagues' use of alcohol and/or other drugs.
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
Accepts responsibility for patient care and staff supervision
Establishes collaborative relations with other health care providers to promote continuity of patient care as appropriate
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

Knowledge

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

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
Assemble clinical and laboratory data, logically compare all potential solutions to the patient's problems, prioritise them and establish a clinical management plan
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
Listen effectively
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

Knowledge

Epidemiology and prevention of infection in the ICU

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

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

11.3 Identifies environmental hazards and promotes safety for patients and staff

Basic Science

Knowledge

Physical requirements of ICU design
Staff safety: susceptibility to harmful physical, chemical and infectious hazards in the ICU
Environmental control of temperature, humidity, air changes and scavenging systems for waste gases and vapours
Measurement of gas and vapour concentrations, (oxygen, carbon dioxide, nitrous oxide, and volatile anaesthetic agents)- environmental safety
Hazards associated with ionising radiation and methods to limit these in the ICU
Electrical safety: conditions which predispose to the occurrence of macro-shock / micro-shock; physical dangers of electrical currents; relevant standards regarding safe use of electricity in patient care; basic methods to reduce electrical hazards.
Equipment requirements and selection: clinical need and priority; accuracy, reliability, safety and practical issues (ease of use, acceptance by staff)
Local policies and procedures relevant to practice
Published standards of care at local, national and international level (including consensus statements and care bundles)
Identification and critical appraisal of literature; integration of findings into local clinical practice

Epidemiology and prevention of infection in the ICU
Risk of colonisation with potentially pathogenic micro-organisms and the factors associated with patient, staff, equipment and environmental colonisation
Types of organisms – emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between contamination, colonisation and infection
Cross infection: modes of transfer and common agents
Requirements for microbiological surveillance and clinical sampling
Infections from contaminated blood / body fluids; strategy if contaminated (e.g. needle stick injury)
Benefits and risks of different prophylactic antibiotic regimens

Knowledge

Outline human factors theory and understand its impact on safety
Understand root cause analysis
Understand significant event analysis

Skills

Seek expert help to ensure all equipment in the ICU conforms with and is maintained to the relevant safety standard

11.4 Identifies and minimises risk of critical incidents and adverse events, including complications of critical illness

Knowledge

Common sources of error and factors which contribute to critical incidents / adverse events (ICU environment, personnel, equipment, therapy and patient factors)
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

Modification of treatment or therapy to minimise the risk of complications and appropriate monitoring to allow early detection of complications
Recognition of patient groups at high risk for developing complications
Risk of bleeding: indications, contraindications, monitoring and complications of therapeutic anticoagulants
Epidemiology and prevention of infection in the ICU

Types of organisms - emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between contamination, colonisation and infection
Autogenous infection: routes and methods of prevention
Local patterns of bacterial resistance and antibiotic policy
Requirements for microbiological surveillance and clinical sampling
Benefits and risks of different prophylactic antibiotic regimens
Staff safety: susceptibility to harmful physical, chemical and infectious hazards in the ICU; psychological?
Factors that determine the optimum staff establishment for specialist and junior medical staff, nurses and allied professional and non-clinical ICU staff
Principles of crisis management, conflict resolution, negotiation and debriefing
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
Local policies and procedures relevant to practice
Published standards of care at local, national and international level (including consensus statements and care bundles)
Purpose and methods of clinical audit (e.g. mortality reviews, complication rates, National Audits) and quality improvement
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
Identification and critical appraisal of literature; integration of findings into local clinical practice

Skills

Assemble clinical and laboratory data, logically compare all potential solutions to the patient's problems, prioritise them and establish a clinical management plan
Consider potential interactions when prescribing drugs and therapies
Record relevant clinical information accurately
Confirm accuracy of clinical information provided by members of the health care team
Monitor complications of critical illness
Accept personal responsibility for the prevention of cross infection and self-infection
Aware of relevant guidelines and consensus statements and apply these effectively in every day practice under local conditions
Implement and evaluate protocols and guidelines
Participate in the processes of clinical audit, peer review and continuing medical education

11.5 Organises a case conference

Knowledge

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

Skills

Identify members of the health care team which require representation at a case conference

Timely organisation – liaise with members of the health care team to identify a suitable time and place for a case conference to maximise attendance
Identify necessary notes / investigations to support discussion during a case conference:
Summarise a case history
Discuss technical, cognitive, affective, contextual and non-technical factors in relation to the case in question
Plan long-term multidisciplinary care for patients in the ICU

11.6 Critically appraises and applies guidelines, protocols and care bundles

Knowledge

Purpose and process of quality improvement activities such as evidence based practice, best practice guidelines & benchmarking and change management
Purpose and methods of clinical audit (e.g. mortality reviews, complication rates) and quality improvement
Published standards of care at local, national and international level (including consensus statements and care bundles)
Local policies and procedures relevant to practice
Treatment algorithms for common medical emergencies
Recent advances in medical research relevant to intensive care
Identification and critical appraisal of literature; integration of findings into local clinical practice; critical appraisal of whether this evidence is relevant to this particular patient.
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
Research methods (see basic sciences)
Statistical concepts (see basic sciences)

Skills

Aware of relevant guidelines and consensus statements and apply these effectively in every day practice under local conditions
Implement and evaluate protocols and guidelines
Propose realistic initiatives / projects to promote improvement
Use a systematic approach to locate, appraise, and assimilate evidence from scientific studies relevant to a patient's health problem
Participate in the processes of clinical quality improvement, peer review and continuing medical education
Recognise the need for clinical audit and quality improvement activities to be non-threatening and non-punitive to individuals
Manage resistance to change in the ICU / hospital environment in order to optimize the outcome of a task

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

Knowledge

Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome

Process and outcome measurement
Principles of general and organ-specific scoring systems and their usefulness in assessing likely outcome of an illness (e.g. Glasgow Coma Scale, APACHE II and III, PRISM, MEWS, organ system failure scores, injury severity scores)
Influence of injury or illness being considered on the validity of a scoring system as a predictor of likely outcome (e.g.
Glasgow Coma Score (GCS) in head injury versus drug overdose)
One general method for measuring severity of illness (severity scoring systems)
Principles of case-mix adjustment
Principles of workforce planning
Factors that determine the optimum staff establishment for specialist and junior medical staff, nurses and allied professional and non-clinical ICU staff

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

Knowledge

Principles of health care provision; strategic planning of the ICU service (structure, function, financing) within the wider health care environment
The non-clinical role of the ICU specialist and how these activities contribute to the efficacy of the ICU, the profile of the ICU within the hospital and the quality of patient management
Principles of administration and management
Physical requirements of ICU design
Principles of resource management; ethics of resource allocation in the face of competing claims to care
Concept of risk : benefit ratio and cost effectiveness of therapies
Difference between absolute requirement and possible benefit when applying expensive technology to critically ill patients
Equipment requirements and selection: clinical need 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 CCM practice
Principles of crisis management, conflict resolution, negotiation and debriefing
Purpose and methods of clinical audit (e.g. mortality reviews, complication rates) and quality improvement
Recent advances in medical research relevant to intensive care
Identification and critical appraisal of literature; integration of findings into local clinical practice
Principles of appraisal of evidence: levels of evidence; interventions; diagnostic tests; prognosis; integrative literature (meta-analyses, practice guidelines, decision and economic analyses)
Local policies and procedures relevant to practice

Published standards of care at local, national and international level (including consensus statements and care bundles)

Skills

Contribute to departmental / ICU activities
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
Respect, acknowledge and encourage the work of others

Domain 12: Professionalism

Attitudes

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
Recognises impaired performance (limitations) in self and colleagues and takes appropriate action
Act appropriately on any concerns about own or colleagues' use of alcohol and/or other drugs.
Takes responsibility for his/her personal physical and mental health, especially where impairment may affect patient care and professional conduct and seeks appropriate help if required
Recognises personal limitations, seeks and accepts assistance or supervision (knows how, when and who to ask)
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

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

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

Knowledge

Consent and assent in the competent and non-competent patient
Principles of 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
Principles of crisis management, conflict resolution, negotiation and debriefing
Strategies to communicate to the general population critical care issues and their impact on the maintenance and improvement of health care.

Skills

Communicate with patients and relatives - give accurate information and re-iterate to ensure comprehension; clarify ambiguities
Discuss treatment options with a patient or relatives before ICU admission
Differentiate competent from incompetent statements by patients
Listen effectively
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
Obtain consent/assent for treatment, research, autopsy or organ donation
Preparation of patient lists with clarification of problems and ongoing care plan
Attitudes
Communicate changes in priority to others
Work in a supportive, empathic and non-judgemental manner without collusion
Be confident and comfortable discussing alcohol and drug use with patients

Professional relationships with patients and relatives

12.4 Involves patients (or their surrogates if applicable) in decisions about care and treatment
12.5 Demonstrates respect of cultural and religious beliefs and an awareness of their impact on decision making

12.6 Respects privacy, dignity, confidentiality and legal constraints on the use of patient data

Knowledge

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

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
Discuss treatment options with a patient or relatives before ICU admission
Differentiate competent from incompetent statements by patients
Obtain consent/assent for treatment, research, autopsy or organ donation
Listen effectively

Professional relationships with members of the healthcare 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

Knowledge

Management of information
Principles of crisis management, conflict resolution, negotiation and debriefing
Principles of professional appraisal and constructive feedback

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
Consult and take into account the views of referring clinicians; promote their participation in decision making where appropriate
Liaise with medical and nursing staff in other departments to ensure optimal communication and continuing care after ICU discharge
Respect, acknowledge and encourage the work of others
Contribute to professional meetings - understand their rules, structure and etiquette
Listen effectively

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 quality improvement under supervision

Knowledge

Basic ethical principles: autonomy, beneficence, non-maleficence, justice
Ethical and legal issues in decision-making for the incompetent patient
Management of information
Principles of crisis management, conflict resolution, negotiation and debriefing
Principles of professional appraisal and constructive feedback
Principles of adult education and factors that promote learning
Methods of quality improvement 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 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
Principles of medical research: research questions; protocol design; power analysis, data collection, data analysis and interpretation of results; manuscript preparation and publication rules.
Ethical principles involved in conducting research (including subject protection, consent, confidentiality and competing interests) and national ethical approval processes
Ethical management of relationships with industry
Requirements of CCM training at local and national level
Understand that organisation is key to time management
Outline techniques for improving time management

Skills

Contribute to departmental / ICU activities
Participate in the processes of clinical audit, quality improvement, peer review and continuing medical education
Propose realistic initiatives / projects to promote improvement
Develop, implement and monitor a personal continuing education plan including maintenance of a professional portfolio
Use learning aids and resources to undertake self directed learning

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.
Demonstrate initiative in problem solving
Listen effectively
Attentive to detail, punctual, reliable, polite and helpful
Take decisions at a level commensurate with experience; accept the consequences of these decisions
Utilise personal resources effectively to balance patient care, learning needs, and outside activities.
Identify clinical and clerical tasks requiring attention or predicted to arise
Estimate the time likely to be required for essential tasks and plan accordingly
Group together tasks when this will be the most effective way of working
Recognise the most urgent / important tasks and ensure that they are managed expediently
Regularly review and re-prioritise personal and team work load
Organise and manage workload effectively

Attitudes

Ability to work flexibly and deal with tasks in an effective fashion
Recognise when you or others are falling behind and take steps to rectify the situation

Rawalpindi Medical University
Department of Critical Care Medicine

DETAILS OF RESEARCH CURRICULUM & MANDATORY WORKSHOPS

DETAILS OF RESEARCH CURRICULUM & MANDATORY WORKSHOPS

INTRODUCTION

With advent of Evidence Based Practice over last two to three decades in medical science, merging the best research evidence with good clinical expertise and patient values is inevitable in decision making process for patient care. Therefore apart from receiving per excellence knowledge of the essential principles of medicine and necessary skills of clinical procedures, the trainees should also be well versed and skilful in research methodologies. So the training in research being imperative is integrated longitudinally in 2 years training tenure of the trainees.

The purpose of the research training is to provide optimal knowledge and skills regarding research methods and critical appraisal. The expected outcome of this training is to make trainees dexterous and proficient to practically conduct quality research through amalgamation of their knowledge, skills and practice in research methodologies.

The research training component for Post Graduate Trainees comprises of 2 years and the Distribution and curriculum for each year is mentioned as follows:

RESEARCH TRAINING YEAR ONE R-Y1	
ACTIVITIES	**ASSESSMENT**
NOMINATION AND SELECTION OF SUPERVISOR	
FORMULATION OF RESEARCH PROPOSAL	ASSESSMENT BY SUPERVISOR
PRESENTATION OF RESEARCH PROPOSAL/S TO INSTITUTIONAL RESEARCH ETHICS COMMITTEE (IREF) OF RMU	ASSESSMENT BY IREF FOR APPRAISAL
PROVIDING ASSURANCE OF FEASIBILITY & AVAILIBILITY OF RESOURCES FOR RESEARCH PROJECTS	QUALITATIVE ASSESSMENT
SUBMISSION OF RESEARCH PROPOSAL BASR OF RMU	ASSESSMENT BY BASR OF RMU
PARTICIPATION IN ATLEAST 5 JOURNAL CLUB SESSIONS INCLUDING 3 PRESENTATIONS	QUALITATIVE ASSESSMENT
INITIATION OF WRITE UP OF LITERATURE REVIEW FOR DISSERTATION	ASSESSMENT BY SUPERVISOR AND PUBLICATION INCHARGE OF ORIC

RESEARCH TRAINING YEAR TWO R-Y2	
ACTIVITIES	**ASSESSMENT**
COMPLETION OF INTRODUCTION AND LITERATURE REVIEW OF DISSERTATION WITHIN FIRST 6 MONTHS OF R-Y2	ASSESSMENT BY SUPERVISOR & PUBLICATION INCHARGE OF ORIC
COMPLETION OF DATA ANALYSIS AND ITS WRITE UP TILL SEVENTH MONTH OF R-Y2	ASSESSMENT BY SUPERVISOR & STATISTICIAN OF ORIC
COMPLETION OF DISSERTATION AND SUBMISSION TO SUPERVISOR & HOD FOR FINAL REVIEW TILL EIGHTH MONTH OF R-Y2	ASSESSMENT BY SUPERVISOR, PUBLICATION INCHARGE OF ORIC AND HOD
FINAL SUBMISSION OF DISSERTATION TO DEGREE AWARDING INSTITUTION TILL NINTH MONTH OF R-Y2	FINAL EVALUATION BY EXAMINATION BODY
PARTICIPATION IN ATLEAST 5 JOURNAL CLUB SESSIONS INCLUDING 3 PRESENTATIONS	NO QUANTITATIVE ASSESSMENT

ALTERNATIVE FOR DISSERTATION (TO BE DONE IN R-Y2)	
DATA COLLECTION, ENTRY AND ANALYSIS OF DATA FOR RESEARCH PAPERS	ASSESSMENT BY SUPERVISOR AND PUBLICATION INCHARGE OF ORIC
COMPLETION AND SUBMISSION OF ONR RESEARCH PAPER TO JOURNAL	ASSESSMENT BY SUPERVISOR, DEAN, HOD AND PUBLICATION INCHARGE OF ORIC
POSSIBILITY A: JOURNAL/S ACCEPT THE RESEARCH PAPER AND IS PUBLISHED	SUBMISSION OF ACCEPATANCE LETTERS AND ORIGINAL ARTICLES TO RMU WITH COPIES TO SUPERVISOR, HOD, DEAN AND PUBLICATION IN CHARGE OF ORIC AND BASR
POSSIBILITY B: JOURNAL/S SEND BACK RESEARCH PAPER FOR MODIFICATIONS	UNDERTAKING MODIFICATIONS UNDER GUIDANCE OF SUPERVISOR, PUBLICATION INCHARGEOF ORIC AND HOD AND RESUBMISSION WITHIN 10 DAYS
POSSIBILITY C: JOURNAL/S REJECTS PUBLICATION OF RESEARCH PAPER	RESUBMISSION TO NEW TARGET JOURNAL UNDER GUIDANCE OF SUPERVISOR, PUBLICATION INCHARGE OF ORIC AND HOD AND RESUBMISSION WITHIN 10 DAYS

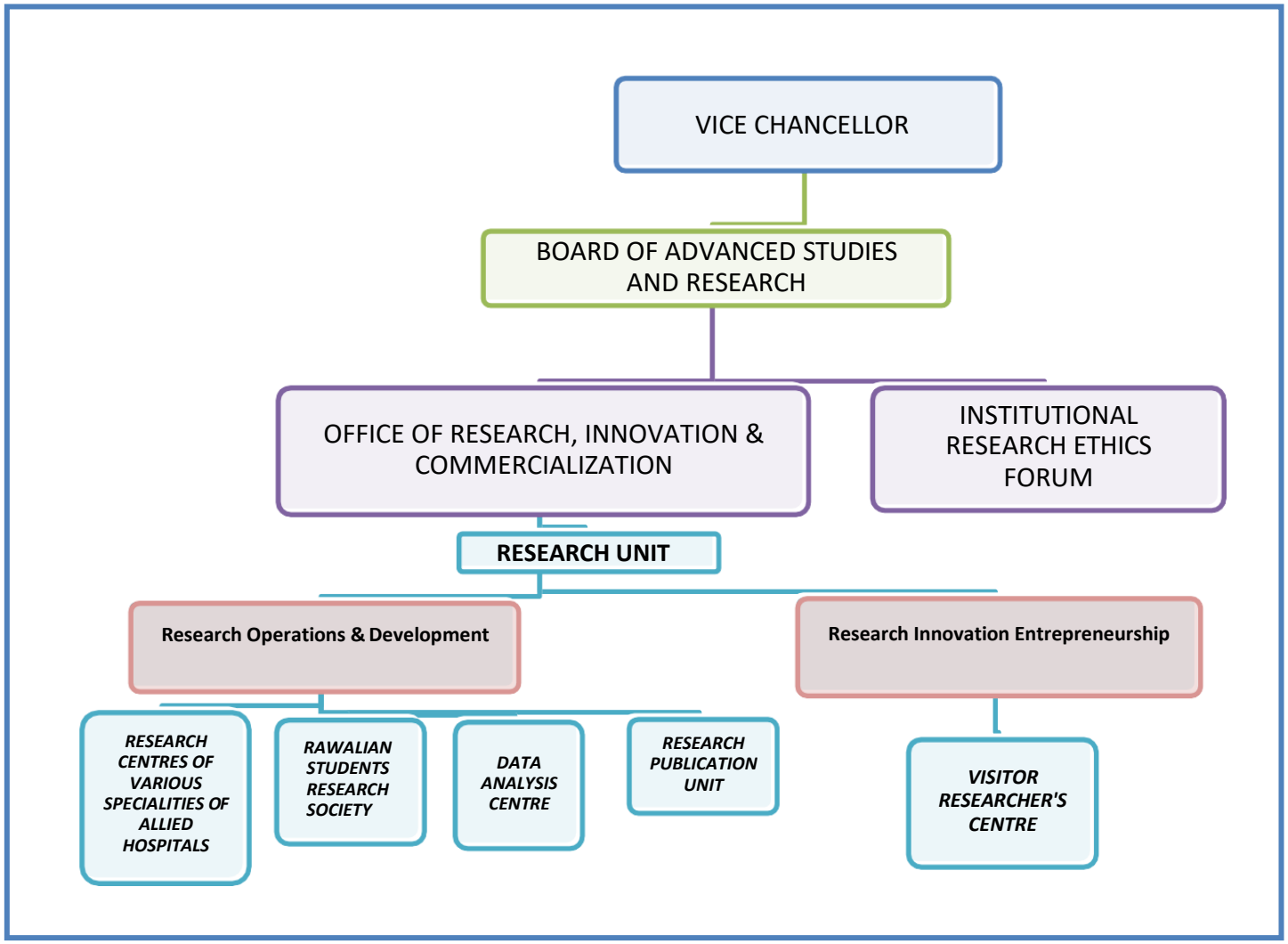
ORIENTATION SESSION FOR POST GRADUATE TRAINEES

a) At the beginning of the research course, an orientation session or an introductory session of one hour duration will be held, organized by Director, Deputy Directors of ORIC (Office of Research Commercialization and Innovation) of RMU to make trainees acquainted to the research courses during 2 years post graduate training, the schedule of all scholarly and academic activities related to research and the assessment procedures.

b) Trainees will also be introduced to all the facilitators of the course, organizational structure of ORIC (Annexure 1) and the terms of references of corresponding authorities (Annexure 2) for any further information and facilitation.

c) All the curriculum details and materials for assistance and guidance will be provided to trainees during the orientation session.

d) The research model of RMU as given in Figure 1 and will be introduced to the newly inducted trainees of RMU.



PARTICIPATION IN JOURNAL CLUB SESSIONS

a) The journal club of every department will comprise of an academic meeting of the head of department, faculty members, trainees and internees at departmental level.
b) The purpose of journal club will be to collectively attempt to seek new knowledge through awareness of current and recent research findings and also to explore best current clinical research and means of its implementation and utilization.
c) Apart from the teaching sessions of the trainees should attend the journal club sessions of the departments and should attempt to actively participate in them too.
d) One journal club meeting must be organized in the department in every two months of the year and its attendance by the trainees will be mandatory.
e) The journal club meeting will be chaired by the Dean of specialty.
f) The purpose of participation of the trainees in journal club will be to enhance their scientific literacy and to have optimal insight of the relationship between clinical practice and evidenced-based medicine to continually improve patient care.

Format of Journal Club Meetings

a) In a journal club meeting, one or two research paper/s published in an indexed national or international journal, selected by the Dean of the department will be presented by year 2 trainees; R-Y2 trainees.
b) The research paper will be presented through power-point and the critical appraisal of the paper will follow it.
c) The topic will also be discussed in comparison to other evidences available according to the latest research.
d) The year one trainee i.e. R-Y1 trainee will only participate in the journal club and will not present during first year of training. He/she will be informed regarding the selected paper one and a half month prior to the meeting and should do extensive literature search on the topic and also of the research paper that will be presented in meeting.
e) The trainees should actively participate in question & answer session of the journal club meeting that will be carried out following the presentation of the critical appraisal of the research paper. It will be compulsion for each R1 trainee to ask at least one question or make at least one comment relevant to the topic and/or the research paper, during the journal club meeting.

FORMULATION OF RESEARCH PROPOSAL OF DISSERTATION/RESEARCH PAPER AS REQUISITE TO POST GRADUATE DEGREE/MD DEGREE

a. At the beginning of year 2, the trainee will start sorting out various research questions for his/her research project as dissertation requisite for the post graduation degree.
b. Trainee must submit and seek approval of the research proposal/s from the concerned institutions till end of year 2 i.e. R-Y2.
c. Since post graduate trainees seeking Fellowship from the College of Physicians and surgeons of Pakistan (CPSP) have either of the two following options, as per guidelines of CPSP:
    i. OPTION A: Submission of one dissertation in specialty field as requisite to FCPS degree OR
    ii. OPTION B: Publication of one original research articles in any CPSP recognized journals, being first author, as requisite to FCPS degree They will have to submit one research proposal for the dissertation till end of second year of training, if following option A and two research proposals of the original articles, if following option B accordingly.
d. The MD scholars will also have to submit one research dissertation, in specialty field, to Rawalpindi Medical University, so they will also submit one research proposal for the dissertation till end of second year of training.
e. Whatever is the post graduation academic scenario; the trainee must decide the research question/s under the guidance of the supervisor till third month of R-Y2 and hence decide the final title of the research project/s.
f. During these first three months of R-Y2, the trainee under guidance of the supervisor and ORIC will do extensive review of the literature, relevant to topic. He/she will do online as well physical search of printed, Journal articles, reports, books, conference papers, dissertations, Research and program reports- published/ unpublished. He/she will also access the libraries of Rawalpindi medical University, repositories of various institutions.
g. The trainee will also consult the research Associates and Deputy Directors at the ORIC for the feasibility of the research question and any modification. The trainees will be encouraged to preferably select research questions that will be better answered through cross sectional comparative, analytic and experimental study designs instead of simple descriptive cross sectional or case series design. Descriptive cross sectional, exploratory or case series design will be allowed only in special cases when the research question will deal with an exceedingly significant and priority issue, not addressed previously ever though published work either locally/nationally or internationally.
h. Once the research question and topic is finalized with mutual understanding of the supervisor, trainee will submit the selected topic to the Head of Department and Dean of specialty.
i. The Dean of the specialty will give approval of the topic after scrutiny and will confirm that there is no duplication of the topic inthe department, after consultation with HOD's.
j. Then the Dean will finalize the list of the topics of research proposals of all trainees during fourth month of R-Y2 and will submit the list to BASR.

k. BASR will give the final approval of all topics within same month.

l. For the post graduate trainees following aforementioned option B (Publication of two original research articles in any CPSP recognized journals, being first author, as requisite to FCPS degree) must submit their topics (already approved from BASR) to CPSP for its approval. Once the topics are approved by CPSP, they will initiate research proposal development for these research projects that they will publish as original articles.

m. Once the trainee gets the approval of the topic/s from all concerned authorities, the formal write up of proposal/s must be initiated within fifth month of R-Y2 in consultation with supervisor and the research associates of ORIC for guidance in methodology.

n. The research proposal/s will be brief outline of trainees' future research project/s (approx of 1000-1500 words) and must comprise of the following topics:

    a) Title of research project.
    b) Introduction and rationale (with Vancouver in text citations)
    c) Research aim, purpose and objectives
    d) Hypothesis, if required according to the study design.
    e) Operational Definitions
    f) Research Methodology:
        (a) Setting
        (b) Study Population
        (c) Study Duration
        (d) Study Design
        (e) Sampling: Sample size with statistical justifications, sampling technique, inclusion criteria & exclusion criteria.
        (f) Data Collection technique/s
        (g) Data Collection tool/s
        (h) Data Collection procedure
        (i) Plan for Data entry & Analysis
        (j) Ethical Considerations
        (k) Work plan/Gantt chart
        (l) Budget with justifications
        (m) Reference list according to the Vancouver referencing style

(n) Annexure (including data collection tool or performa, consent form, official letters, scales, scoring systems and/or any other relevant material)

(o) The research proposal should be completed in eighth month of R-Y2 and should also be reviewed and finalized by the Supervisor of the trainees.

o. The finalized research proposal will be reviewed by publication in charge of ORIC for plagiarism through turn-it-in software. Any proposal that will have originality score less than 90% or similarity index more than 10% will be returned back to trainees for rephrasing and resubmission. Only when the eligible scores will be reached, then the proposal will be further processed.

p. The statistician at data analysis centre of ORIC will facilitate the trainees in sample size calculation through sample size calculators according their study designs.

q. The trainees should formulate all the data collection tools under guidance of supervisor and research associates of ORIC and should also pretest to finalize all the data collection tools for their research projects.

r. These research proposals along with the tools will be submitted to all concerned authorities for appraisal.

s. The supervisors and research associates of ORIC will also ensure that the duration of research project should be adequate and realistic so that trainees will be able to complete their project/s during third year of training leaving enough time for its write up during year 2 of training. For the post graduate trainees following option of Publication of two original research articles as requisite to FCPS degree, the study duration will be even briefer.

PRESENTATION OF RESEARCH PROPOSAL TO INSTITUTIONAL RESEARCH ETHICS COMMITTEE (IREF) OF RMU

i. The R-Y2 trainees will already be aware of the standard operational procedures and protocols of the Institutional Research Ethics Committee of RMU as they had, as a mandatory activity, participated and observed the proceedings of the meeting during R-Y1. However, he/she will be informed about any modifications or updates regarding the standard procedures of application to IREF if will have occurred during last one year.

ii. Trainees will be individually provided an updated step wise guidance by the research associates of ORIC, regarding how an applicant should access the RMU website and download the application Performa and then how to electronically fill it in for final submission. They will also be provided updated format of presentation for their Research Proposal presentations at IREF meetings.

iii. The trainees must submit ten sets of hard copies of all the documentation including the research proposal with all annexes, plagiarism detection report and application performa to ORIC, at least ten days prior to the monthly meeting. ORIC will provide

them date and month of the IREF meeting for presentation and the trainee must present in the meeting along with his/her supervisor.

iv. The trainee must make a five to ten minutes' presentation through power-point at Institutional Research Ethics Forum during 9-10 months of R-Y2. By the end of presentation, he/she will respond to all the queries of the forum and the supervisor will facilitate in defense of the proposal.

v. The IREF will appraise and scrutinize every aspect of the proposal/s and if found acceptable then will provide on spot verbal approval of the project followed by written approval letter within next two weeks to the trainees.

vi. If members of IREF will find any modifications required in the proposal/s they will recommend them to trainee and supervisor. The trainee must incorporate those changes and will resubmit the corrected version of proposal/s within next one week's period.

vii. The written approval letter of IREF will be issued within next two weeks of meeting, to the trainee.

viii. In case the trainee will be working on option B of CPSP i.e. publication of two research papers, instead of writing dissertation, then he/she will present both research proposals to IREF for the two topics already approved by CPSP.

ASSURANCE OF FEASIBILITY & AVAILIBILITY OF RESOURCES FOR RESEARCH PROJECTS

i. The trainee will ensure that for his/her research project/s ample resources in terms of monetary, human or physical will be available to complete the project. He will also provide documented proof and justification to avoid any unforeseen problems that may lead to incompletion of research project/s.

ii. No individual funding will be provided to the trainees for their research projects requisite to their post graduation degrees by Rawalpindi Medical University. The trainee may be bearing all the expenses on individual basis or may be applying to any of national or international funding agencies for research project/s.

iii. In case the trainee will be applying for any external source of funding from any national or international funding agency, the funding application and approval process must be completed by the end of year 2 of training.

iv. The trainee may also be pursuing the degree, through any scholarship that also will include the research project expenses.

v. In either of the above mentioned circumstances, the trainee must provide and submit the budget details and documented evidences of the funding or availability of monetary resources to the supervisor and Dean who will ensure the feasibility of the resources available to the trainees.

vi. Moreover, if any tools, kits, equipment or physical materials will be required for research project, the trainee will provide documented evidence of its availability.
vii. If the data collection will require hiring of additional human resources, then the trainee will provide documented evidence like consent of staff members contributing to his/her research or details of training expenses or honorarium details if any to the supervisor.
viii. The supervisor will also consult the Dean and HOD's in ensuring the feasibility and availability of resources of a trainee during second year of training.

SUBMISSION OF RESEARCH PROPOSAL TO BASR OF RMU

i. Post graduate trainees applying for their CPSP fellowship using aforementioned option A (Submission of one dissertation in specialty field as requisite to FCPS degree) after receiving appraisal of IREF of RMU, must submit their proposal to CPSP during last quarter of second year of training. The approval process from CPSP takes approximately 3 months on an average but in case any corrections are suggested the resubmission and acceptance procedure may take 6 months on an average. These trainees will initiate data collection as soon as they receive the acceptance by CPSP authorities.
ii. However, the post graduate trainees who will opt to publish two original research articles in any CPSP recognized journals, as requisite to FCPS degree, will not require any submission of their proposals to CPSP. The will directly initiate the data collection as soon as they will receive the IREF acceptance letter. Hence their data collection phase of both research projects will begin in last quarter of R-Y2.
iii. The MD scholars of RMU will submit their research proposals to the Board of Advanced Studies and Research (BASR) of RMU for appraisal. BASR will issue an acceptance letter of the research proposal endorsed by the Vice chancellor of RMU copied to the concerned stake holders and authorities including office of Dean and ORIC. If members of BASR will find any modifications required in the proposal they will recommend them to trainee and supervisor. The trainee must incorporate those changes and will resubmit the corrected version of proposal to BASR within next one-week period. The written approval letter of BASR will then be issued within next two weeks to the trainee. The trainees will thus receive formal permission to initiate data collection phase through this acceptance of BASR.

iv. All trainees who will require data collection from any RMU or its teaching hospitals that are Benazir Bhutto Hospital, District Headquarters Hospital and Holy Family Hospital, will not require any permission from the administration of these hospitals. The appraisal letters of IREF and BASR will be considered as acceptance by all authorities of the RMU.
v. If any trainee will need to collect data from any institution other than RMU or its teaching hospital, they must seek that institution's approval too according to their standard protocols parallel to the period when they will have submitted proposals to CPSP/BASR to save their time.
vi. All the post graduate trainees will follow the guidelines regarding the format and content of the research proposals provided by the authorities to whom they will be presenting their research proposals that are Board of Advanced Studies and Research (BASR) for MD scholars or College of Physicians and surgeons of Pakistan (CPSP).

DATA COLLECTION, ENTRY AND ANALYSIS OF RESEARCH PROJECT OF DISSERTATION/RESEARCH PAPER

i. By the beginning of year 2, the trainees will have received the approval from the IREF, BASR and respective examination authorities for their research proposals of dissertations or research papers. Moreover, till then all the data collection tools for their research projects will also have been ready after pretesting.
ii. During first quarter of year 2, it will be mandatory for the trainees to initiate the data collection phase of their project/s. If the trainee will be collecting the data individually for his/her research project, it will be started under continuous guidance of their supervisors and continuous facilitation by the research centers of specialties, the data analysis center and Research Associates of ORIC of RMU.
iii. In case the data collection will require more human resources, other than trainee himself/herself, either as honorary or hired data collection staff, they should be properly trained for data collection by the trainee. The supervisor will also ensure that the additional data collection staff will be adequate in number within data within the time framework and should also make sure that they will be proficient enough to collect high quality and authentic data.
iv. The data storage will also be finalized by trainee under the guidance of Supervisor and research center of specialty.
v. The trainee will initiate data collection phase and will seek assistance of statisticians at Data analysis centre of ORIC for compilation of data sheets in SPSS/or any other statistical software for data coding and entry. The trainees will be encouraged by statisticians to collect the data and enter it simultaneously after cleaning into the soft ware to save time.
vi. By the end of R-Y2, the data collection and entry of data must be completed.
vii. In case the trainee will be working on option B of CPSP i.e. publication of two research papers, keeping in consideration, the lengthy period required for submission and then acceptance of papers by journals, he/she should be vigilant in data collection and

must do it at faster pace as compared to those writing dissertation. So such trainees should complete data collection of both papers within first half of year 2 of training simultaneously. Otherwise they can also collect data for first paper within first three months of year 2 of training and then will initiate data collection of second paper from sixth to ninth month of year 2 of training. Whatever is the option followed by the trainee, the data collection phase should not extend beyond ninth month of R-Y2, in order to complete both papers for submission till end of R-Y2.

viii. The trainees and MD scholars writing dissertation must also complete data collection and analysis till last month of R-Y2.

COMPLETION AND SUBMISSION OF ONE RESEARCH PAPERS AS REQUISITE TO CPSP FELLOWSHIP DEGREE

This section D implies only for the trainees who will be following option B of CPSP i.e. publication of a research papers, as requisite to fellowship of CPSP, instead of submitting a dissertation.

ii. The trainees opting for publication of research paper should complete and submit manuscripts research papers by the end of third year of training. Keeping in consideration, the lengthy period required for submission and then acceptance of papers by journals (that varies from journal to journal and may range from 3 months to even one year) he/she should be vigilant in data collection and paper completion at faster pace as compared to those writing dissertation.

iii. These trainees will be provided the following options and they will choose either of it based on their will and their supervisor's advise:

- OPTION 1: The trainees should complete data collection of both papers within first 6 months of year 2 of training simultaneously. Then after analyzing data and completing write up of original article in next 5-6 months must submit both papers during last month of R-Y2 to journals of choice.
- OPTION 2: The trainees should complete data collection of first paper within first three months of year 2 of training and then submit first paper after completion of manuscript till sixth month of R-Y2 to journal of choice. Then the trainee will initiate data collection of second paper till ninth month of year 2 of training and then submit second manuscript after completion till last month of R-Y2 to journal of choice.

iv. Whatever is the option followed by the trainee, both of his/her paper should be submitted to journals of choice before initiation of year 2 of trainee, keeping adequate time secured in advance, in case any paper will not be accepted and will have to be sent to another journal accordingly.

v. During the data collection and entry phase, trainees will receive continuous assistance from the Research Associates and Data analysis unit of ORIC of RMU.

vi. When the data entry will be completed in the statistical software, the trainee will be provided full assistance in data analysis, interpretation and write up of results by the statisticians of ORIC.

vii. The supervisors and publication in charge of ORIC will also guide the trainee to write the section "Discussion" based on the comparison of the findings of their study with the previously available research nationally as well as internationally.

viii. They should also be able to identify strengths and weaknesses of their studies and should make recommendations with statement of final conclusion.

ix. The trainees will identify the target journals for publication and after formatting their write up according to the specific format required by both journals.

x. The research papers will be reviewed by publication in charge of ORIC for plagiarism through turn-it-in soft ware. Any article that will have originality score less than 90% or similarity index more than 10% will be returned back to trainees for rephrasing and resubmission. Only when the eligible scores will be reached, then the trainee will be allowed to proceed further and to submit their research in the form of original articles under continuous assistance of Publication unit of ORIC.

xi. The trainee should also submit copies of submitted papers to the Dean, Director of ORIC and Chairperson of BASR that will be kept with them as confidential documents.

xii. In case the research paper/s is/are sent back with recommended corrections or modifications, the supervisor and associated staff at ORIC will assist the trainee on urgent basis to get it rectified and resubmitted within next 10 days' time.

xiii. In case any of the paper is refused publication by a journal even then the supervisor and publication unit at ORIC will assist the trainee on urgent basis, to get it rectified and resubmitted to another target journal of choice within next 10 days' time and not delaying it all.

Since the trainees who will be submitting dissertation in specialty field as requisite to FCPS degree or as a requisite to their MD degree will not comply with this section D, they will continue with data collection and entry and will also initiate write up of literature review for their dissertations during this last half of R-Y2.

COMPLETION OF RESEARCH PROJECT AND ITS WRITE UP AS A DISSERTATION

This section A implies only for the trainees who will be either MD scholars or those post graduate trainees following option A of CPSP i.e. writing dissertation, as requisite to fellowship of CPSP.

a. The trainees writing dissertations should have completed their data collection and entry by the end of third year of training and will have also initiated write up literature view for the dissertation.

b. As soon as the year four of training commences, these trainees should complete the introduction and literature review sections of their dissertations along with proper referencing during first three months of R-Y2. They will be continuously guided in this task by their supervisors, research associates and the publication in charge at the ORIC.

c. The trainees, In the meanwhile, will also seek continuous assistance of statisticians of Data analysis unit of ORIC for data analysis in statistical soft ware. Trainees will be guided how to interpret the results, how to determine the statistical significances and how to write these results in textual, tabulated and graphical forms. They will have to complete their data analysis and write up of results till fourth month of year 2.

d. The supervisor and publication in charge at ORIC will also guide the trainee to write the section of “discussion” for their dissertations based on the comparison of the findings of their study with the previously available research nationally as well as internationally.

e. The trainees will also identify strengths and weaknesses of their study and should make recommendations with statement of final conclusion.

f. According to the required referencing systems the reference lists and in text citation will also be completed correctly.

g. After writing the abstract and cover pages and annexure of the dissertation, the trainee will submit his/her dissertation’s final draft to publication in charge ORIC for plagiarism detection through turn-it-in soft ware. Any dissertation that will have originality score less than 90% or similarity index more than 10% will be returned back to trainees for rephrasing till the eligible scores will be reached.

h. Then the trainee should submit final draft of dissertation to the supervisor and head of department till end of fifth month of year for final modifications. Since the supervisor will be incessantly involved in every aspect of the project since the beginning and will be persistently guiding the procedure, so he/she should not take more than 10 days to give final review to dissertation of the trainee with written feedback that will be entered in a structured performa with recommendations for improvement or corrections. The Head of Department will also provide his feedback within 10-15 days.

i. Based on the feed back of the reviews, the trainee will make final editing and will get the dissertation printed and submitted to the degree awarding authority accordingly (BASR for MD trainees and CPSP for post graduate trainees of fellowship) for review for acceptance before third week of sixth month of year 2.

j. The trainee will also submit a copy of dissertation to head of department, the Dean, Director of ORIC and Chair person of BASR that will be dealt as a confidential document in order to avoid potential risk of plagiarism.

k. While the dissertations will be under review by the degree awarding authority for acceptance, the trainees will be continuously guided by the supervisor and the research associates at ORIC regarding defense of their dissertation. They will be guided how to make effective presentations according to the format provided by the examination authorities and also how to successfully and confidently respond to the queries of examiners.

l. In case the dissertation is sent back with recommended corrections or modifications, the supervisor and research associates at ORIC will assist the trainee on urgent basis to get it rectified and resubmitted within at least 10 days' time and not more than it.

RESUBMISSION OF RESEARCH PAPER IN CASE MODIFICATIONS ADVICED OR REJECTED FOR PUBLICATION BY A JOURNAL

This section B implies only for the post graduate trainees who will be opt for two research paper submission as requisite to fellowship of CPSP and provided one or both of their research paper/s is/are sent back for modifications or rejected publication.

i. In case the research paper/s is/are sent back with recommended corrections or modifications, the supervisor, publication in charge and concerned facilitators at ORIC will assist the trainee on urgent basis to get it rectified and resubmitted within next 10 days' time.

ii. In case any of the paper is refused publication by a journal even then the supervisor and publication unit at ORIC will assist the trainee on urgent basis, to get it rectified and resubmitted to another target journal of choice within next 10 days' time without any delay.

SUBMISSION OF ACCEPTANCE LETTERS OF APPROVED RESEARCH PAPER AND SUBMISSION OF HARD AND SOFT COPIES OF PUBLISHED RESEARCH PAPER

This section C implies only for the post graduate trainees who will be opt for two research paper submission as requisite to fellowship of CPSP and provided their research paper/s is/are approved by journals and are published.

i. In case the research paper/s is/are approved by the target journals, the trainee will submit the letter of acceptance/s to CPSP in addition to copies to supervisor, HOD, Dean and Publication in charge of ORIC.

ii. When the original article will be published in journal/s, then the trainee will submit hard and soft copies of the original journal with his/her published articles to CPSP in addition to copies to supervisor, HOD, Dean and Publication in charge of ORIC and BASR.

MONITORING OF RESEARCH ACTIVITIES

i. During the last year of training of post graduate trainees, they will be scrutinized for each and every activity of dissertation completion by research centers of specialties, supervisors, Head of Departments and the research associates and Deputy Directors at the Office of Research Innovation & Commercialization of RMU.

ii. The structured component of research in Log books of fourth training year will pertain to various components of their research projects including timing and completeness of data analysis, result write up, introduction, literature review's write up, methodology, discussion, recommendations, conclusions and cover pages.

iii. The log books will also include the attendance details of the trainees in the Journal club sessions of the department during R-Y2. This information will be endorsed by the supervisor of the trainee and the HOD.

iv. The Log Books of the trainees in addition to the Research portfolio during fourth year will be endorsed by the supervisor and Deputy Directors of ORIC. The research portfolio of the R-Y2 will again include self assessment regarding research activities of the trainee in narrative form. In addition to individual assessment of the objectives and aims formulated for fourth year of training and their successful attainment, it will also include participation in any research course/s, conference/s and/or competition/s etc. during year R-Y2.

OVERALL ASSESSMENT OF PERFORMACE OF TRAINEES

i. The overall assessment of performance of trainee will not rely on any scores or marks attained by trainees since there will not be any examination Paper or scoring for the home tasks assignments or presentation of journal club.

ii. The Heads of department and the director of ORIC will observe research portfolio of trainees in addition to the log books for attendance record and the remarks of supervisor regarding his/her opinion regarding the trainee's overall performance during fourth year of training. Based on their observations, they will evaluate the completeness and quality of performance of each activity of trainee during fourth year.

EVALUATION/ FEEDBACK OF RESEARCH

The research course and activities of third year of training will be evaluated by the trainees, facilitators ORIC and supervisors.

i. The end of year R-Y2 and end of R-Y2' research training feedback of trainees will include structured evaluation through feedback questionnaire not only four fourth year but also for entire four year of research training. It will be anonymous and apart from questions phrased in Likert scale, open ended questions will also be included for the opinions of trainees.

ii. The end of year R4 and end of of 2 years' research training feedback of trainers will also reflect the anonymous feedback for the opinions of all supervisors and facilitators regarding benefits, drawbacks or weaknesses of R-Y2 course as well as of entire four year's research training course.

iii. Three focus group discussions; oneof the R-Y2 trainees, second of the concerned facilitators and third of the supervisors will also be organized by the ORIC to evaluate the entire four year's research course, its benefits and weaknesses and scope for improvement.

iv. A final evaluation report of the Research Course R-Y2 and entire 2 years' research training Course will be formulated and compiled by the ORIC of RMU. The report will be presented to all concerned stake holders.

QUALITY ASSURANCE OF RESEARCH

i. The quality assessment of research course of R-Y2 as well as the entire 2 years' research course will be carried out through

i. review of materials and observations of proceedings by the evaluation team of RMU.

ii. The research dissertations submitted by post graduate trainees will be observed as confidential evidences by Director of ORIC, Dean and chairperson of BASR for quality assessment. No other person will have access to these manuscripts in order to avoid any risk of potential plagiarism.

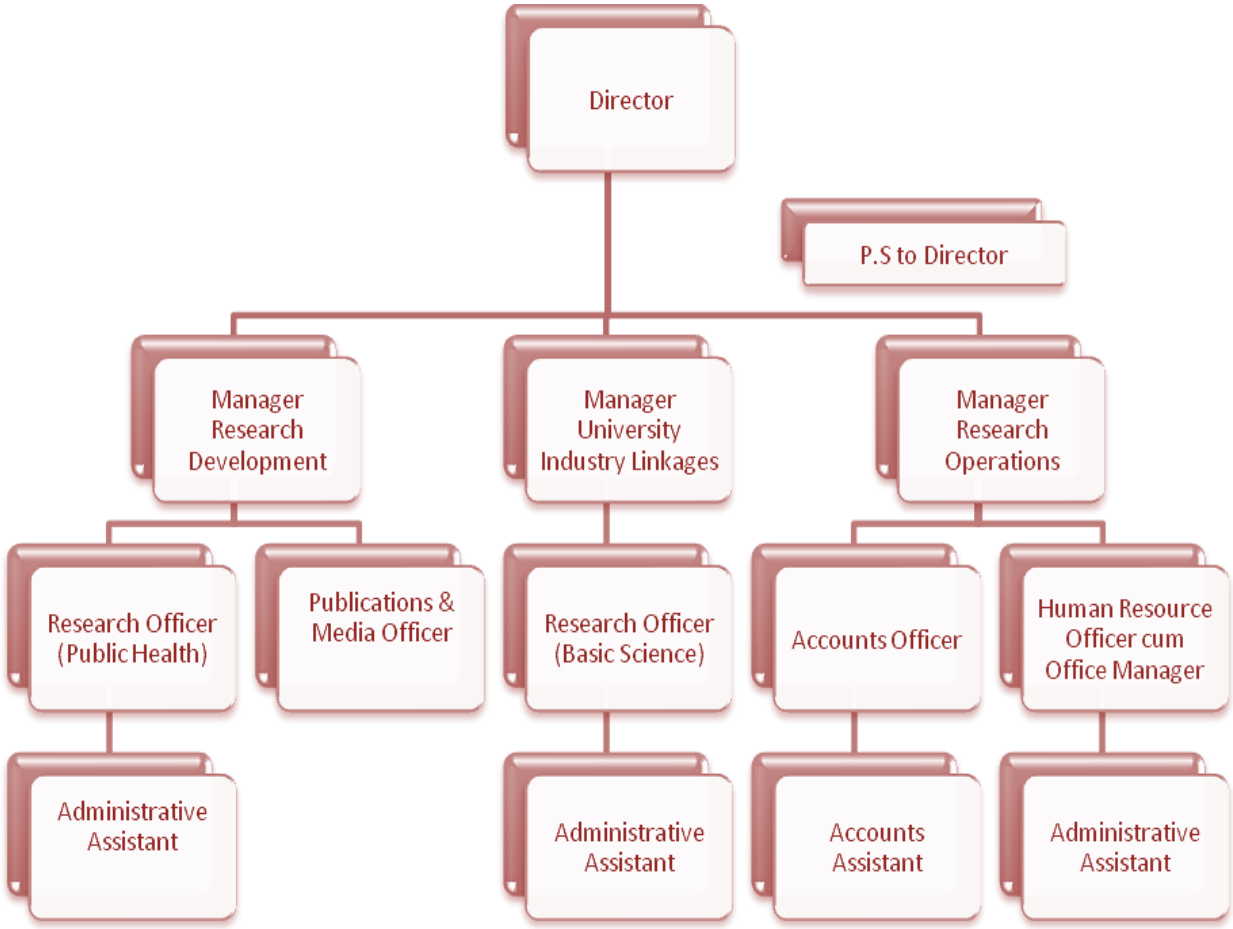
iii. ORIC will submit evaluation content of R-Y2 to all stake holders including a copy to the Quality Enhancement Cell (QEC) of RMU for internal as well as external evaluation.

iv. An annual meeting of the trainers by end of year 2, will be organized by the Quality Enhancement Cell of RMU, including representatives of supervisors, Head of Departments, Dean, representative members of BASR, ORIC, QEC, DME & IREF, to review and discuss all the evaluation materials of R-Y2, its quality and any recommendations for quality enhancement, under the chairman ship of Vice chancellor of RMU.

The activities of trainees of RMU are displayed in table according to their concerned options. Successful completion of above mentioned requirements of research course will be mandatory requirement for completion of Post Graduate training final year as well as for MD scholar's training at RMU.

ANNEXURE 1

THE ORGANIZAITONAL CHART OF ORIC OF RMU



Note: Managers of ORIC are also referred to as Deputy Directors in RMU

ANNEXURE 2

TERMS OF REFERENCES OF STAFF MEMBERS OF RMU WITH REFERENCE TO THE RESEARCH TRAINING PROGRAM OF POST GRADUATE TRAINEES OF RMU

A. THE VICE CHANCELLOR:

a. The vice chancellor of RMU will be final authority to approve nominations of external supervisors of MD scholars, in consultation with the Dean of specialty.
b. Regarding nominations of the internal supervisors of MD trainees and also of Post graduate trainees of fellowship of CPSP, after completion of first year of training, i.e. R-Y1, no substitution in nomination will be allowed. But in case of any serious incompatibility between the trainee and the supervisor, the issue will be brought to the Vice chancellor, directly by the Dean, as a special case. And only the vice chancellor will make the final decision accordingly, as the final authority.
c. The vice chancellor will also be the head of the quality evaluation team of research training courses that will also include the Head of departments, Deans, selected representatives of BASR, IREF, Director of ORIC and Director of Quality enhancement cell (QEC). The selection of above mentioned team members will be made by the Vice chancellor of RMU.
d. The Vice chancellor will have the authority through the research training course, to make surprise visits, evaluations, rounds and checking (without any prior information to the trainees and trainers) at any random occasion, being member of quality evaluation team individually or in team.
e. An annual meeting of the trainers will also be organized by the Quality Enhancement Cell of RMU, including representatives of supervisors, Head of Departments, Dean, representative members of BASR, ORIC, QEC & IREF and this meeting will be chaired by the Vice chancellor.
f. In perspective of the quality assessed through extensive procedure all the year round and also during the Annual meeting of quality assessment and enhancement, the Vice Chancellor and the Board of Advanced study and Research will finalize any modifications or enhancement in the next Research course.
g. When the MD scholars of RMU will submit their research proposals to the Board of Advanced Studies and Research (BASR) of RMU for appraisal, BASR will issue an acceptance letter of the research proposal that will be endorsed by the Vice chancellor of RMU.

B. MEMBERS OF BOARD OF ADVANCED STUDIES AND RESEARCH:

a. The Board of Advanced studies and Research of RMU will finalize, approve and issue final approval list of the supervisors of the trainees of

RMU.

b. The Board of Advanced Studies and Research (BASR) of RMU will receive the submitted research proposals of MD scholars of RMU for appraisal. BASR will issue an acceptance letter of the research proposal endorsed by the Vice chancellor of RMU copied to the concerned stake holders and authorities including office of Dean and ORIC. If members of BASR will find any modifications required in the proposal they will recommend them to trainee and supervisor. The trainee must incorporate those changes and will resubmit the corrected version of proposal to BASR within next one-week period. The written approval letter of BASR will then be issued within next two weeks to the trainee. The trainees will thus receive formal permission to initiate data collection phase through this acceptance of BASR.
c. The quality evaluation team of research training course will include selected representatives of BASR who will be nominated and selected by BASR and Vice chancellor of RMU. The members may pay random visits for physical observation of the proceedings and materials of all the research related activities of the trainees and supervisors for quality assessment and assurance.
d. The copies of research papers or dissertations submitted by post graduate trainees following option of publication of two original articles to CPSP accredited journals will also be submitted to the chairperson of BASR for quality assessment to be observed as confidential evidences
e. Representative members of BASR will attend the annual meeting of Quality assurance, by end of each research training year and will also share their experiences of their evaluation visits and observations to validate the existing materials.
f. The quality of Research Training course will be stringently determined by BASR in their meetings and the members will provide recommendations for further quality enhancement and will have the authority for policy formulation or modification regarding the research training course.

C. MEMBERS OF INSTITUTIONAL RESEARCH AND ETHICS FORUM OF (IREF) RMU:

a. Institutional Research Ethics Forum will organize monthly meetings for approval of research proposals of the trainees of RMU in which the trainee must present along with his/her supervisor for presentation and defense of proposals of dissertations/research papers.
b. The members will be provided hard copies of the research proposals prior to the meetings that they will review before coming to the meeting.
c. Members will listen and visualize five to ten minutes' presentation through power-point by the trainees and by the end of presentationwill make relevant queries to the trainees.
d. The IREF will appraise and scrutinize every aspect of the proposal/s and if found acceptable then will provide on spot verbal approval of the project followed by written approval letter within next two weeks to the trainees.
e. If members of IREF will find any modifications required in the proposal/s they will recommend them to trainee and supervisor. The trainee

must incorporate those changes and will resubmit the corrected version of proposal/s within next one week's period.

f. The written approval letter of IREF will be issued within next two weeks of meeting, to the trainee.
g. In case the trainee will be working on option B of CPSP i.e. publication of two research papers, instead of writing dissertation, then he/she will present both research proposals to IREF for the two topics already approved by CPSP.
h. The quality evaluation team of research training course will include selected representatives of IREF who will be nominated and selected bychairperson of IREF and Vice chancellor of RMU. The members may pay random visits for physical observation of the proceedings and materials of all the research related activities of the trainees and supervisors for quality assessment and assurance.
i. Representative members of IREF will attend the annual meeting of Quality assurance, by end of each research training year and will also share their experiences of their evaluation visits and observations to validate the existing materials.
j. The quality of Research Training course will be stringently determined by IREF in their meetings and the members will provide recommendations for further quality enhancement to BASR, if any, regarding research training course.

D. THE DEAN OF THE SPECIALITY:

a. The journal club meetings will be chaired by the Dean of specialty.
b. In a journal club meeting, one or two research paper/s published in an indexed national or international journal will be selected by the Dean and will be notified to the departments at least one and a half month prior to the meeting.
c. The Dean of the specialty will decide the nomination of the supervisor for the post graduate trainee as well as the internal supervisors of MD scholars within first six months of the first year of training R-Y1.
d. For the selection of supervisors, the Dean will chair meeting for selection of supervisors that will be held in the middle of the first research training year, preferably in June.
e. The list of all the first year trainees and the available supervisors in each department will be presented to the Dean, by respective heads of each department in meeting.
f. The Dean will consider the recommendations and proposals of most suitable supervisors for each trainee after eloquent discussions and justifications with the Head of Departments.
g. The Dean will then call each trainee individually to inform him/her the suggested Supervisor for him/her and will also give right and time for objection or reservation in nomination, if any. The Dean will seek the trainee's final consent and then after asking the trainee to leave the meeting room, will call the supervisor for final consent.
h. If the supervisor will also be willing to happily supervise the trainee, then the Dean will finally approve the nomination.

i. A tentative list will be issued by the office of the Dean, within three days of the meeting, copied to the HOD's and the trainees and supervisors.
j. Both the trainees and the supervisors will be given two weeks to challenge the nominations and will also be given right to personally approach the Dean for any request for change. In case of any objection, the Dean will make changes in consultation with the HOD's, after final consent and satisfaction of both trainee and supervisor
k. The final revised list of nominations will be then issued by the office of Dean and will be sent to the Board of Advanced studies and Research of RMU (BASR).
l. During the last few months of the first year of training, the trainees and supervisors will be advised by the Dean, to get familiar with each other and try to identify their abilities to efficiently and successfully work together as a team.
m. In case of any issues, either of both will have right to request any change in nomination to the Dean, till last week of first year of training. The Dean will then consider the case and will seek modification in nomination from the BASR.
n. After completion of first year of training, no substitution in nomination will be allowed. In case of any serious incompatibility between the trainee and the supervisor, the Dean will have authority to bring it to the notice of the Vice chancellor as a special case.
o. As regards the MD scholars, the external supervisors will also be nominated and those nominations will be made by Vice chancellor of RMU in consultation with the Dean of specialty. After finalization of nominations a letter of agreement of supervision will be submitted by the trainee to the office of Dean, including consent and endorsement of both trainee and the internal and/or external supervisor.
p. Regarding the project of undertaking clinical audits on various aspects of the department during first year of research training, on one topic assigned to each group by the Dean in consultation with Heads of Departments.
q. The clinical audits completed in groups will be published as Annual Audit Reports of the departments by the Dean
r. The Dean will make the decision regarding the presentation of clinical audit weekly Clinico-pathological conferences (CPC) of the University.
s. Once the research question and topic is finalized with mutual understanding of the supervisor, the Dean will also be handed over the selected topic by the trainee. The Dean of the specialty will give approval of the topic after scrutiny and will confirm after consultation with HODs that there is no duplication of the topic in the department.
t. The Dean will finalize the list of the topics of research proposals of all trainees during fourth month of R-Y2 and then will submit the list to BASR.
u. Dean will also ensure the feasibility and availability of resources during second year of research training of the trainees of RMU, before initiation of the research project.
v. The office of Dean will receive a copy of approval of the acceptance letter of BASR once the MD scholars of RMU will get their research proposals approved by to the Board of Advanced Studies and Research (BASR) of RMU.

w. The Dean will receive the copies of final manuscript by post graduate trainees following option of publication of two original articles to CPSP accredited journals that will be observed as confidential evidences by Dean for quality assessment. It will be kept strictly confidential by the office of the Dean in order to avoid any risk of potential plagiarism

x. The Dean will also receive the copies of final dissertation manuscript by post graduate trainees and MD trainees that will be observed as confidential evidences by Dean for quality assessment. It will be kept strictly confidential by the office of the Dean in order to avoid any risk of potential plagiarism.

y. The office of Dean must also receive the letter of acceptance/s by the trainees, in case the research paper/s is/are approved by the target journals. When the original article will be published in journal/s, then the trainee will submit hard and soft copies of the original journal with his/her published articles to Dean of speciality for evidence.

z. The Dean of speciality will be member of the quality evaluation team of research course and he/she will have right to make any surprise visit during the 2 years training research course, at any random occasion, either individually or in teams, without any prior information to the trainees and trainers.

aa. The Dean will also attend the annual meeting that will be organized by the Quality Enhancement Cell of RMU. During the meeting, the Dean will share his/her experience of evaluation visits and observations to validate the existing materials.

E. THE HEAD OF THE DEPARTMENT:

a. The Head of the Department (HOD) will oversee all the research activities of the trainees, in close consultation with the Dean and the supervisors at the departmental level.

b. The HOD will attend all the journal club sessions of department.

c. During the first six months of research training year 1 i.e. R-Y1, the HOD will be responsible for consideration of the nominations of the internal supervisor of each trainee. The HOD will decide these nominations based on his/her own personal observation of the level of performance, talent personality and temperament of both the trainees and the supervisors. Based on his/her personal observation of the compatibility of both eligible trainees and the supervisors, Head of department will recommend or propose most suitable supervisors for each trainee after eloquent discussions and justifications to the Dean during a nomination meeting that will be especially held for this purpose.

d. The nominations will be finalized in a special meeting by all heads of the departments and the Dean. The list of all the first year trainees and the available supervisors in each department will be presented by respective heads of each department in meeting.

e. In case of any objection to nominations of supervisors, the Dean will make changes after direct consultation with the HOD's, apart from

final consent and satisfaction of both trainee and supervisor.

f. After finalization of nominations a copy of letter of agreement of supervision will be received by the office of HOD, submitted by the trainee.
g. The weekly meetings of the supervisor and the trainee will be monitored by the HOD through observation of the documented record of meeting in log books, by the end of every month.
h. During ninth month of training year 1; R-Y1 the head of department will supervise the project of clinical audit of the trainees. In this regard HOD will firstly form groups of trainees, either two or three trainees in one group (along with each supervisor of each trainee), depending on the total number of trainees available in that respective first year.
i. The HOD in consultation with the Dean of specialty will assign topics of audits to each group.
j. The clinical audits completed in groups will be published as Annual Audit Reports of the departments under supervision of HOD's.
k. The presentation of clinical audit in weekly Clinico-pathological conferences (CPC) of the University, will also be supervised by HOD's.
l. The contribution of the trainees in execution and publication of clinical audit will also be qualitatively assessed by the head of departments.
m. Once the trainee finalizes research question and topic in mutual understanding with supervisor, the HOD will also be handed over the selected topic by the trainee who in consultation with the Dean of the specialty will confirm for non duplication of the topic in the department.
n. HOD will also ensure the feasibility and availability of resources during second year of research training of the trainees of RMU, before initiation of the research project.
o. The trainee should submit final draft of dissertation to the head of department till end of fifth month of year for final modifications and the Head of Department will also provide his /her feedback within 10-15 days.
p. The HOD will receive a copy of final dissertation by the trainee during fourth year of research training that will be kept by him/her as a confidential document in order to avoid any potential risk of plagiarism.
q. In case the research paper/s of the trainees is/are approved by the target journals, the office of HOD trainee will also receive a copy of the letter of acceptance/s and when the original article will be published in journal/s, even then the trainee will submit hard and soft copies of the original journal with his/her published articles to HOD.
r. All the Head of Departments along with other staff members of Office of Research Innovation & Commercialization of RMU will keep vigilant and continuous monitoring of all the research activities of each trainee.
s. The HOD will monthly check and endorse the sections of research in Structured Log books of trainees and also section of Research in portfolio record of the trainees specific to research component of the training.

t. The HOD will also endorse the attendance of the trainees in the Journal club sessions of the department in the log books along with his/her quantitative and/or qualitative assessment of the trainees' active participation and/or presentation during the journal club session. HOD will also endorse the information whether any question or comment was raised by the trainee during each journal club session or not. The Heads of department will observe the log books for assessments of facilitators of short courses during third year of research training and their comments regarding the home tasks/assignments apart from the remarks of supervisor regarding his/her opinion regarding the trainee's overall performance during third year of training.

u. In case of any deficiencies or weaknesses, HOD will personally call the trainee and supervisor and will guide them how to correct or improve accordingly.

v. The research course of the trainees will also be evaluated by the HOD's through end of sessions forms and then collectively through end of course feedback forms.

w. The HODs will also be members of the quality evaluation team of research training course and will vigilantly and equitably observe and evaluate all the documented records and materials during the course and finally by the end of each course year for quality assessment.

x. They will also make surprise visits at any random occasion, without any prior information to the trainees and trainers, individually or in team.

y. HODs will also attend the annual meeting quality assessment and enhancement where they along with other participants will actively review and discuss all the evaluation material. And will also share their experiences of evaluation visits and observations to validate the existing materials.

F. THE DIRECTOR OF OFFICE OF RESEARCH INNOVATION AND COMMERCIALIZATION (ORIC):

a. The Director ORIC (Office of Research Commercialization and Innovation) of RMU will conduct an orientation session or an introductory session of one-hour duration along with Deputy Directors of ORIC at the commencement of first research training year of all post graduate trainees of RMU. During the session, the Director will make trainees acquainted to the complete research course of 2 years' post graduate training, its schedule of all scholarly and academic activities and the assessment procedures. He/she will also introduce the model of research at RMU, organizational structure of ORIC and all requisites of training along with introduction to the staff members of ORIC who will be involved in their training.

b. The director ORIC will take few research training sessions of first two training years (R-Y1 & R-Y2) that will comprise of didactic lecture followed by taking exercises and then also be responsible for giving and checking the home task assignments (if any) related to session.

c. During the third year of training the Director ORIC will conduct few of short refresher courses/workshops along with other staff members of

Office of Research Innovation and commercialization. For the specific course, Director will have to carry out a 20-25 minutes' power-point presentation to restore the memories of the trainees regarding the previous knowledge attained by them in R-Y1 and R-Y2. The director ORIC will also facilitate the individual or groups exercises of trainees in the training session following the presentation and also check the take home assignments.

d. Director at the Office of Research Innovation & Commercialization of RMU will keep vigilant and continuous monitoring of all the academic activities of each trainee related to Research courses.
e. Director of ORIC will check the research portfolio of the trainee and will endorse it.
f. Based on his/her observations, the completeness and quality of performance of each trainee will be evaluated and in case of any deficiencies or weaknesses he/she will personally call the trainee and supervisor and will guide them how to correct or improve accordingly.
g. Director ORIC will supervise the formulation of evaluation report of the research training course and after its endorsement will send it to all concerned departments and stake holders. The director ORIC will also be responsible for submission of the evaluation content to the Quality Enhancement Cell (QEC) of RMU for internal evaluation and external evaluation.
h. The Director will also be member of the quality evaluation team of research training course and will also evaluate all the documented records and materials during the course and finally by the end of each course year for quality assessment.
i. Like all other members of Quality evaluation team, the director will also have the right to make a surprise visit at random individually or in team. The evaluation will include not only physical observation of the materials but the evaluators may also make a visit to observe any proceedings or activities of the research course e.g. a lecture, a group exercise, a journal club session and/or an IREF meeting.
j. The Director will attend the annual meeting quality assessment and enhancement where he/she will actively review and discuss all available material of training course will also share his/her experience of evaluation visits and observations to validate the existing materials.
k. The trainees who will opt for publication of research papers to journals will submit copy of submitted papers to Director of ORIC who will check and keep them secured in records as confidential documents.
l. The Director will receive a copy of dissertation of the trainee for record as a confidential document in order to avoid potential risk of plagiarism.

G. THE DEPUTY DIRECTORS OF OFFICE OF RESEARCH INNOVATION AND COMMERCIALIZATION (ORIC):

a. The Deputy Directors ORIC (Office of Research Commercialization and Innovation) of RMU, along with Deputy Director and other staff

members of ORIC will conduct an orientation/introductory session of one-hour duration at the initiation of first research training year of all post graduate trainees of RMU. The Deputy Directors will provide introduction to trainees regarding the research course of 2 years' post graduate training, its schedule of all scholarly and academic activities and the assessment procedures. They will also inform the trainees organizational structure of ORIC and all requisites of training along with introduction to the staff members of ORIC who will be involved in their training.

b. The Deputy directors ORIC will take research training sessions of first two training years (R-Y1 & R-Y2) that will comprise of didactic lecture followed by taking exercises and then also be responsible for giving and checking the home task assignments (if any) related to session.
c. The submitted record and scores of trainees attained for the individual and group assignments during first two training years will be endorsed by the Deputy Directors of ORIC.
d. During the third year of training the Deputy Directors ORIC will conduct a few of short refresher courses/workshops. For the specific course, they will have to carry out a 20-25 minutes' power-point presentation to restore the memories of the trainees regarding the previous knowledge attained by them in R-Y1 and R-Y2. In addition, they will also facilitate the individual or groups exercises of trainees in the training session following the presentation and will also check the take home assignments.
e. The submitted record and scores of trainees attained for the individual and group assignments of the short training courses of third year of training will also be endorsed by the Deputy Directors of ORIC.
f. The Deputy Directors will check and mark the written papers of end of year examination or Annual Research Paper of first two training year R-Y1 & R-Y2. They will also endorse the scores of the Annual papers in the log book of the trainees.
g. The research course will be evaluated by the deputy directors of ORIC too through end of sessions forms and then collectively through end of course feedback forms.
h. During these first three months of R-Y2, the Deputy Directors at the ORIC will provide consultation to the trainees regarding feasibility of their research questions and will be advised if any modification required.
i. The deputy directors will be continuously involved in an alert and continuous monitoring of all the scholarly activities of each trainee.
j. The structured Research component of Log books and Research portfolio of the trainees specific to research component of all the training years R-Y1 to R-Y2 will also be regularly observed, monitored and endorsed by the Deputy Directors of ORIC. Based on his/her observations, the completeness and quality of performance of each trainee will be evaluated and in case of any deficiencies or weaknesses he/she will personally call the trainee and supervisor and will guide them how to correct or improve accordingly.
k. The Deputy Director will also monitor the submission of the evaluation content to all including a copy to the Quality Enhancement Cell (QEC) of RMU for internal evaluation.

H. THE RESEARCH ASSOCIATES OF OFFICE OF RESEARCH INNOVATION AND COMMERCIALIZATION (ORIC):

a. The Research Associates of ORIC (Office of Research Commercialization and Innovation) of RMU, along with Deputy Director and other staff members of ORIC will facilitate the orientation/introductory session of one-hour duration at the initiation of first research training year of all post graduate trainees of RMU.
b. The Research Associates will take few research training sessions of first two training years (R-Y1 & R-Y2) that will comprise of didactic lecture followed by taking exercises and then also be responsible for giving and checking the home task assignments (if any) related to session.
c. The Research Associates will also be will be present and will be actively involved in facilitation of all the training sessions that will be taken by Director, Deputy Directors or guest facilitators. They will actively facilitate the individual and group works of the trainees during the sessions.
d. The Research Associates will be responsible for record keeping of the post graduate trainees regarding the training sessions and the records and scores of trainees for the individual and group assignments during all four training years that will also be endorsed by the Deputy Directors of ORIC. They will not only collate the record at the ORIC in computerized versions as well as in the form of hard copies. The Research Associates will also fill in the record in research sections of the log books relevant to the training sessions and other relevant activities that will be supervised by them.
e. During the third year of training, the Research Associates will also be present in the short refresher courses/workshops for facilitating the Director, Deputy Directors or guest facilitators. They will actively facilitate the individual and group works of the trainees during the workshops.
f. The Research Associates along with the Deputy Directors will check and mark the written papers of end of year examination or Annual Research Paper of first two training year R-Y1 & R-Y2. They will enter the the scores of the Annual papers in the log book of the trainees and will also keep its record at the ORIC in computerized versions as well as in the form of hard copies.
g. During the first three months of R-Y2, the Research Associates at the ORIC will provide consultation to the trainees regarding feasibility of their research questions and will advise trainees if any modification required.
h. Once the trainee gets the approval of the topic/s from all concerned authorities during R-Y2 and will initiate the formal write up of proposal/s, the research associates of ORIC will guide them regarding the research methodologies.
i. The research associates of ORIC will also ensure that the duration of research project should be adequate and realistic so that trainees will be able to complete their project/s timely during training leaving enough time for its write up.
j. The research associates of ORIC will also guide the trainees regarding the research formulation of data collection tools, their pre-testing and execution of data collection phase

k. Trainees will be individually provided an updated step wise guidance by the research associates of ORIC, regarding submission of their synopsis to IREF for appraisal. They will be supervised by Research Associates regarding how to access the RMU website, to download the application Performa and then how to electronically fill it in for final submission. They will also be provided updated format of presentation by the Research Associates for their Research Proposal presentations at IREF meetings.

l. The record of the trainees regarding timely completion and quality of each activity related to completion of research proposals and its presentation in the monthly meeting of the Institutional Research Ethics Forum (IREF) of RMU will also be part of the Log Book that will be entered by the research associates of ORIC and conveners of the IREF and BASR.

m. As soon as the year four of training commences, these trainees should complete the introduction and literature review sections of their dissertations along with proper referencing during first three months of R-Y2 and the Research Associates will also guide them along with the supervisors and the publication in charge at the ORIC.

n. While the dissertations will be under review by the degree awarding authority for acceptance, the trainees will be continuously guided by the supervisor and the research associates at ORIC regarding defence of their dissertation. They will be guided how to make effective presentations according to the format provided by the examination authorities and also how to successfully and confidently respond to the queries of examiners.

o. In case the dissertation is sent back with recommended corrections or modifications, research associates at ORIC will guide the trainee along with supervisor on urgent basis to get it rectified and resubmitted within at least 10 days' time.

I. THE PUBLICATION IN CHARGE OF OFFICE OF RESEARCH INNOVATION AND COMMERCIALIZATION (ORIC):

a. The Publication in charge will be actively involved in the Research training course and for the academic sessions relevant to literature search, review and write up, he/she will take didactic lectures, followed by facilitating individual and group exercises and checking of relevant home tasks and assignments.

b. The post graduate trainees and MD scholars submit a copy of their finalized research proposal/s for the dissertation/research papers to the publication in charge of ORIC who will review for plagiarism through turn-it-in soft ware. Any proposal that will have originality score less than 90% or similarity index more than 10% will be returned back to trainees for rephrasing and resubmission. Only when the eligible scores will be reached, then the publication in charge will approve and the proposal will be further processed.

c. The publication in charge of ORIC will also guide the trainees to write the literature review sections and the section of "Discussion" based on the comparison of the findings of their study with the previously available research nationally as well as internationally.

d. The final research papers/dissertations of trainees will also be reviewed by publication in charge of ORIC for plagiarism through turn-it- in

software. Any article that will have originality score less than 90% or similarity index more than 10% will be returned back to trainees for rephrasing and resubmission. Only when the eligible scores will be reached, then the trainee will be allowed to proceed further and to submit their research in the form of original articles under continuous assistance of Publication unit of ORIC.

e. In case the research paper/s of trainees is/are sent back with recommended corrections or modifications publication in charge along with the supervisor and concerned facilitators at ORIC will assist the trainee on urgent basis to get it rectified and resubmitted within next 10 days' time.

f. In case any of the paper of trainee is refused publication by a journal then the publication unit at ORIC along with the supervisor and concerned facilitators at ORIC will assist the trainee on urgent basis, to get it rectified and resubmitted to another target journal of choice within next 10 days' time and not delaying it all.

J. THE STATISTICIANS AT DATA ANALYSIS UNIT OF OFFICE OF RESEARCH INNOVATION AND COMMERCIALIZATION (ORIC):

a) The statisticians at the Data Analysis Unit of ORIC at data analysis centre of ORIC will also be actively involved in the Research training course specifically those of Basic and advanced Biostatistics and Epidemiological concepts. The statisticians will take didactic lectures, followed by facilitating individual and group exercises and checking of relevant home tasks and assignments.

b) The statisticians will facilitate the trainees in sample size calculation through sample size calculators according their study designs.

c) Trainees will also be assisted by the statisticians in planning the Data analysis for the research projects and also data coding, cleaning and sorting accordingly.

d) The statisticians will facilitate the trainees in formulation of the data entry sheets in SPSS or other data analysis software and will be continuously assisted in the process till data entry is completed.

e) The trainees will perform the data analysis of their research projects for research papers or dissertations, under continuous guidance and supervision of the statisticians who will also guide them how to interpret analyzed files and to write up results in textual forms, tabulated versions or figures/graphs.

f) In case the research paper/s or dissertation/s of trainees is/are sent back with recommended corrections or modifications in results section then the statisticians along with the supervisor, publication in charge and concerned facilitators at ORIC will assist the trainee on urgent basis to get it rectified and resubmitted within next 10 days' time.

K. DEPARTMENT OF MEDICAL EDUCATION:

a. The quality evaluation team of research training course will include Director of Department of Medical Education who may pay random

visits for physical observation of the proceedings and materials of all the research related activities of the trainees and supervisors for quality assessment and assurance.

b. The Director DME will also attend the annual meeting of Quality assurance, by end of each research training year and will also share his/her experiences of evaluation visits and observations to validate the existing materials.

c. The demonstrator at the DME will keep record of attendances of all the post graduate trainees and MD scholars for all the academic sessions attended by them regarding the research training course along with the record of all assessments, scores, marks of annual papers. They will monitor the log books and research portfolio for the completeness and regularity too. The record will not only be kept and maintained at DME as hard copies as well as computerized version, but they will also regularly share records with ORIC and Quality enhancement cells of RMU.

L. THE SUPERVISOR OF THE TRAINEE FOR THE DISSERTATION PROJECT

a. The supervisor of the trainee must be nominated within first six months of the research training. The Dean of the specialty will decide the nomination of the supervisor for the post graduate trainee as well as MD scholars. In this regards a meeting will be held that will be attended by all heads of the departments and the Dean. The list of all the first year trainees and the available supervisors in each department will be presented by respective heads of each department in meeting. All of the eligible trainees and supervisors will also be around for brief interviews during the meeting. The supervisor for the trainee will be nominated based the the level of performance, talent personality and temperament of both the trainees and the supervisors by the HOD. If the supervisor will also be willing to happily supervise the trainee, then the Dean will finally approve the nomination, apart from other requirements.

b. After finalization of nominations a letter of agreement of supervision will be submitted by the trainee to the office of Dean, including consent and endorsement of both trainee and the internal and/or external supervisor, with copies to HOD, ORIC and BASR.

c. The supervisor will be bound to meet with the trainee, on weekly basis exclusively for research activity and will document the activity performed during the meeting in the log book along with endorsement.

d. During ninth month of training year 1; R-Y1 the supervisor/s will supervise trainees together in groups and will undertake clinical audit on various aspects of the department as a project assignment, on one topic assigned to each group by the Dean and Heads of Departments. The contribution of the post graduate trainees'/ MD trainees in audits will be qualitatively assessed by the supervisors and the head of departments.

e. The supervisor will keep vigilant and continuous monitoring of all the research related academic activities of each trainee.

f. The supervisors will provide their feedback through structured and anonymous feedback forms/questionnaire, including closed and

partially closed questions that will be regularly provided by them. They will provide their inputs and opinions regarding effectiveness of the course contents, curriculum, teaching methodologies, teaching aids and technologies, content and usefulness of the exercises and assessments etc.

g. One Focus group discussion of supervisors will also be organized by the ORIC to evaluate the research course, its benefits and weaknesses and scope for improvement, each year.
h. The supervisor will keep a close and continuous check on the Log books, Research portfolio of the trainee and will endorse it regularly. Based on his/her observations, the supervisor will evaluate the performance of the trainee and will discuss it in monthly meeting with the Head of Department or Dean of the specialty if required.
i. The supervisor will not only guide and facilitate the trainee in preparation of presentation of Journal Club but will also ensure that trainees should actively participate in question & answer session of the journal club meeting and will also ensure the attendance of the trainees in Journal club as per set requirements.
j. During these first three months of R-Y2, supervisor will guide and supervise the trainee to do extensive review of the literature, relevant to topic and finalize the research question/s and research topic/s with mutual understanding and will submit the selected topic to the Head of Department and Dean of specialty.
k. The supervisor will facilitate the trainee at every step, the formal write up of research proposal/s in consultation with the research associates of ORIC for guidance in methodology. The research proposal should be completed in eighth month of R-Y2 and should also be reviewed and finalized by the Supervisor of the trainees.
l. The trainees should formulate all the data collection tools under guidance of supervisor and should also pretest to finalize all the data collection tools for their research projects.
m. The supervisors will also ensure that the duration of research project should be adequate and realistic so that trainees will be able to complete their project/s during third year of training leaving enough time for its write up during year 2 of training. The supervisor will also consult the Dean and HOD's in ensuring the feasibility and availability of resources of a trainee during second year of training.
n. The supervisor will help the trainee to make a five to ten minutes' presentation through power-point at Institutional Research Ethics Forum during 9-10 months of R-Y2. By the end of presentation, the supervisor will facilitate in defense of the proposal.
o. During first quarter of year 2, it will be mandatory for the trainees to initiate the data collection phase of their project/s under continuous guidance of their supervisors. In case the data collection will require more human resources, other than trainee himself/herself, the supervisor will ensure that the additional data collection staff will be adequate in number within data within the time framework and should also make sure that they will be proficient enough to collect high quality and authentic data.
p. The data storage will also be finalized by trainee under the guidance of Supervisor and research centre of specialty.

q. Whether the trainee is opting for dissertation writing or research paper publication, the supervisor will ensure that every step and procedure is being followed effectively and timely meeting all set requirements as per standard operational procedures.
r. The supervisor will actively assist the trainee in write up of dissertation/ research papers.
s. The trainee should submit final draft of dissertation to the supervisor till end of fifth month of year4 for final modifications. Since the supervisor will be incessantly involved in every aspect of the project since the beginning and will be persistently guiding the procedure, so he/she should not take more than 10 days to give final review to dissertation of the trainee with written feedback that will be entered in a structured performa with recommendations for improvement or corrections.
t. In case the dissertation or research paper/s is/are sent back with recommended corrections or modifications, the supervisor will assist the trainee on urgent basis to get it rectified and resubmitted within next 10 days' time. In case any of the paper is refused publication by a journal even then the supervisor will assist the trainee on urgent basis, to get it rectified and resubmitted to another target journal of choice within next 10 days' time and not delaying it all.
u. In case the research paper/s is/are sent back with recommended corrections or modifications, the supervisor will assist the trainee on urgent basis to get it rectified and resubmitted within next 10 days' time. In case any of the paper is refused publication by a journal even then the supervisor and publication unit at ORIC will assist the trainee on urgent basis, to get it rectified and resubmitted to another target journal of choice within next 10 days' time and not delaying it all.
v. While the dissertations will be under review by the degree awarding authority for acceptance, the trainees will be continuously guided by the supervisor regarding defense of their dissertation. They will be guided how to make effective presentations according to the format provided by the examination authorities and also how to successfully and confidently respond to the queries of examiners.

WORKSHOPS

BIOSTATISTICS & RESEARCH METHODOLOGY (4 DAYS)	
LEARNING OBJECTIVES	**TOPICS TO BE COVERED**
• To understand the basics of Bio- Statistics • To critique why research is important? • To discuss the importance of Selecting a Field for Research • To prepare oneself for Participation in National and International Research • To prepare oneself for Participation in Pharmaceutical Company Research • To interpret the importance of research ideas & Criteria for a good research topic • To discuss Ethics in Health Research • To learn to write a Scientific Paper • To learn to make a Scientific Presentation • To learn to make a purposeful literature search	1. Introduction to Bio-Statistics 2. Introduction to Bio- Medical Research Why research is important? 3. What research to do? i. Selecting a Field for Research ii. Drivers for Health Research iii. Participation in National and International Research iv. Participation in Pharmaceutical Company Research v. Where do research ideas come from vi. Criteria for a good research topic Ethics in Health Research 4. Writing a Scientific Paper 5. Making a Scientific Presentation & Searching the Literature

INTRODUCTION TO COMPUTER/INFORMATION TECHNOLOGY & SOFTWARE (5 DAYS)	
LEARNING OBJECTIVES	**TOPICS TO BE COVERED**
By the end of this workshop student should be able to: • Appropriately start up and shut down your computer. • Navigate the operating system and start applications. • Perform basic functions of file management. • Perform basic functions in a word processor and spreadsheet. • Manage print settings and print documents. • Receive and send email. • Use a web browser to navigate the Internet. • work with windows, toolbars, and command menus • perform basic word processing and graphic tasks • make a Power Point presentation • explore Web browsing basics • back up files • save, copy, and organize your workto enter data accurately in software of Statistic al Package for Social Sciences	1. Hardware and Software • Understand the function of communication devices • Understand the role of Operating Systems, programs and apps. 2.Windows • Turning on the computer and logging on. • The Windows screen. • Running programs from the Start Menu. • Minimising, maximising, moving, resizing and closing windows. • Logging off and shutting down your computer. 3.Working with Programs • Running multiple programs. • Desktop icons and creating a desktop shortcut. • Managing programs from the taskbar. • Closing programs. 4.File Management • Managing Windows Explorer. • Creating, moving, renaming and deleting folders and files. • Understandings file extensions. • Viewing storage devices and network connections. • Managing USB flash drives. 5.Word Processing • Creating documents in Microsoft Word. • Typing text, numbers and dates into a document. • Easy formatting. • Checking the spelling in your document. • Making and saving changes to your document.

	6.Power Point • Making Power Point presentation 7.Spreadsheets • Understanding spreadsheet functionality. • Creating spreadsheets in Microsoft Excel. • Typing text numbers and dates into a worksheet. • Easy formulas. • Easy formatting. • Charting your data. • Making and saving changes to your workbook. • Printing a worksheet. 8.Printing • Print preview. • Print settings. • Managing the print queue. 9.Using Email • The Outlook mail screen elements. • Composing and sending an email message. • Managing the Inbox. 10.Accessing the Internet • Going to a specific website and bookmarking. • Understanding how to search/Google effectively. • Copy and paste Internet content into your documents and emails. • Stopping and refreshing pages. • Demystifying the Cloud. • Understanding social media platforms such as Facebook and Twitter. • Computer security best practices. 11.Statistical Package for Social Sciences • general understanding for data entry

COMMUNICATION SKILLS (3 DAYS)	
LEARNING OBJECTIVES	**TOPICS TO BE COVERED**
• To learn to use Non-medicinal Interventions in Communication Skills of Clinical Practice • To discuss the importance of counseling • To role play as a counselor • To learn to manage a conflict resolution • To learn to break a bad news • To discuss the importance of Medical Ethics, Professionalism and Doctor-Patient Relationship Hippocratic Oath • To learn to take an informed consent • To illustrate the importance of confidentiality • To summarize Ethical Dilemmas in a Doctor's Life	1. Use of Non-medicinal Interventions in Clinical Practice Communication Skills 2. Counseling 3. Informational Skills 4. Crisis Intervention/Disaster 5. Management Conflict Resolution 6. Breaking Bad News 7. Medical Ethics, Professionalism and Doctor-Patient Relationship Hippocratic Oath 8. Four Pillars of MedicalEthics (Autonomy, Beneficence, Non-malficence and Justice) 9. Informed Consent and Confidentiality 10. Ethical Dilemmas in a Doctor's Life

CLINICAL AUDIT (2 DAYS)	
LEARNING OBJECTIVES	**TOPICS TO BE COVERED**
Road Map for workshop: Step 1:Topic selection Step 2: Setting of criteria and standards Step 3: First data collection Step 4: Evaluation and comparison with criteria and standards Step 5: Implementation of change Step 6: Second data collection – evaluation of change The following are factors that may affect your choice of audit topic: • Strong impact on health • Convincing evidence available about appropriate care • Common condition which can be clearly defined • Good reasons of believing that current performance can be improved • Readily accessible data which can be collected within a reasonable length of time • Consensus on the audit topic among the practice members	1. To understand clinical audit process. To help clinicians decide exactly why they are doing a particular audit and what they want to achieve through carrying out the audit. 2. To determine, how clinical audit relates to other activities related to accountability for the quality and safety of patient care. 3. To select the right subject for audit. 4. To use evidence of good practice in designing clinical audits. 5. To help clinicians formulate measures of quality based on evidence of good practice, as the basis for data collection and also to develop data collection protocols and tools and advise on data collection for clinical audits. 6. To help in understanding how to handle data protection issues related to clinical audit. 7. To understand use of statistics for analyzing and presenting findings of data collection and thus help clinicians to analyze causes of problems that are affecting the quality of care. This helps in applying principles and strategies for taking action to achieve changes in clinical practice. 8. To help clinicians manage review of clinical audit findings with their colleagues. 9. To be able to prepare clinical audit reports. 10. To recognize and handle ethics issues related to clinical audit.

ADVANCED CARDIAC LIFE SUPPORT (4 DAYS)	
LEARNING OBJECTIVES	**TOPICS TO BE COVERED**
Upon successful completion of the workshop, the student will be able to: • Recognize and initiate early management of pre-arrest conditions that may result in cardiac arrest or complicate resuscitation outcome • Demonstrate proficiency in providing BLS care, including prioritizing chest compressions and integrating automated external defibrillator (AED) use • Recognize and manage respiratory arrest • Recognize and manage cardiac arrest until termination of resuscitation or transfer of care, including immediate post-cardiac arrest care • Recognize and initiate early management of ACS, including appropriate disposition • Recognize and initiate early management of stroke, including appropriate disposition • Demonstrate effective communication as a member or leader of a resuscitation team and recognize the impact of team dynamics on overall team	The workshop is designed to give students the opportunity to practice and demonstrate proficiency in the following skills used in resuscitation: 1. Systematic approach 2. High-quality BLS 3. Airway management 4. Rhythm recognition 5. Defibrillation 6. Intravenous (IV)/intraosseous (IO) access (information only) 7. Use of medications 8. Cardioversion 9. Transcutaneous pacing 10. Team dynamics 11. Reading and interpreting electrocardiograms (ECGs) - Be able to identify—on a monitor and paper tracing—rhythms associated with bradycardia, tachycardia with adequate perfusion, tachycardia with poor perfusion, and pulseless arrest. These rhythms include but are not limited to: Normal sinus rhythm, Sinus bradycardia, Type I second-degree AV block, Type II second-degree, AV block, Third-degree AV block, Sinus tachycardia, Supraventricular tachycardias, Ventricular tachycardia, Asystole, Ventricular fibrillation, Organized rhythm without a pulse 12. Basic understanding of the essential drugs used in: Cardiac arrest, Bradycardia, Tachycardia with adequate perfusion, Tachycardia with poor perfusion, Immediate post–cardiac arrest care

Rawalpindi Medical University
Department of Critical Care Medicine

ASSESSMENT

UNIVERSITY RESIDENCY PROGRAM OF RAWALPINDI MEDICAL UNIVERSITY: THE ASSESSMENT STRATEGIES FOR MD CRITICAL CARE MEDICINE

THE VISION

To improve health care and population health by assessing and advancing the quality of resident physician's education through accreditation.

THE MISSION

We imagine a world characterized by:

- A structured approach to evaluating the competency of all residents and fellows
- Motivated physician role Models leading all program of the university.
- High quality, supervised, humanistic clinical educational experience, with customized formative feedback.
- Clinical learning environments characterized by excellence in clinical care, safety of patients, doctors and paramedics and professionalism.
- Residents and fellows achieving specific proficiency prior to graduation.
- Residents and fellows are prepared to be Virtuous Physicians who place the needs and well-being of patients first

THE VALUES

- Honesty and Integrity
- Excellence and Innovation
- Accountability and Transparency
- Fairness and Equity
- Stewardship and Service
- Engagement of Stakeholders
- Leadership and Collaboration

BACK GROUND/ RATIONALE

- Need for Modernization of the Post Graduate Medical Training in the country.

- Need for structuration of all the components of Post Graduate Medical training in Pakistan.
- Need for better Monitoring of the System for better out comes.

AIMS

- To fulfil the need of Modernization of the Assessment strategies.
- To structure the Assessment strategies.
- To shift the paradigm from an Examination Oriented System towards a Training Oriented System.

THE CHARACTERISTICS OF THE DOCUMENT ON ASSESSMENT STRATEGIES

Following aspects are tried to be accomplished while synthesis of this document on assessment strategies for MD Critical Care Medicine University Residency Program:

- Should be Technically Sound
- Should be acceptable by all the stakeholders
- Should bed feasible for implementation
- Should be concise
- Should be according to the need of our educational system
- Should be reproducible / can be nationalized
- Should be sustainable
- Should be able to assesses all required competencies accurately

Few definitions before we proceed further made to be clear:

1. What Is Competency?

The ability to do something successfully or efficiently.

2. What Is Competence?

Competency is described what an individual is enable to do while performance should describe what an individual actually does in clinical practice. The terms “performance” and “competency” are often used interchangeably.

3. What is performance based assessment of curriculum?

Performance based assessment measures students’ ability to apply the skills & knowledge learned from a unit of study.

4. What is work place based assessment of curriculum?

The apprenticeship model of medical training has existed for thousands of years: the apprentice learns from watching the master and the master in turn observe the apprentice's performance & helps them improve. Performance assessment not therefore a new concept higher work in modern healthcare environment with its discourse of accountability, performance assessment increasing role In ensuring that professionals develop and maintain the knowledge and skills required for practice. However now it will be done in a structured manner.

5. What is a Formative Assessment?

• Such an Assessment which creates learning itself, from one's deficiencies. • It is non-threatening for the students because it does not decide pass or fail.

• Provision of Feed back to the students is essential component of Formative Assessment

6. What is a Summative Assessment?

• Criteria Based High Stake Examinations

• Provision of Feedback to the students is not essential for Summative Examinations

7. What is continuous Internal Assessment?

A collection of Formative Assessments is called Continuous Internal Assessment

BASIS OF CURRICULUM AND ASSESSMENT OF MD CRITICAL CARE MEDICINE OF RAWALPINDI MEDICAL UNIVERSITY RAWALPINDI

The curriculum of MD Critical Care Medicine of Rawalpindi Medical University Rawalpindi is derived from Accreditation Council for Graduate Medical Education which is competency / performance based system depends upon six which are further divided into twelve competencies to match curriculum of ESICM (European Society of Intensive Care Medicine).

Details about various competencies required for MD Critical Care Medicine along with brief details of Teaching Strategies, Type of Assessment, Weightage given to the competency & Tools of Assessment

Sr. No	Competency to be assessed	Teaching & learning strategies	Type of Assessment for the competency to be assessed	% Weightage of the competency	Tools of Assessment
1.	**Medical knowledge**	Case based discussion & problem based learning, large group interactive session, self-directed learning, teaching rounds, and literature search.	Formative Assessment leading to continue internal assessment and also summative assessment in high stake exams	**55% for both Medical Knowledge and Patient Care**	MCQs, SEQs, Directly observe procedure, mini clinical examinations, charts, OSCE, teaching ward rounds, case discussion, seminars, topic presentation
2.	**Patient care**	Case based discussion, teaching rounds, morbidity & mortality meetings, 360^0 feedback evaluation, DOPS, long case/ short case discussions OPDs, emergency indoor workshops, hands on trainings.	Formative assessment leading to continue internal assessment and also summative assessment in high stake exams		Teaching rounds, case base discussion, presentations, CPC participations, clinical management, problem base learning, peer assisted learning, dealing with paramedics & patient attendants
3.	**Professionalism**	Teaching rounds, known conferences, workshops, hands on training, CPC, morbidity & mortality meetings, journal club	Formative assessment leading to continue internal assessment	**25% for both professionalism & interpersonal communication skills**	Working in OPDs, wards, emergency DOPs, clinical case discussion, dealing with paramedics, meeting with supervisor & mentors, mini clinical examination
4.	**Interpersonal & communication skills**	Teaching rounds, hands on training, workshops related to research methodology, SPSS, data entry, LGIS, session with supervisor & mentors, session with research units, SDL,	Formative assessment leading to continuous internal assessment		Multi source & 360 degree evaluation.
5.	**Practice based learning**	Case based discussion, teaching rounds, known conferences, morbidity & mortality meetings, OPDs, emergency indoor workshops, hands on trainings.	Formative assessment leading to continuous internal assessment Multi source & 360 degree evaluation (Logbook & portfolio)	**10% for both Practice Based & System Based Learning**	Working in ICUs, emergency DOPs, clinical case discussion, dealing with paramedics, meeting with supervisor & mentors, mini clinical examination
6.	**System based learning**	Working in wards, OPDs, Emergency	Formative assessment leading to continuous internal assessment Multi source & 360 degree evaluation (Logbook & portfolio)		Working in ICUs, emergency DOPs, clinical case discussion, dealing with paramedics, meeting with supervisor & mentors, mini clinical examination
7.	**Research**	Large group Interactive sessions on Research, hands on training & workshops, practical work of research including literature search, finding research question, synopsis writing, data collection, data analysis, thesis writing	Formative leading to continuous internal assessment Multi source & 360 degree evaluation (Logbook & portfolio)&also Summative assessment	**10%**	Approval of research topic and synopsis & thesis from URTMC, Board of Advanced studies and Research and ethical review board, Requirement of Completion certificate of research workshops as eligibility criteria for examinations, Defense of Thesis examination

LEVEL OF COMPETENCY DISCRIPTOR

Cognitive domain –C (Knowledge)		
Level of Domain	**Stands For**	**Details**
C1	Remembering	Ability to remember facts without necessarily understanding.
C2	Understanding	Ability to understand and interpret learned information
C3	Applying	Ability to use learned material in new situation
C4	Analysing	Ability to breakdown information into its components
C5	Evaluating	Ability to put parts together
C6	Creating	Ability to combine elements into a pattern not clearly there before
Psychomotor Domain –P (Skills)		
Level of Domain	**Stands For**	**Details**
P1	Imitation	Observe other person behaviour and copy it
P2	Manipulation	Ability to perform skills by following the instructions
P3	Precision	Ability to perform skill with minimal errors and more precision
P4	Articulation	Ability to solve and modify skills to fit new requirements
P5	Naturalisation	Ability to perform the skills with perfection.
Attitude Domain –A (Professionalism)		
Level of Domain	**Stands For**	**Details**
A1	Receiving	Awareness, willingness to hear, selected attention
A2	Responding	Willingness to respond, or satisfaction in responding
A3	Valuing	Refers to voluntarily giving worth to an object phenomenon or stimulus
A4	Organization	Involves building an internally consistent value system

Workplace-Based Assessment Tools Key

D	Direct Observation of Procedural Skills [DOPS]	C	Case-Based Discussion [CBD]	T	Acute Care Assessment Tool [ACAT]
I	ICM Mini-Clinical Evaluation Exercise [I-CEX]	M	Multi-source Feedback [MSF]	S	Simulation

Direct Observation of Procedural Skills (DOPS)

A DOPS is an assessment tool designed to evaluate the performance of a trainee in undertaking a practical procedure, against a structured checklist. The trainee receives immediate feedback to identify strengths and areas for development.

Intensive Care Mini -Clinical Evaluation Exercise (I-CEX)

This tool evaluates a clinical encounter with a patient to provide an indication of competence in skills essential for good clinical care such as history taking, examination and clinical reasoning. The trainee receives immediate feedback to aid learning. This can be used at any time and in any setting when there is a trainee and patient interaction and an assessor is available.

Case-based Discussion (CBD)

The CbD assesses the performance of a trainee in their management of a patient to provide an indication of competence in areas such as clinical reasoning, decision-making and application of medical knowledge in relation to patient care. It also serves as a method to document conversations about, and presentations of, cases by trainees. The CbD should focus on a written record (such as written case notes, out-patient letter,and discharge summary). A typical encounter might be when presenting newly referred patients in the out- patient department.

Multi-Source Feedback (MSF): 360-Degree Evaluation Instrument

360-degree evaluations consist of measurement tools completed by multiple people in a person's sphere of influence. Evaluators completing rating forms in a 360-degree evaluation usually are superiors, peers, subordinates, and patients and families. Most 360-degree evaluation processes use a survey or questionnaire to gather information about an individual's performance on several topics (e.g., teamwork, communication, management skills & decision-

making). Most 360-degree evaluations use rating scales to assess how frequently a behavior is performed (e.g., a scale of 1 to 5, with 5 meaning “all the time” and 1 meaning “never”). The ratings are summarized for all evaluators by topic and overall to provide feedback. Evaluators provide more accurate and less lenient ratings when the evaluation is intended to give formative feedback rather than summative evaluations. A 360-degree evaluation can be used to assess interpersonal and communication skills, professional behaviors, and some aspects of patient care and systems-based practice.

Acute Care Assessment Tool (ACAT)

The ACAT is designed to assess and facilitate feedback on a doctor’s performance during their practice on the Acute Medical Take. Any doctor who has been responsible for the supervision of the Acute Medical Take can be the assessor for an ACAT.

Simulations And Models

Simulations used for assessment of clinical performance closely resemble reality and attempt to imitate but not duplicate real clinical problems. Key attributes of simulations are that: they incorporate a wide array of options resembling reality, allow examinees to reason through a clinical problem with little or no cueing, permit examinees to make life-threatening errors without hurting a real patient, provide instant feedback so examinees can correct a mistaken action, and rate examinees’ performance on clinical problems that are difficult or impossible to evaluate effectively in other circumstances. Simulation formats have been developed as paper-and- pencil branching problems (patient management problems or PMPs), computerized versions of PMPs called clinical case simulations (CCX®), role-playing situations (e.g., standardized patients (SPs), clinical team simulations), anatomical models or mannequins, and combinations of all three formats. Mannequins are imitations of body organs or anatomical body regions frequently using pathological findings to simulate patient disease. The models are constructed of vinyl or plastic sculpted to resemble human tissue with imbedded electronic circuitry to allow the mannequin to respond realistically to actions by the examinee. Virtual reality simulations or environments (VR) use computers sometimes combined with anatomical models to mimic as much as feasible realistic organ and surface images and the touch sensations (computer generated haptic responses) a physician would expect in a real patient. The VR environments allow assessment of procedural skills and other complex clinical tasks that are difficult to assess consistently by other assessment methods. Simulations using VR environments have been developed to train and assess surgeons performing arthroscopy of the knee and other large joints, anesthesiologists managing life-threatening critical incidents during surgery, surgeons performing wound debridement and minor surgery, and medical students and residents responding to cardio-pulmonary incidents on a full-size human mannequin. Written and computerized simulations have been used to assess clinical reasoning, diagnostic plans and treatment for a variety of clinical disciplines as part of licensure and certification examinations.

FINAL EXAMINATION

The final MD Critical Care Medicine examination will be conducted after the completion of training. Examination dates will be announced by the university on annual basis. The Vice Chancellor of the university reserves the right to change the dates of examinations.

Eligibility of final examination

A candidate will be eligible for appearing in Witten part of final examination if he/she has completed

i. 24 months of training including rotational training
ii. Completed the research program as approved by the university
iii. Completed and submitted the Logbook
iv. Approved Research Proposal from ORIC,BASR or a research paper is accepted in no less than category “Y” of the HEC
v. Has attained the Certification of Completion of Training from the university
vi. Candidate who has passed the written examination will be eligible for appearing in the OSCE

Structure of Final Examination

The final examination will include

i. MCQ based written examination of 100 MCQs
ii. OSCE of 10 stations

WRITTEN EXAMINATION (MCQ)

A written or computer-based MCQ examination is composed of multiple-choice questions (MCQ) selected to sample medical knowledge and understanding of a defined body of knowledge, not just factual or easily recalled information. Each question or test item contains an introductory statement followed by four or five options in outline format. The examinee selects one of the options as the presumed correct answer by marking the option on a coded answer sheet. Only one option is keyed as the correct response. The introductory statement often presents a patient case, clinical findings, or displays data graphically. A separate booklet can be used to display pictures, and other relevant clinical information. In computer-based examinations the test items are displayed on a computer monitor one at a time with pictures and graphical images also displayed directly on the monitor. In a computer-adaptive test fewer test questions are needed because test items are selected based upon statistical rules programmed into the computer to quickly measure the examinee’s ability. Medical knowledge and understanding can be measured by MCQ examinations. Comparing the test scores on in-training examinations

with national statistics can serve to identify strengths and limitations of individual residents to help them improve. Comparing test results aggregated for residents in each year of a program can be helpful to identify residency training experiences that might be improved.

OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE)

In an objective structured clinical examination (OSCE) one or more assessment tools are administered at 12 to 20 separate standardized patient encounter stations, each station lasting 10-15 minutes. Between stations candidates may complete patient notes or a brief written examination about the previous patient encounter. All candidates move from station to station in sequence on the same schedule. Standardized patients are the primary assessment tool used in OSCEs, but OSCEs have included other assessment tools such as data interpretation exercises using clinical cases and clinical scenarios with mannequins, to assess technical skills. OSCEs have been administered in most of the medical schools worldwide, many residency programs, and by the licensure board examinations. The OSCE format provides a standardized means to assess: physical examination and history taking skills; communication skills with patients and family members, breadth and depth of knowledge; ability to summarize and document findings; ability to make a differential diagnosis, or plan treatment; and clinical judgment based upon patient notes.

PORTFOLIOS

A portfolio is a collection of products prepared by the resident that provides evidence of learning and achievement related to a learning plan. A portfolio typically contains written documents but can include video- or audio-recordings, photographs, and other forms of information. Reflecting upon what has been learned is an important part of constructing a portfolio. In addition to products of learning, the portfolio can include statements about what has been learned, its application, remaining learning needs, and how they can be met. In graduate medical education, a portfolio might include a log of clinical procedures performed; a summary of the research literature reviewed when selecting a treatment option; a quality improvement project plan and report of results; ethical dilemmas faced and how they were handled; a computer program that tracks patient care outcomes; or a recording or transcript of counselling provided to patients. Portfolios can be used for both formative and summative evaluation of residents. Portfolios are most useful for evaluating mastery of competencies that are difficult to evaluate in other ways such as practice-based improvement, use of scientific evidence in patient care, professional behaviours, and patient advocacy. Teaching experiences, morning report, patient rounds, individualized study or research projects are examples of learning experiences that lend themselves to using portfolios to assess residents.

DETAILS OF COMPETENCIES AS PER THEIR LEVEL IN ASSESSMENT, WEIGHTAGE IN FINAL EXAMINATION (MCQ/OSCE) & WBA TOOLS

Domain and Competencies	SUMMATIVE ASSESSMENT									FORMATIVE ASSESSMENT	
	Level of Competency/% in Assessment						%Weightage Overall	%Weightage in MCQs	%Weightage in OSCE	Timeline in Months	Other Assessment Tools
	C	%	P	%	A	%					
Domain 1: Resuscitation and management of the acutely ill patient (MCQs = NIL , OSCE = 1 STATION)											
1.1 Adopts a structured and timely approach to the recognition, assessment and stabilisation of the acutely ill patient with disordered physiology	C3		P2		A4					4	I, C, M, T, S
1.2 Manages cardiopulmonary resuscitation – ALS recommended	C3-5	30%	P5	60%	A4	10%	1.5%		3%	3	I, M, T, S
1.3 Manages the patient post resuscitation	C3,4		P3		A2					4	I, M, T, S
1.4 Triages and prioritises patients appropriately, including timely admission to ICU	C3		P3		A2					3	C, M, T
1.5 Assesses and provides initial management of the trauma patient	C5		P3		A2					12	D, I, M, T, C, S
1.6 Assesses and provides initial management of the patient with burns	C3		P3		A2					12	D, I, M, T, C
1.7 Describes the management of mass casualties	C3		P1		A2					6	C
Domain 2: Diagnosis, Assessment, Investigation, Monitoring and Data Interpretation (MCQS = 27, OSCE = 1 STATION)											
2.1 Obtains a history and performs an accurate clinical examination	C3	25%	P3,4	40%	A4	35%	0.5%		1%	2	I, M
2.2 Undertakes timely and appropriate investigations	C3		P3-5		A3					3	I, C, M
2.3 Performs electrocardiography (ECG / EKG) and interprets the results	C2	55%	P5	40%	A2	5%	3.5%	5%	2%	1	D, I, C
2.4 Obtains appropriate microbiological samples and interprets results	C2-5	35%	P3	65%	A1		5%	9%	1%	1	D, C
2.5 Obtains and interprets the results from blood gas samples	C4-5	75%	P3,4	25%	A1		4%	7%	1%	6	D, C
2.6 Interprets imaging studies	C4-5	100%	P3-5		A1		1%		2%	18	I, C
2.7 Monitors and responds to trends in physiological variables	C4	85%	P5	15%	A1		3.5%	6%	1%	8	I, T, S
2.8 Integrates clinical findings with laboratory investigations to form a differential diagnosis	C5	100%	P3		A1		0.5%		1%	6	I, C, T, S
Domain 3: Disease Management (MCQs = 35, OSCE = 1 STATION)											
3.1 Manages the care of the critically ill patient with specific acute medical conditions	C3	40%	P3,4	55%	A4	5%	1.5%	2%	1%	6	D, I, C, M, T, S
3.2 Identifies the implications of chronic and co-morbid disease in the acutely ill patient	C3-5	80%	P3-5	20%	A2	-	2%	3%	1%	9	C
3.3 Recognises and manages the patient with circulatory failure	C3,4	50%	P5	50%	A2		2.5%	3%	2%	6	I, C, T, S
3.4 Recognises and manages the patient with, or at risk of, acute renal failure	C3	50%	P3	40%	A2	10%	2.5%	3%	2%	9	I, C, T
3.5 Recognises and manages the patient with, or at risk of, acute liver failure	C5	60%	P3,4	35%	A2	5%	2.5%	3%	2%	4	I, C, T
3.6 Recognises and manages the patient with neurological impairment	C3	65%	P3-5	30%	A2	5%	2.5%	3%	2%	3	I, C, T, S
3.7 Recognises and manages the patient with acute gastrointestinal failure	C3-5	50%	P5	45%	A2	5%	2.5%	3%	2%	2	I, C, T

Domain and Competencies	Level of Competency/% in Assessment						%Weightage Overall	%Weightage in MCQs	%Weighage in OSCE	Timeline in Months	Other Assessment Tools
	C	%	P	%	A	%					
3.8 Recognises and manages the patient with severe acute respiratory failure / acute lung injury syndromes (ALI / ARDS)	C3,4	35%	P3	55%	A2	10%	3.5%	5%	2%	3	I, C, T
3.9 Recognises and manages the septic patient	C3	70%	P3-5	25%	A2	5%	3%	4%	2%	3	I, C, T
3.10 Recognises and manages the patient following intoxication with drugs or environmental toxins	C5	80%	P5	15%	A2	5%	2.5%	3%	2%	3	I, C, S
3.11 Recognises life-threatening maternal peripartum complications and manages care	C4	45%	P3	50%	A2	5%	2.5%	3%	2%	6	I, C, S
Domain 4: Therapeutic interventions / Organ support in single or multiple organ failure (MCQs = 25, OSCE = 1 STATION)											
4. 1 Prescribes drugs and therapies safely	C3	10%	P3,4	80%	A2	10%	1.5%	2%	1%	1	D, C, M
4.2 Manages antimicrobial drug therapy	C3-5	20%	P3-5	75%	A2	5%	3.5%	4%	3%	4	I, C, M
4.3 Administers blood and blood products safely	C3,4	5%	P5	90%	A2	5%	2%	3%	1%	1	D, C, M
4.4 Uses fluids and vasoactive / inotropic drugs to support the circulation	C3	25%	P3,4	70%	A2	5%	3%	4%	2%	2	I, C
4.5 Describes the use of mechanical assist devices to support the circulation	C3-5		P3-5		A2					6	C
4.6 Initiates, manages, and weans patients from invasive and non-invasive ventilatory support	C3,4	30%	P5	70%	A4		2%	4%		12	D, C, T
4.7 Initiates, manages and weans patients from renal replacement therapy	C3	35%	P3	60%	A4	5%	2%	4%		18	D, I, C, T
4.8 Recognises and manages electrolyte, glucose and acid-base disturbances	C5	85%	P3-5	10%	A2	5%	3%	3%	3%	3	I, C, T, S
4.9 Co-ordinates and provides nutritional assessment and support	C3	70%	P2	5%	A4	25%	1.5%	1%	2%	18	I, C, T
Domain 5: Practical procedures (MCQs = NIL , OSCE = 2 STATIONS)											
5.1 Administers oxygen using a variety of administration devices	C3	10%	P3,4	88%	A2	2%	0.5%		1%	6	D, S
5.2 Performs emergency airway management	C3-5	15%	P3-5	80%	A2	5%	1%		2%	10	D, S
5.3 Performs difficult and failed airway management according to local protocols	C3,4	25%	P5	70%	A2	5%	0.5%		1%	20	D, S
5.4 Performs endotracheal suction	C3	15%	P3	85%	A2		0.5%		1%	1	D
5.5 Performs fibreoptic bronchoscopy and BAL in the intubated patient	C5	25%	P3-5	70%	A2	5%	0.5%		1%	24	D, M
5.6 Performs percutaneous tracheostomy	C3	20%	P3,4	75%	A2	5%	0.5%		1%	24	D, M, S
5.7 Performs chest drain insertion	C3-5	15%	P3-5	80%	A2	5%	1%		2%	24	D
5.8 Performs arterial catheterisation	C3,4	15%	P5	85%	A2		0.5%		1%	6	D, C
5.9 Performs ultrasound techniques for vascular localisation	C3	10%	P3	85%	A2	5%	0.5%		1%	6	C
5.10 Performs central venous catheterisation	C5	20%	P3-5	78%	A2	2%	1%		2%	6	D, C
5.11 Performs defibrillation and cardioversion	C3	40%	P3,4	60%	A2		1%		2%	3	D, C, S
5.12 Performs transthoracic cardiac pacing, describes transvenous	C3-5	20%	P3-5	78%	A2	2%	0.5%		1%	18	D, C
5.13 Describes how to perform pericardiocentesis	C3,4	100%	P5		A2		0.5%		1%	6	C

Domain and Competencies	Level of Competency/% in Assessment						%Weightage Overall	%Weightage in MCQs	%Weighage in OSCE	Timeline in Months	Other Assessment Tools
	C	%	P	%	A	%					
5.14 Demonstrates a method for measuring cardiac output and derived haemodynamic variables	C3	85%	P3	15%	A2		0.5%		1%	6	D, C
5.15 Performs lumbar puncture (intradural / 'spinal') under supervision	C5	10%	P3,4	88%	A2	2%	1%		2%	9	D, S
5.16 Manages the administration of analgesia via an epidural catheter	C3	12%	P3-5	85%	A2	3%	0.5%		1%	24	I
5.17 Performs abdominal paracentesis	C3-5	12%	P5	85%	A2	3%	0.5%		1%	3	D
5.18 Describes Sengstaken tube (or equivalent) placement	C3,4	100%	P3		A2		0.5%		1%	4	C
5.19 Performs nasogastric tube placement	C3	7%	P3-5	92%	A2	1%	0.5%		1%	2	D
5.20 Performs urinary catheterisation	C5	5%	P3	95%	A2		0.5%		1%	1	D
Domain 6: Perioperative care (MCQs = NIL, OSCE = NIL)											
6.1 Manages the pre- and post-operative care of the high risk surgical patient	C3		P3,4		A2					12	C, M, T
6.2 Manages the care of the patient following cardiac surgery	C3-5		P3-5		A2					18	C
6.3 Manages the care of the patient following craniotomy	C3,4		P5		A2					12	C, T
6.4 Manages the care of the patient following solid organ transplantation	C3		P3		A2					24	C
6.5 Manages the pre- and post-operative care of the trauma patient under supervision	C5		P3-5		A2					24	C, T
Domain 7: Comfort and recovery (MCQs = 5, OSCE = 1 STATION)											
7.1 Identifies and attempts to minimise the physical and psychosocial consequences of critical illness for patients and families	C3	25%	P3,4	15%	A4	60%	0.5%		1%	3	M, C
7.2 Manages the assessment, prevention and treatment of pain and delirium	C3-5	35%	P3-5	50%	A2	15%	1.5%	2%	1%	6	D, I, C, M, T
7.3 Manages sedation and neuromuscular blockade	C3,4	40%	P5	60%	A2		2.5%	3%	2%	3	D, I, C, M, T
7.4 Communicates the continuing care requirements, including rehabilitation, of patients at ICU discharge to health care professionals, patients and relatives	C3	5%	P3	10%	A3	85%	0.5%		1%	12	M, T, S
7.5 Manages the safe and timely discharge of patients from the ICU	C5		P3-5		A4					12	M, T
Domain 8: End of life care (MCQs = 5, OSCE = 1 STATION OPTIONAL)											
8.1 Manages the process of withholding or withdrawing treatment with the multi-disciplinary team	C3	10%	P3,4	15%	A2	75%	0.5%		1%	20	C, M
8.2 Discusses end of life care with patients and their families / surrogates	C3-5	5%	P3-5	40%	A4	55%	0.5%		1%	12	C, M, D
8.3 Manages palliative care of the critically ill patient	C3,4	65%	P5	30%	A2	5%	1%	2%		6	C, M, T
8.4 Performs brain-stem death testing	C3	15%	P3	85%	A2		1%	1%	1%	12	D, S
8.5 Manages the physiological support of the organ donor	C5	35%	P3-5	55%	A2	10%	1.5%	2%	1%	24	I, C
8.6 Manages donation following cardiac death	C3	5%	P3	55%	A4	40%	0.5%		1%	24	C, T, S

Domain and Competencies	Level of Competency/% in Assessment						%Weightage Overall	%Weightage in MCQs	%Weighage in OSCE	Timeline in Months	Other Assessment Tools
	C	%	P	%	A	%					
Domain 9: Paediatric care (MCQs = NIL, OSCE = NIL)											
9.1 Describes the recognition of the acutely ill child and initial management of paediatric emergencies	C2	75%	P3	22%	A2	3%	0.5%		1%		I, C, S
9.2 Describes national legislation and guidelines relating to child protection and relevance to critical care	C2		P3		A4						C
Domain 10: Transport (MCQs = NIL, OSCE = NIL)											
10.1 Undertakes transport of the mechanically ventilated critically ill patient outside the ICU	C3	25%	P5	70%	A2	5%	0.5%		1%	6	D, I, C, M
Domain 11: Patient safety and health systems management (MCQs = 3, OSCE = 1 STATION)											
11.1 Leads a daily multidisciplinary ward round	C3		P3,4		A3					18	M
11.2 Complies with local infection control measures	C3-5		P3-5		A4					3	C, M
11.3 Identifies environmental hazards and promotes safety for patients and staff	C3,4	25%	P5	30%	A3	45%	1%	1%	1%	3	C, M
11.4 Identifies and minimises risk of critical incidents and adverse events, including complications of critical illness	C3	65%	P3,4	30%	A1	5%	2.5%	2%	3%	12	C, M
11.5 Organises a case conference	C3-5		P3-5		A2					12	C, M
11.6 Critically appraises and applies guidelines, protocols and care bundles	C3,4	45%	P5	55%	A4		1.5%		3%	12	C
11.7 Describes commonly used scoring systems for assessment of severity of illness, case mix and workload	C3	95%	P3	5%	A4		1%		2%	12	C
11.8 Demonstrates an understanding of the managerial and administrative responsibilities of the CCM specialist	C5		P3-5		A4					18	C, M
Domain 12: Professionalism (MCQs = NIL, OSCE = 1 STATION)											
12.1 Communicates effectively with patients and relatives	C3	5%	P3,4	25%	A3	70%	0.5%		1%	6	D, M, T, S
12.2 Communicates effectively with members of the health care team	C3-5	5%	P3-5	20%	A3	75%	0.5%		1%	12	D, M, S
12.3 Maintains accurate and legible records / documentation	C3,4	15%	P5	40%	A2	45%	0.25%		0.5%	3	D, M, T
12.4 Involves patients (or their surrogates if applicable) in decisions about care and treatment	C3	5%	P3	55%	A4	40%	0.5%		1%	3	C, M, T
12.5 Demonstrates respect of cultural and religious beliefs and an awareness of their impact on decision making	C5	35%	P3-5	30%	A4	35%	0.5%		1%	6	C, M, T
12.6 Respects privacy, dignity, confidentiality and legal constraints on the use of patient data	C3	15%	P3,4	40%	A4	45%	0.5%		1%	1	C, M
12.7 Collaborates and consults; promotes team-working	C3-5	5%	P3-5	55%	A3	40%	0.5%		1%	6	M

Domain and Competencies	Level of Competency/% in Assessment						%Weightage Overall	%Weightage in MCQs	%Weighage in OSCE	Timeline in Months	Other Assessment Tools
	C	%	P	%	A	%					
12.8 Ensures continuity of care through effective hand- over of clinical information	C3,4	10%	P5	40%	A3	50%	0.5%		1%	3	C, M, T, S
12.9 Supports clinical staff outside the ICU to enable the delivery of effective care	C3		P3	25%	A4	75%	0.5%		1%	3	C, M, T
12.10 Appropriately supervises, and delegates to others, the delivery of patient care	C5	5%	P3-5	15%	A3	80%	0.25%		0.5%	12	C, M, T
12.11 Takes responsibility for safe patient care	C3	10%	P3,4	50%	A2	40%	0.25%		0.5%	18	D, C, M, T
12.12 Formulates clinical decisions with respect for ethical and legal principles	C3-5	20%	P3-5	10%	A4	70%	0.25%		0.5%	12	C, M, T
12.13 Seeks learning opportunities and integrates new knowledge into clinical practice	C3,4		P5		A1					6	M
12.14 Participates in multidisciplinary teaching	C3		P3		A2					6	M
12.15 Participates in quality improvement under supervision	C5		P3-5		A2					6	M

THE TIMELINE OF TRAINING & WORK PLACE BASED ASSESSMENTS AGAINST CURRICULUM COMPETENCIES

Domain 1: Resuscitation and initial management of the acutely ill patient										
Competence	*Description*	**ACAT**	**CBD**	**DOPS**	**I-CEX**	**MSF**	**SIM**	**MCQ**	**OSCE**	**TIMELINE MONTHS**
1.1	Adopts a structured and timely approach to the recognition, assessment and stabilisation of the acutely ill patient with disordered physiology	√	√		√	√	√			4
1.2	Manages cardiopulmonary resuscitation	√			√	√	√		√	3
1.3	Manages the patient post resuscitation	√			√	√	√			4
1.4	Triages and prioritises patients appropriately, including timely admission to ICU	√	√			√				3
1.5	Assesses and provides initial management of the trauma patient	√	√	√	√	√	√			12
1.6	Assesses and provides initial management of the patient with burns	√	√	√	√	√				12
1.7	Describes the management of mass casualties		√							6
Domain 2: Diagnosis, Assessment, Investigation, Monitoring and Data Interpretation										
Competence	*Description*	**ACAT**	**CBD**	**DOPS**	**I-CEX**	**MSF**	**SIM**	**MCQ**	**OSCE**	**TIMELINE**
2.1	Obtains a history and performs and accurate clinical examination				√	√			√	2
2.2	Undertakes timely and appropriate investigations		√		√	√				3
2.3	Performs electrocardiography (ECG / EKG) and interprets the results		√	√	√			√	√	1
2.4	Obtains appropriate microbiological samples and interprets results		√	√				√	√	1
2.5	Obtains and interprets the results from blood gas samples		√	√				√	√	6
2.6	Interprets imaging studies		√		√				√	18
2.7	Monitors and responds to trends in physiological variables	√			√		√	√	√	8

2.8	Integrates clinical findings with laboratory investigations to form a differential diagnosis	√	√		√		√	√	√	6
Domain 3: Disease Management										
Competence	*Description*	**ACAT**	**CBD**	**DOPS**	**I-CEX**	**MSF**	**SIM**	**MCQ**	**OSCE**	**TIMELINE MONTHS**
3.1	Manages the care of the critically ill patient with specific acute mental conditions	√	√	√	√	√	√	√	√	6
3.2	Identifies the implications of chronic and co-morbid disease in the acutely ill patient		√					√	√	9
3.3	Recognises and manages the patient with circulatory failure	√	√		√		√	√	√	6
3.4	Recognises and manages the patient with, or at risk of, acute kidney injury	√	√		√			√	√	9
3.5	Recognises and manages the patient with, or at risk of, acute liver failure	√	√		√			√	√	4
3.6	Recognises and manages the patient with neurological impairment	√	√		√		√	√	√	3
3.7	Recognises and manages the patient with acute gastrointestinal failure	√	√		√			√	√	2
3.8	Recognises and manages the patient with acute lung injury syndromes (ALI / ARDS)	√	√		√			√	√	3
3.9	Recognises and manages the septic patient	√	√		√			√	√	3
3.10	Recognises and manages the patient following intoxication with drugs or environmental toxins		√		√		□	√	√	3
3.11	Recognises life-threatening maternal peripartum complications and manages care under		√		√		□	√	√	6
Domain 4: Therapeutic interventions / Organ support in single or multiple organ failure										
Competence	*Description*	**ACAT**	**CBD**	**DOPS**	**I-CEX**	**MSF**	**SIM**	**MCQ**	**OSCE**	**TIMELINE MONTHS**
4.1	Prescribes drugs and therapies safely		√	√		√		√	√	1
4.2	Manages antimicrobial drug therapy		√		√	√		√	√	4
4.3	Administers blood and blood products safely		√	√		√		√	√	1
4.4	Uses fluids and vasoactive / inotropic drugs to support the circulation		√		√			√	√	2

4.5	Describes the uses of mechanical assist devices to support the circulation		√						6
4.6	Initiates, manages, and weans patients from invasive and non-invasive ventilatory support	√	√	√				√	12
4.7	Initiates, manages and weans patients from renal replacement therapy	√	√	√	√			√	18
4.8	Recognises and manages electrolyte, glucose and acid-base disturbances	√	√		√		√	√	√	3
4.9	Co-ordinates and provides nutritional assessment and support	√	√		√			√	√	18
Domain 5: Procedures										
Competence	*Description*	**ACAT**	**CBD**	**DOPS**	**I-CEX**	**MSF**	**SIM**	**MCQ**	**OSCE**	**TIMELINE MONTHS**
5.1	Administers oxygen using a variety of administration devices			√			√		√	6
5.2	Performs emergency airway management			√			√		√	10
5.3	Performs difficult and failed airway management according to local protocols			√			√		√	20
5.4	Performs endotracheal suction			√					√	1
5.5	Performs fibreoptic bronchoscopy and BAL in the intubated patient under supervision			√		√			√	24
5.6	Performs percutaneous tracheostomy			√		√	√		√	24
5.7	Performs chest drain insertion			√					√	24
5.8	Performs arterial catheterisation		√	√					√	6
5.9	Performs ultrasound techniques for vascular localisation		√						√	6
5.10	Performs central venous catheterisation		√	√					√	6
5.11	Performs defibrillation and cardioversion		√	√			√		√	3
5.12	Performs transthoracic cardiac pacing describes transvenous		√	√					√	18
5.13	Describes how to perform pericardiocentesis		√						√	6
5.14	Demonstrates a method for measuring cardiac output and derived haemodynamic variables		√	√					√	6

5.15	Performs lumbar puncture (intradural / 'spinal') under supervision			√			√		√	9
5.16	Manages the administration of analgesia via an epidural catheter				√				√	24
5.17	Performs abdominal paracentesis			√					√	3
5.18	Describes Sengstaken tube (or equivalent) placement		√						√	4
5.19	Performs nasogastric tube placement in the intubated patient			√					√	2
5.20	Performs urinary catheterisation			√					√	1
Domain 6: Perioperative Care										
Competence	*Description*	**ACAT**	**CBD**	**DOPS**	**I-CEX**	**MSF**	**SIM**	**MCQ**	**OSCE**	**TIMELINE MONTHS**
6.1	Manages the pre- and post-operative care of the high risk surgical patient	√	√			√				12
6.2	Manages the care of the patient following cardiac surgery under supervision		√							18
6.3	Manages the care of the patient following craniotomy under supervision	√	√							12
6.4	Manages the care of the patient following solid organ transplantation under supervision		√							24
6.5	Manages the pre- and post-operative care of the trauma patient under supervision	√	√							24
Domain 7: Comfort and Recovery										
Competence	*Description*	**ACAT**	**CBD**	**DOPS**	**I-CEX**	**MSF**	**SIM**	**MCQ**	**OSCE**	**TIMELINE MONTHS**
7.1	Identifies and attempts to minimise the physical and psychosocial consequences of critical illness for patients and families		√			√			√	3
7.2	Manages the assessment, prevention and treatment of pain and delirium	√	√	√	√	√		√	√	6
7.3	Manages sedation and neuromuscular blockade	√	√	√	√	√		√	√	3

7.4	Communicates the continuing care requirements, including rehabilitation, of patients at ICU discharge to health care professionals, patients and relatives	√				√	√		√	12
7.5	Manages the safe and timely discharge of patients from the ICU	√				√				12
Domain 8: End of life care										
Competence	*Description*	**ACAT**	**CBD**	**DOPS**	**I-CEX**	**MSF**	**SIM**	**MCQ**	**OSCE**	**TIMELINE MONTHS**
8.1	Manages the process of withholding or withdrawing treatment with the multidisciplinary team		√			√			√	20
8.2	Discusses end of life care with patients and their families / surrogates		√	√		√			√	12
8.3	Manages palliative care of the critically ill patient	√	√			√		√		6
8.4	Performs brain-stem death testing			√			√	√	√	12
8.5	Manages the physiological support of the organ donor		√		√			√	√	24
8.6	Manages donation following cardiac death	√	√				√		√	24
Domain 9: Paediatric care										
Competence	*Description*	**ACAT**	**CBD**	**DOPS**	**I-CEX**	**MSF**	**SIM**	**MCQ**	**OSCE**	**TIMELINE MONTHS**
9.1	Describes the recognition of the acutely ill child and initial management of paediatric emergencies		√		√		√		√	24
9.2	Describes national legislation and guidelines relating to child protection and their relevance to critical care		√							24
Domain 10: Transport										
Competence	*Description*	**ACAT**	**CBD**	**DOPS**	**I-CEX**	**MSF**	**SIM**	**MCQ**	**OSCE**	**TIMELINE MONTHS**
10.1	Undertakes transport of the mechanically ventilated critically ill patient outside the ICU		√	√	√	√	√		√	6
Domain 11: Patient safety and health systems management										
Competence	*Description*	**ACAT**	**CBD**	**DOPS**	**I-CEX**	**MSF**	**SIM**	**MCQ**	**OSCE**	**TIMELINE MONTHS**
11.1	Leads a daily multidisciplinary ward round					√				18
11.2	Complies with local infection control measures		√			√				3
11.3	Identifies environmental hazards and promotes		√			√		√	√	3

	safety for patients and staff									
11.4	Identifies and minimises risk of critical incidents and adverse events, including complications of critical illness		√			√		√	√	12
11.5	Organises a case conference		√			√				12
11.6	Critically appraises and applies guidelines, protocols and care bundles		√						√	12
11.7	Describes commonly used scoring systems for assessment of severity of illness, case mix and workload		√						√	12
11.8	Demonstrates an understanding of the managerial and administrative responsibilities of the CCM specialist		√			√				18
Domain 12: Professionalism										
Competence	*Description*	**ACAT**	**CBD**	**DOPS**	**I-CEX**	**MSF**	**SIM**	**MCQ**	**OSCE**	**TIMELINE MONTHS**
12.1	Communicates effectively with patients and relatives	√		√		√	√		√	6
12.2	Communicates effectively with members of the health care team			√		√	√		√	12
12.3	Maintains accurate and legible records / documentation	√		√		√			√	3
12.4	Involves patients (or their surrogates if applicable) in decisions about care and treatment	√	√			√			√	3
12.5	Demonstrates respect of cultural and religious beliefs and an awareness of their impact on decision making	√	√			√			√	6
12.6	Respects privacy, dignity, confidentiality and legal constraints on the use of patient data		√			√			√	1
12.7	Collaborates and consults; promotes team-working					√	√		√	6
12.8	Ensures continuity of care through effective hand-over of clinical information	√	√			√			√	3
12.9	Supports clinical staff outside the ICU to enable the delivery of effective care	√	√			√				3
12.10	Appropriately supervises	√	√			√			√	12

12.11	Takes responsibility for safe patient care	√	√	√		√			√	18
12.12	Formulates clinical decisions with respect for ethical and legal principles	√	√			√			√	12
12.13	Seeks learning opportunities and integrates new knowledge into clinical practice					√				6
12.14	Participates in multidisciplinary teaching					√				6
12.15	Participates in quality improvement under supervision					√				6

Rawalpindi Medical University
Department of Critical Care Medicine

LOG-BOOK MD-CRITICAL CARE MEDICINE

PREFACE

The horizons of *Medical Education* are widening & there has been a steady rise of global interest in *Post Graduate Medical Education*, an increased awareness of the necessity for experience in education skills for all healthcare professionals and the need for some formal recognition of postgraduate training in Critical Care Medicine

We are seeing a rise in the uptake of places on postgraduate courses in medical education, more frequent issues of medical education journals and the further development of e-journals and other new online resources. There is therefore a need to provide active support in *Post Graduate Medical Education* for a larger, national group of colleagues in all specialties and at all stages of their personal professional development. If we were to formulate a statement of intent to explain the purpose of this curriculum we might simply say that our aim is to help clinical colleagues to teach and to help students to learn in a better and advanced way. This book is a state of the art book with representation of all activities of the MD Internal Medicine program at RMU. Curriculum is incorporated in the book for convenience of supervisors and residents. MD curriculum is based on six Core Competencies of ACGME ***(Accreditation Council for Graduate Medical Education)*** including ***Patient Care, Medical Knowledge, System Based Practice, Practice Based Learning, Professionalism, Interpersonal and Communication Skills***. The mission of Rawalpindi Medical University is to improve the health of the communities and we serve through education, biomedical research and health care. As an integral part of this mission, importance of research culture and establishment of a comprehensive research structure and research curriculum for the residents has been formulated and provided in this book.

Prof. Dr. Muhammad Umar
(Sitara-e-Imtiaz)
MBBS, MCPS, FCPS, FACG, FRCP (Lon), FRCP (Glasg) , AGAF
Vice Chancellor Rawalpindi Medical University & Allied Hospitals

CONTRIBUTIONS

SR.NO	NAME & DESIGNATION	CONTRIBUTIONS IN FORMULATION
1.	**Prof.Dr.Muhammad Umar (Sitara-e-Imtiaz)** **MBBS, MCPS, FCPS, FACG, FRCP (Lon), FRCP (Glasg), AGAF** Vice Chancellor Rawalpindi Medical University & Allied Hospitals	For his vision, guidance, proof reading and unflinching support for the synthesis of Curriculum of MD Critical Care Medicine
2.	**Prof Dr. BUSHRA KHAR, MBBS, FCPS** Ex-Professor of Medicine Head Department of Gastroenterology Holy Family Hospital, Rawalpindi	Guidance regarding technical matters of Curriculum of MD Critical Care Medicine
3.	**Prof. Dr. Muhammad Khurram , MBBS, FCPS, FRCP** Dean of Medicine & Allied Rawalpindi Medical University , Rawalpindi	Proof reading & synthesis of final print version of Curriculum of MD Critical Care Medicine.
4.	**Dr. Abrar Akbar , MBBS, FCPS** Assistant Professor Medicine Head of Department Critical Care Medicine Holy Family Hospital, Rawalpindi	Proof reading of final print version of Curriculum of MD Critical Care Medicine.
5.	**Dr Umar Kaleem, MBBS, FCPS, MRCP, FCCP** Senior Registrar Department of Critical Care Medicine Holy Family Hospital, Rawalpindi	Over all synthesis, structuring & over all write up of Curriculum of MD Critical Care Medicine, under guidance of Prof. Muhammad Umar Vice Chancellor, Rawalpindi Medical University, Rawalpindi. Also Proof reading & synthesis of final print version of Curriculum of MD Critical Care Medicine.

ENROLMENT DETAILS

Program of Admission _____

Session _____

Registration / Training Number _____

Name of Candidate _____

Father's Name _____

Date of Birth_____/_____/_____ CNIC No. _____

Present Address _____

Permanent Address _____

E-mail Address _____

Cell Phone _____

Date of Start of Training _____

Date of Completion of Training _____

Name of Supervisor _____

Designation of Supervisor _____

Qualification of Supervisor _____

Title of department / Unit _____

Name of Training Institute / Hospital _____

INTRODUCTION OF LOGBOOK

A structured book in which certain types of educational activities and patient related information is recorded, usually by hand. Logbooks are used all over the world from undergraduate to postgraduate training, in human, veterinary and dental medicine, nursing schools and pharmacy, either in paper or electronic format .

Logbooks provide a clear setting of learning objectives and give trainees and clinical teachers a quick overview of the requirements of training and an idea of the learning progress. Logbooks are especially useful if different sites are involved in the training to set a (minimum) standard of training. Logbooks assist supervisors and trainees to see at one glance which learning objectives have not yet been accomplished and to set a learning plan. The analysis of logbooks can reveal weak points of training and can evaluate whether trainees have fulfilled the minimum requirements of training.

Logbooks facilitate communication between the trainee and clinical teacher. Logbooks help to structure and standardize learning in clinical settings. In contrast to portfolios, which focus on students' documentation and self- reflection of their learning activities, logbooks set clear learning objectives and help to structure the learning process in clinical settings and to ease communication between trainee and clinical teacher. To implement logbooks in clinical training successfully, logbooks have to be an integrated part of the curriculum and the daily routine on the ward.

Continuous measures of quality management are necessary.

Reference

Brauns KS,Narciss E, Schneyinck C, Böhme K, Brüstle P, Holzmann UM, etal. Twelve tips for successfully implementing logbooks in clinical training. Med Teach. 2016 Jun 2; 38(6): 564–569.

SECTION 1: MORNING REPORT PRESENTATION/ CASE PRESENTATION (LONG AND SHORT CASES)

SR#	DATE	REG # OF PATIENT	DIAGNOSIS & BRIEF DESCRIPTION	SIGNATURES OF THE SUPERVISOR

SECTION 2: TOPIC PRESENTATION/SEMINAR

SR#	DATE	NAME OF THE TOPIC & BRIEF DETAILS OF THE ASPECTS COVERED	SIGNATURES OF THE SUPERVISOR

SECTION 3: JOURNAL CLUB

SR#	DATE	TITLE OF THE ARTICLE	NAME OF JOURNAL	DATE OF PUBLICATION	SIGNATURES OF THE SUPERVISOR

SECTION 4: PROBLEM CASE DISCUSSION

SR #	DATE	REG.# OF THE PATIENT DISCUSSED	DIAGNOSIS	BRIEF DESCRIPTION OF THE CASE	SIGNATURES OF THE SUPERVISOR

SECTION 5: RECORD OF TOTAL CASES SEEN DURING TRAINING

SR.#	DATE	TOTAL NUMBER OF CASES ATTENDED	SIGNATURES OF THE SUPERVISOR

SECTION 6: PROCEDURES

SR.#	DATE	REG NO. OF PATIENT	NAME OF PROCEDURE	OBSERVED/ASSISTED/PERFORMED UNDER SUPERVISION/PERFORMED INDEPENDENTLY	PLACE OF PROCEDURE	SIGNATURES OF THE SUPERVISOR

SECTION 7: CLINICOPATHOLOGICAL CONFERENCE (CPC)

SR#	DATE	BRIEF DESCRIPTION OF THE TOPIC/CASE DISCUSSED	SIGNATURES OF THE SUPERVISOR

SECTION 8: MORTALITY MEETINGS

SR#	DATE	REG. # OF THE PATIENT DISCUSSED	BRIEF DESCRIPTION	COMMENTS/SUGGESTIONS	SIGNATURES OF THE SUPERVISOR

SECTION 9: HANDS ON TRAINING/WORKSHOPS

SR#	DATE	TITLE	VENUE	FACILITATOR	SIGNATURES OF THE SUPERVISOR

SECTION 10: PUBLICATIONS

SNO.	NAME OF PUBLICATION	TYPE OF PUBLICATION ORIGINAL ARTICLE/EDITORIAL/CASE REPORT ETC	NAME OF JOURNAL	DATE OF PUBLICATION	PAGE NO.	SIGNATURES OF THE SUPERVISOR

SECTION 11: MAJOR RESEARCH PROJECT DURING TRAINING

SNO.	RESEARCH TOPIC	PLACE OF RESEARCH	NAME AND DESIGNATION OF SUPERVISOR UNDER WHOM RESEARCH WAS CONDUCTED	BRIEF DETAILS	SIGNATURES OF THE SUPERVISOR

SECTION 12: WRITTEN ASSESSMENT RECORD

S.NO	TOPIC OF WRITTEN TEST/EXAMINATION	TYPE OF THE TEST MCQS OR SEQS OR BOTH	TOTAL MARKS	MARKS OBTAINED	SIGNATURES OF THE SUPERVISOR

SECTION 13: CLINICAL RECORD

SR.#	TOPIC OF CLINICAL TEST/ EXAMINATION	TYPE OF THE TEST& VENUE OSPE, MINI-CEX, DOPS, SIMULATED PATIENT, SKILL LAB e.t.c	TOTAL MARKS	MARKS OBTAINED	SIGNATURES OF THE SUPERVISOR

THE END