SAUDI COMMISSION FOR HEALTH SPECIALTIES

Scientific Council for Anesthesia & Intensive Care

Critical Care Fellowship Programme

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COMMITTEE IN-CHARGE FOR PREPARING CRITICAL CARE FELLOWSHIP

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Abbreviations Key:

  CCM = Critical Care Medicine
  COCCM = Committee of Critical Care Medicine
  SCFHS = Saudi Commission for Health Specialties
I. PREAMBLE

With the rapid development of health care in the Kingdom, there is an equal increasing demand for qualified intensive care physicians. Currently, non-Saudi physicians manage most critical care patients and units in the Kingdom. The intensivist is a highly specialized physician qualified through well-structured fellowship programs, enabling him/her to provide continuous, safe, effective and humane care for critically ill patients.

This proposed National Fellowship Program in Adult Critical Care Medicine (CCM) has the aim to define the educational objectives, the body of knowledge and practical skills required by physicians specializing in CCM.

II. MISSION STATEMENT

- To develop and set the educational standards for the training and certification for subspecialist in the field of Adult CCM.
- To evaluate and accredit training centers in CCM.

III. OBJECTIVES

1. To train physicians in the clinical and scientific aspects of CCM.
2. To enable the physician to assume consultant responsibility for the comprehensive management of critically ill patients.
3. To enable the prospective consultant to function at a higher academic level.

IV. ENROLLMENT REQUIREMENTS

The candidate must fulfil the SCFHS admission criteria for subspecialty fellowship programs. The following are pre-request for enrolment in the CCM program:

- Medical graduate who has successfully completed a residency training (minimum of four years) in a Saudi Commission for Health Specialties (SCFHS) approved program in any of the following fields: Internal Medicine, Anesthesia, Emergency Medicine, Surgery or other specialties accepted by the training committee.
- The candidates must obtain their primary specialty certification before allowed to sit for the subspecialty certification Exams. They may be allowed to commence training in CCM after the completion of the residency-training program and passing the final written Exam.
- It is anticipated, although not obligatory, that at least six (6) months would have been previously spent in a post with substantial exposure to CCM.
- The candidate will provide three letters of recommendation from 3 consultants involved in his/her training for at least 6 months period.
- The candidate must pass an interview or pre-selection exam as sit by the Committee of Critical Care Medicine (COCCM).
- The candidate will provide a letter of release from primary sponsoring institute for the total period of training.
- Annual registration and payment of annual training fees as sit by SCFHS.

Candidates Selection:

Candidates can apply directly to the SCFHS to be enrolled in CCM training. Also approved training programs can recommend candidates for enrolment in the CCM program.

V. ACCREDITATION OF TRAINING CENTER

The Units considered for training must meet the following requirements:

1. Have a minimum of seven (7) beds
2. The Unit provides multidisciplinary critical care service
3. The annual patient load should not be less than 500 patients per year
4. The Unit must provide mechanical ventilation, noninvasive and invasive hemodynamic monitoring
5. A (1:1 or 1:1.5) nurse to patient ratio maintained constantly
6. A dedicated medical staff must be available 24 hours a day seven days a week to provide the needed patient care
7. The Unit must adapt totally closed or concurrent care system
8. The Unit must have a dedicated director who will ensure the development and application of the medical policies and may also serve as the program director if he/she has the suitable qualifications.
9. Requirements for the Programme Director:
   a. Must be a consultant with a minimum of 5 years experience at that level.
   b. Must have completed training in an accredited program in critical care medicine.
   c. Must have experience in postgraduate training education and research.
   d. Demonstrates commitment to critical care medicine practice.
   e. Have the interest, authority, and time required to fulfill teaching responsibilities in order to develop, implement, and achieve the educational goals of the fellowship.
   f. Maintains active clinical involvement in the practice of critical care medicine.
   g. Maintain continuous education in critical care medicine.
   h. Exhibits active interest in medical research related to critical care medicine.
10. Other Critical Care Staff – There should be a minimum of two (2) consultants in the Section.
11. The Center should have the following subspecialties:
   a. Pulmonary
   b. Cardiology +/- Cardiovascular Surgery
   c. Nephrology
   d. Infectious Diseases
   e. Neurology +/- Neurosurgery
   f. General Surgery +/- Urology +/- Orthopedic

VI. STRUCTURE OF THE PROGRAMME

This is a two-year minimum training programme during which the fellows will become experienced in various areas of critical care medicine.

a. Training Period
   This period of 24 months will be distributed as ICU 14 months, CSICU/CCU 2 months, Pulmonary 2 months, Research/elective 4 months and leave 2 months. The Candidate will be entitled for 1 week study leave during the whole programme.

* Fellows other than anesthesia trainees must have a rotation in anesthesia of 2 months, early on starting their ICU fellowship programme and the period will be included in the total ICU period of 14 months.

** Candidates who have Pulmonary Medicine background will be exempted from this rotation and the period will be used for further training as per discretion of the Programme Director and the candidates’ needs.

b. Special Credentials
   1. Each trainee should achieve Advance Cardiac Life support (ACLS) provider status.
   2. Each trainee should achieve instructor status in ACLS.
   3. Highly recommended, though not mandatory for the ICU fellows to achieve ATLS and FCCS provider/instructor status.

c. Responsibilities of Fellows:
   1. Carryout rounds every morning in all patients
   2. Join the consultant rounds
   3. Attend the hand-over rounds
   4. Be responsible for the care of all patients under the supervision of the consultant
   5. Be responsible for all admissions and should be available to receive reports from referring doctors
   6. Supervise rotating residents/junior fellows joining the unit
7. Do oncall duties as appear on the monthly rota
8. Provide consultation to other services in the hospital
9. Participate in educational activities in the department or in the unit

d. Patient Care Experience

During the two years of training, the trainees are expected to acquire clinical, investigative, and research skills which will enable them to act as consultants in critical care. To achieve these objectives:

**Trainees must (at a minimum) be exposed to patients with:**

1. Hemodynamic instability
2. Respiratory insufficiency and failure
3. Acute neurological insult including those with elevated intracranial pressure
4. Acute renal insufficiency and failure
5. Acute life-threatening endocrine and/or metabolic derangement
6. Drug overdose and poisonings
7. Coagulation disorders
8. Serious infections including sepsis
9. Nutritional inadequacy and failure
10. Acute multiple trauma

In order to properly prepare the future intensivist to function in the multidisciplinary environment, it is necessary for all trainees to have patient care experience with both critically ill medical and surgical patients.

* Inter-hospital and inter-institutional cooperation among medical centers may also be necessary to provide the trainee with adequate patient experience. Additional experiences may include but not limited to:

1. Burn patients (one month)
2. Trauma (one to two months)
3. Nutritional support (one month)

e. Reading

Trainees are expected to refer to standard textbooks in Critical Care Medicine and to read designated critical care journals as well as articles selected by the consultant on regular basis.

f. Teaching

The trainees are expected to attend all teaching activities provided by individual sections and to be actively participating and providing lectures to the section of Critical Care and joining staff in various important topics in the field.

g. Research

Research is highly encouraged as a part of the fellows’ training. The fellows, though is not mandatory, will be encouraged to participate in the ongoing research projects in the department and to prepare case reports and other articles for publication in reputable international journals. Statistical methodology will be made available to fellows. They will learn to design, criticize, and execute protocols. They should be encouraged to attend local, national, and international meetings in order to have maximum exposure to different experiences in the field of Critical Medicine. Attendance at one internationally-recognized meeting during the fellowship training will be encouraged.

h. Administration

Some exposure to the administrative aspects of Critical Care Medicine will be necessary, for example, attendance at ad hoc committees and Section meetings. Also, they will be attending collaborative practice meeting with other members and departments sharing care of critically ill patients.
VII. EVALUATION

Critical Care Medicine Fellows will be periodically evaluated by the consultants in the Critical Care Department/Section on all aspects of their training. The evaluation will be discussed with the fellow, if required, remedial action will be taken. Each program might use additional evaluation systems such as periodic MCQ’s evaluation tests.

VIII. PROMOTION

A fellow’s advancement from the first to second year is contingent upon professional performance and personal growth according to guidelines and policy and the ongoing evaluation by the program supervisors during the training period. Following completion of fellowship training, a certificate of completion of training will be awarded. Obtaining the “Saudi Specialty Certificate in Adult Critical Care Medicine” is contingent upon completing the training program and passing the “Final Certification Exam.”

IX. HOLIDAYS AND STUDY LEAVE

The fellow is entitled to:

- Yearly 4 weeks holiday (can be taken after 6 months or at the end of 1st year)
- 1 week study leave

X. CERTIFICATION

Upon completion of the required training program of CCM and passing the final examination of the subspecialty, the candidate will be awarded the “Saudi Specialty Certificate in Critical Care Medicine”.
X. APPENDIX I

I. The following major areas are mandatory to the fellow’s experience (as recommended by the Guidelines Committee of the Society of Critical Care Medicine):

A. **Shock**
   1. Hypovolemic
   2. Cardiogenic
   3. Traumatic
   4. Distributive
   5. Obstructive

2. Myocardial infarction and its complications
3. Cardiac arrhythmia and conduction disturbances; indications for pacemakers
4. Pulmonary embolism
5. Pulmonary edema; cardiogenic, and noncardiogenic
6. Cardiac tamponade and other acute pericardial diseases
7. Acute valvular disorders (Opt)
8. Acute aortic and/or peripheral vascular disorders including A-V fistulae (Opt)
9. Acute complications of cardiomyopathies and myocarditis
10. Vasoactive and isotropic therapy
11. Complications of devices and artificial hearts (Opt)
12. Complications of angioplasty (Opt)
13. Current concepts of Starling’s Law of the Heart and perfusion to include calculations and interpretation of hemodynamic parameters
14. Hemodynamic effects caused by ventilatory assist devices
15. Thrombolytic therapy
17. Recognition, evaluation, and management of hypertension

B. **Respiratory Physiology, Pathology, and Therapy**

1. Acute respiratory failure:
   a. Adult respiratory distress syndrome
   b. Hypercapnic
   c. Neurogenic

2. Status asthmaticus
3. Smoke inhalation and airway burns
4. Aspiration and chemical pneumonitis
5. Flail chest and chest trauma
6. Bronchopulmonary infections
7. Upper airway obstruction
8. Drowning
9. Pulmonary function tests:
   a. Pulmonary mechanics
   b. Respiratory adequacy and arterial and venous blood gases interpretation
10. Oxygen therapy
11. Hyperbaric oxygenation
12. Mechanical ventilation:
   a. Pressure and volume ventilators
   b. Positive end-expiration pressure, intermittent mandatory ventilation, continuous positive airway pressure, high frequency ventilation, inverse ratio ventilation, pressure support ventilation, negative pressure ventilation, and differential lung ventilation
   c. Indications for and hazards of mechanical ventilation
   d. Barotrauma
   e. Criteria for weaning and weaning techniques
   f. Extracorporeal membrane oxygenation (desirable for Pediatrics)
13. Airway maintenance
   a. Emergency airway management
b. Endotracheal intubation
c. Tracheostomy
d. Long-term intubation versus tracheostomy
14. Ventilatory muscle physiology, pathophysiology, and therapy

C. Renal Physiology, Pathology, Pathophysiology, and Therapy

1. Renal regulation of fluid balance and electrolytes
2. Renal failure: Prerenal, renal and postrenal
3. Derangement secondary to alterations in osmolality and electrolytes. Sodium ad potassium balance
4. Acute acid-base disorders and their management
5. Principles of hemodialysis, peritoneal dialysis, ultrafiltration, continuous arteriovenous hemofiltration (CAVH), and continuous venous-venous hemofiltration (CVVH)
6. Interpret urine electrolytes
7. Evaluate oliguria
8. Drug dosing in renal failure

D. CNS Physiology, Pathology, Pathophysiology and Therapy

1. Coma
   a. Metabolic
   b. Traumatic
   c. Infectious
   d. Mass lesions
   e. Vascular-anoxic-ischemic
   f. Drug overdose:
      - Barbiturates
      - Narcotics
      - Tranquilizers
      - Organophosphate
      - “Street” drugs
      - Salicylate; acetaminophen
      - Petroleum distillates
      - Heavy metals
      - Industrial products
      - Alcohol
      - Cocaine
2. Hydrocephalus
3. Psychiatric emergencies
4. Perioperative management of patient undergoing neurological surgery
5. Brain death evaluation and certification
6. Diagnosis and management of persistent vegetative states

F. Infectious Disease Physiology, Pathology, Pathophysiology, and Therapy

1. Antibiotics:
   a. Aminoglycosides
   b. Antifungal agents
   c. Antituberculosis agents
   d. Penicillin and other antibiotics
   e. Antiviral agents
   f. Agents for parasitic infections
2. Infection control for special care units
3. Anaerobic infections
4. Systemic sepsis
5. Tetanus
6. Hospital acquired and opportunistic infections in the critically-ill patients
7. Adverse reactions to antimicrobial agents
8. A.I.D.S.
9. Infectious risks to health care workers

G. Hematological Disorders Secondary to Acute Illness

1. Acute defects in hemostasis:
   a. Thrombocytopenia
   b. Disseminated intravascular coagulation
   c. Primary fibrinolytic therapy
2. Anticoagulation; fibrinolytic therapy
3. Principles of blood component therapy:
   a. Platelet transfusion
   b. Packed red cells, including frozen red cells
   c. Fresh frozen plasma
   d. Specific coagulation factor concentrates
   e. Albumin and plasma protein fraction
   f. Stroma-free hemoglobin
   g. White blood cell transfusion
   h. Cryoprecipitate
4. Acute hemolytic disorders
5. Acute syndromes associated with neoplastic disease and anti-neoplastic therapy
6. Acute disorders of immunosuppressed patients
7. Neonatal bleeding disorders (Opt)
8. Sickle cell crisis
9. Plasmapheresis

H. Gastrointestinal (GI)/Genitourinary (GU)/Obstetric/Gynecological (Ob/Gyn) Acute Disorders

1. Acute pancreatitis with shock
2. Upper gastrointestinal bleeding including variceal bleeding
3. Lower gastrointestinal bleeding
4. Acute and fulminant hepatic failure
5. Toxic megacolon
6. Acute perforations of the gastrointestinal tract
7. Ruptured esophagus
8. Acute inflammatory diseases of the intestine
9. Acute vascular disorders of the intestine, including mesenteric infarction
10. Obstructive uropathy and acute urinary retention
11. Urinary tract bleeding
12. Toxemia of pregnancy; amniotic fluid embolism (optional for Pediatrics)
13. Hydatidiform mole
14. Perioperative management of patients undergoing (GI/GU/Ob/Gyn Surgery
15. Stress ulcer prophylaxis
16. Drug dosing in hepatic failure

I. Immunology and Transplantation

1. Principles of transplantation (organ donation, procurement, preservation, transportation, allocation, implantation, national organization of transplantation activities)
2. Immunosuppression
3. Different organ transplantation: indications and postoperative care

J. Trauma and Burns

1. Initial approach to the management of multisystem trauma
2. CNS trauma (brain and spinal cord)
3. Skeletal trauma including the spine
4. Chest trauma:
   a. Blunt
b. Penetrating  
c. Cardiac  
5. Abdominal trauma, blunt, and penetrating  
6. Crash injury  

K. Monitoring, Bioengineering, and Biostatistics  
1. Prognostic indices, severity and therapeutic intervention scores  
2. Principles of electrocardiographic monitoring, measurement of skin temperature and resistance, and transcutaneous measurements  
3. Invasive hemodynamic monitoring  
a. Principles of strain gauge transducers  
b. Signal conditioners, calibration, and gain adjustment  
c. Display techniques  
d. Principles of arterial, central venous, and pulmonary artery pressure catheterization and monitoring  
e. Assessment of cardiac function and derived hemodynamic parameters  
4. Noninvasive hemodynamic monitoring  
5. Electrical safety  
6. Thermoregulation  
7. Brain monitoring (intracranial pressure, cerebral blood flow, cerebral metabolic rate, and EEG)  
8. Respiratory monitoring (airway pressure, intrathoracic pressure, tidal volume, pulse oximetry, dead space-tidal volume ratio, compliance, resistance, capnography, and pneumotachography)  
9. Metabolic monitoring (oxygen consumption, carbon dioxide production, and respiratory quotient)  
10. Use of computers in critical care units (Opt)  

L. Administrative and Management Principles and Techniques  
1. Recommendations for training physicians in Critical Care Medicine  
2. Organization and staffing of critical care units  
3. Standards for special care units, Joint Commission on Accreditation of Health Care Organizations  
4. Medical record keeping in special care units:  
a. Problem-oriented record approach  
b. System-structures record approach  
c. Manual versus mechanical (computer) record generation  
d. Organization of physician, nursing, technical and laboratory records within special care units  
5. Priorities in the care of the critically-ill or injured patients  
6. Collaborative practice principles  
7. Emergency medical systems in pre-hospital care  
8. Quality improvement, principles and practices  
9. Principles of triage and resource allocation  

M. Pharmacokinetics and Dynamics: Drug Metabolism and Excretion in Critical Illness  
1. Uptake  
2. Metabolism  
3. Excretion  

N. Ethical and Legal Aspects of Critical Care Medicine  
1. Death and dying  
2. Foregoing life-sustaining treatment and orders not to resuscitate  
3. Standards of treatment for handicapped and mentally retarded  
4. Rights of patients, the right to refuse treatment  
5. Living wills, advance directives; durable power of attorney  

(Opt) O. Psychosocial Aspects: Awareness of the Physiological and Social Effects of Life-threatening Illness on Patients and Families
II. Procedural Skills

In addition to training in the following procedural skills, the fellow must also be trained in the indications, contraindications, complications, and pitfalls of these interventions:

A. Airway Management

1. Maintenance of open airway in non-intubated, unconscious, paralyzed patients
2. Intubation (oral, nasotracheal)
3. Cricothyrotomy, transtracheal catheterization and tracheotomy

B. Breathing, Ventilation

1. Ventilation of bag and mask.
2. Indications, applications, techniques, criteria, and physiological effects of positive end-expiratory pressure; intermittent positive pressure breathing; intermittent mandatory ventilation; continuous positive airway pressure, pressure support ventilation; and noninvasive ventilation.
3. Suction techniques
4. Chest physiotherapy and incentive spirometry
5. Fiberoptic laryngotraechobronchoscopy
6. Weaning techniques
7. Management of pneumothorax (needle, chest tube insertion, drainage systems)
8. Monitoring airway pressures
9. Operation of mechanical ventilators
10. Measurement of endotracheal tube cuff pressures
11. Interpretation of sputum cultures by smear
12. Performance of bedside pulmonary functions tests
13. Application of appropriate oxygen therapy

C. Circulation

1. Arterial puncture and blood sampling
2. Insertion of monitoring lines:
   a. central venous
   b. arterial
   c. pulmonary artery catheters
3. Pericardiocentesis
4. Management of arterial and venous air embolism
5. Transvenous pacemaker insertion
6. Cardiac output determinations by the thermodilution techniques
7.* Use of computer and calculators to determine derived parameters, including systemic and pulmonary vascular resistance
8. Obtain 12-lead ECG
9.* Dynamic ECG interpretation
10.* Infusion of epinephrine, dopamine, norepinephrine, nitroglycerine, dobutamine, isoproterenol, nitroprusside, and other vasoactive drugs
11. Use of infusion pumps for vasoactive drugs
12. Cardioversion
13. Application and regulation of intra-aortic assist devices
14. Application of noninvasive cardiovascular monitoring
15. Transcutaneous pacing/defibrillation

D. Central Nervous System

1. Lumbar puncture
2.* Management of intracranial pressure monitors and intracranial hypertension
3. Monitoring of modified EEG
4. Application of hypothermia

E. Renal
1. Manage peritoneal dialysis
2. Manage CAVH, CAVHD
3. Insertion of hemedialysis catheters

F. Gastrointestinal Tract
1. Insertion of transesophageal devices
2.* Prevention and management of upper gastrointestinal bleeding

G. Hematology
1.* Insertion of transesophageal devices
2.* Management of massive transfusions
3.* Autotransfusion
4.* Proper ordering and interpretation of coagulation studies

H. Infection
1. ICU sterility techniques and precautions
2. Sampling, staining, interpretation of blood, sputum, urine, body fluids and drainage
3.* Interpretation of antibiotic levels, and sensitivities

I. Metabolism and Nutrition
1. Tube feeding
2. Parenteral nutrition
3.* Monitoring and assessment of metabolism and nutrition
4.* Maintenance of temperature homeostasis

J. Monitoring and Bioengineering
1. Utilization, zeroing, and calibration of transducers
2. Use of amplifiers and recorders
3. Trouble-shooting equipment
4. Correcting basic electrical safety hazards

K. Trauma
1. Temporary immobilization of fractures
2.* G-suit applications
3. Use of special beds, e.g., circle electric bed, roto bed, flexicare
4. Peritoneal lavage

L. Intensive Care Unit Laboratory
1. Blood gas analysis
2.* Calculation of oxygen content, intrapulmonary shunt, alveolar-arterial gradients, systemic and pulmonary vascular resistance, oxygen transport, \( O_2 \) consumption.

*while not procedure, these items represent specific management skills or calculations that are deemed important, and requiring specific evaluation.
XI. APPENDIX II

I. KNOWLEDGE BASE

The knowledge base expected of each trainee on entering a program in Critical Care Medicine includes an understanding of the definition, incidence, etiology, microbiology, pathology and pathogenesis, signs, symptoms, investigation, diagnosis and differential diagnosis, treatment, prognosis, and complications of the disease states listed in the objectives.

II. PATIENT WITH RESPIRATORY DYSFUNCTION

A. Terminal Objective:

Given a critically-ill patient, the trainee shall be able to determine the presence of respiratory failure, provide emergency support, and have a plan of action to investigate subsequently and manage the problem.

B. Enabling Objectives:

The trainee shall demonstrate knowledge of:

1. The normal anatomy of the respiratory system.
2. The physiology of the gas exchange unit, lung and chest wall mechanics, airway dynamics, and control of respiration.
3. The pathophysiology of disease states leading to respiratory failure, including hypoxemic and hypercarbic respiratory failure in both children and adults.

III. PATIENT WITH CARDIOVASCULAR DYSFUNCTION

A. Terminal Objective:

Given a critically ill patient admitted with chest pain, myocardial infarction, arrhythmia, pulmonary edema, heart failure, or hemodynamic instability, the trainee shall be able to recognize the major categories of congenital and acquired heart disease, provide lifesaving support, and embark upon a diagnostic and management program that distinguishes the major categories of congenital and acquired heart disease.

B. Enabling Objectives:

The trainees shall demonstrate:

1. Knowledge of the methods and application “Advanced Cardiac Life Support” techniques;
2. Knowledge of the principles of noninvasive and invasive hemodynamic monitoring;
3. The ability to assess and manage the patient with chest pain, including myocardial infarction;
4. Detailed knowledge of the pathophysiology and treatment of cardiac failure in children and adults, including the pharmacology of drugs used to treat this entity;
5. An understanding of basic and complex cardiac arrhythmia, including pharmacological and electrical management;
6. An understanding of the shock syndromes, with emphasis on the pathophysiological events leading to and resulting from the shock state;
7. An understanding of heart-lung interactions, with particular emphasis on the role of right-heart hemodynamics;
8. Familiarity with the hemodynamic complications of acute ________?
9. The management of problems associated with cardiac and vascular surgical interventions in children and adults
IV. PATIENT WITH CNS DYSFUNCTION

A. Terminal Objective:

Given a patient with a CNS crisis and/or an altered level of conscious, the trainee should be able to recognize the nature of the situation, institute immediate life-sustaining measures, carry out appropriate neurologic examination, derive a differential diagnosis and continue with appropriate diagnostic and supportive measures until the problem is eventually resolved.

B. Enabling Objectives:

The trainee shall demonstrate knowledge of:

1. The pathophysiology and importance of coma and raised intracranial pressure (ICP), allowing for the differences between children and adults.
2. The investigation of coma and raised ICP and the monitoring techniques involved.
3. The available treatment for intracranial hypertension.
5. Seizure abnormalities and systemic metabolic consequences of status epilepticus, with emphasis on pharmacologic management.
7. Environmental and drug-related psychopathology associated with life support in the ICU, e.g., anxiety, sleep disorders, hallucinations, and withdrawal.

V. PATIENT WITH NEUROMUSCULAR DYSFUNCTION

A. Terminal Objective:

Given a patient with a progressive life-threatening neuromuscular disorder, the trainee should be able to recognize the seriousness of the problem, institute immediate life-sustaining measures, and compose a precise programme of definitive diagnosis, ongoing support, and specific therapy.

B. Enabling Objectives:

The trainee shall demonstrate knowledge of:

1. The major focus of care, i.e., support of vital organs, circulation, respiration, nutrition, and bowel, bladder, and skin care.
2. The major pathophysiologic entities associated with neuromuscular disease, including any specific therapeutic options available, e.g., immunosuppressants, plasmapheresis, etc.
3. The importance of supportive services integral to the management of patients with chronic neuromuscular disease, e.g., physiotherapy, occupational therapy, orthotics, social services, etc.

VI. PATIENT WITH RENAL DYSFUNCTION

A. Terminal Objective:

Given a critically-ill patient with oliguria or evidence of advancing renal failure or established renal failure, the trainee should be able to recognize the problem, institute measures to preserve remaining renal function, and provide for precise diagnosis, adequate supportive measures, and primary therapy.

B. Enabling Objectives:

The trainee shall demonstrate:

1. The ability to distinguish between prerenal, renal, and postrenal failure.
2. An understanding of the central importance of renal perfusional support and operative, nonoperative, and pharmacologic intervention in each of prerenal, renal and postrenal failure.
3. Knowledge of the interaction between drugs, nephrotoxins, and the kidneys, in both normal and diseased states.

VII. PATIENT WITH GI DYSFUNCTION

A. Terminal Objective:

Given the critically-ill patient who is admitted with GI crisis, the trainee should be able to evaluate the nature of the illness, institute immediate life-sustaining support, and embark upon a program of precise diagnosis, continuing support, and, where possible, resolution of the pathophysiologic entity.

B. Enabling Objectives:

The trainee shall demonstrate knowledge of:

1. The causes, diagnostic techniques, and management of the acute abdomen.
2. The diagnosis and medical and surgical management of upper and lower GI bleeding.
3. The diagnosis and medical and surgical management of hollow viscous dysfunction.
4. The complications of abdominal surgery and trauma.

VIII. PATIENT WITH JAUNDICE AND HEPATIC DYSFUNCTION

A. Terminal Objective:

Given a patient with multisystemic disease and jaundice and/or manifest hepatic failure, the trainee should be able to recognize the problem, provide for immediate life-sustaining support, and develop a plan for the diagnosis of the precise disorder and for the ongoing support and maintenance of the patient.

B. Enabling Objectives:

The trainee shall demonstrate knowledge of:

1. The pathophysiology of acute and chronic liver disease in terms of presinusoidal, intrahepatic sinusoidal, and postsinusoidal disorders; including knowledge of the indications for and limitations of a variety of diagnostic techniques.
2. The problems inherent in the use of drugs and supportive interventions in patients with liver disease.
4. The liver as an organ with a central role in the reticuloendothelial system, as a site for metabolism and for the production of a variety of enzymes and as a center for detoxification of endogenous and exogenous substances and for production of substances necessary for hemostasis.

IX. PATIENT WITH NUTRITIONAL AND FLUID DEFICIENCY

A. Terminal Objective:

Given a critically ill patient, the trainee shall evaluate the nutritional and fluid status of the patient, identify current deficiencies, ongoing losses, and the extra needs induced by the illness. The trainee shall also be able to devise a management strategy for the provision of enteral and/or parenteral nutrition to sustain the patient throughout the period of critical illness.

B. Enabling Objectives:

The trainee shall demonstrate knowledge of:

1. The distribution of body water in health and disease and the therapy for restoration of effective circulating volume and interstitial and intracellular fluid.
2. The techniques and laboratory tests used to evaluate nutritional status in children and adults.
3. The methods of assessing basal energy expenditure and monitoring the effectiveness of supportive care.
4. The indications, limitations, methods, and complications of enteral and parenteral nutritional techniques.
5. The indications, methods, limitations, and complications of various access routes for both enteral and parenteral nutrition.

X. PATIENT WITH HEMATOLOGIC DYSFUNCTION

A. Terminal Objective:

Given a critically-ill patient with a problem of thrombotic or thrombolytic disorder, bleeding, neutropenia, thrombocytopenia, or anaemia, the candidate should be able to recognize the problem, provide for any indicated life-sustaining support, and proceed with an orderly course of investigation, management, continuing support and treatment.

B. Enabling Objectives:

The trainee shall demonstrate knowledge of:

1. The number and function of circulating WBC, emphasizing the role of neutropenia in the immunocompromised host.
2. The pathogenesis and management of thrombocytopenia.
3. Anemia with differentiation of marrow dysfunction, hemolysis, and internal and external loss of red blood cells.
4. The red cell in oxygen transport in critically ill patients and aberrations of this role.
5. The coagulation sequence, the fibrinolytic pathway, and disorders of these mechanisms, including recognition and knowledge of the causes of abnormal bleeding that result from local factors.

XI. PATIENT WITH METABOLIC-ENDOCRINE DYSFUNCTION

A. Terminal Objective:

Given a critically-ill patient with metabolic-endocrine, fluid, and/or electrolyte abnormalities, the trainee should be able to recognize the nature and severity of the problem, establish a differential diagnosis, institute immediate measures to sustain life, and embark on a course of definitive diagnosis, continued monitoring, and support.

B. Enabling Objectives:

The trainee shall demonstrate knowledge of:

1. The pathophysiology, diagnosis, and treatment of acid-base disorders.
2. The pathophysiology, diagnosis, and treatment of fluid and electrolyte problems.
3. The pathophysiology, diagnosis, and treatment of endocrine disorders, recognizing both childhood and adult disorders, and metabolic disorders.
4. Disorders of thermoregulation and normal body temperature.

XII. PATIENT WITH SEPSIS

A. Terminal Objective:

Given a patient with catastrophic septic illness, the trainee should be able to recognize the infective nature of the condition, institute immediate life-sustaining measures, establish a differential diagnosis of probable site of origin and etiologic pathogens, and embark upon a course of definitive diagnosis, continued life support, and appropriate antimicrobial and/or surgical therapy.
B. **Enabling Objectives:**

The trainee shall demonstrate knowledge of:

1. Available diagnostic techniques, e.g., acquisition of appropriate specimens for special staining, culture, and serology
2. The epidemiology of infectious disease.
3. The immunocompromised host and the diseases and treatments unique to the immunodeficient state.
4. The techniques to control and limit nosocomial sepsis
5. The pharmacology, indications for use, complications, interactions, monitoring, and efficacy of usual antimicrobial agents, including antibiotics, antifungals, bacteriostatics, antivirals, and antiparasitics.
6. The occult indices of sepsis, e.g., persistent metabolic acidosis, thrombocytopenia, and large volume fluid intake.

XIII. **PHARMACOTHERAPY FOR THE ICU PATIENT**

A. **Terminal Objective:**

Given the spectrum of ages and types of patients requiring drugs during critical illness, the trainee shall have a thorough knowledge of pharmacotherapy.

B. **Enabling Objectives:**

The trainee shall demonstrate knowledge and recognition of:

1. The pharmacologic and therapeutic applications of drugs.
2. The side effects and drug interactions associated with medications.
3. The significance of avoiding and relieving discomfort in patients by means of the judicious administration of agents used for sedation, analgesia, and anaesthesia.

XIV. **ENVIRONMENTAL HAZARDS**

A. **Terminal Objective:**

The trainee should be aware of the potential for environmental hazards within the ICU.

B. **Enabling Objective:**

The trainee shall demonstrate recognition and knowledge of environmental hazards as they apply to the patient and to the ICU staff.

XV. **TRANSPORTATION OF THE PATIENT**

A. **Terminal Objective:**

The trainee should demonstrate awareness of the problems peculiar to the transportation of the critically ill patient.

B. **Enabling Objectives:**

The trainee shall demonstrate recognition and knowledge of:

1. The importance of on-site resuscitation before transportation
2. Those patients who require physician accompaniments
3. The possible alterations in cardiopulmonary physiology during air transportation
4. The need for prophylactic management of problems known to occur during transport
5. The problems inherent in monitoring the patient during transportation and the solution to these problems
6. The advantages and disadvantages of the available means of transportation
7. The role of paramedical personnel
8. The importance of thorough communication between referring and receiving institutions and physicians before transportation
9. The importance of transferring with the patient all medical records and available blood products and radiographic studies
10. The importance of supplying appropriate follow-up information to the referring physician and institution
11. The need for comprehensive critical care monitoring and physician and nurse support outside the ICU during diagnostic procedures

XVI. ACADEMIC DEVELOPMENT OF CRITICAL CARE PHYSICIANS

A. Terminal Objective:

The trainee shall demonstrate an ability to apply in clinical practice, critical appraisal of diagnostic and therapeutic interventions, understanding of techniques for assessing prognosis, and methods of self-evaluation and continuing education.

B. Enabling Objectives:

The trainee shall demonstrate knowledge of:

1. Clinically applied biostatistics.
3. The selection of diagnostic tests.
4. Interpretation of diagnostic data.
5. The selection of optimal therapeutic interactions.
6. Assessment of techniques used to make prognoses.
8. The methods and importance of continuing medical education.

XVII. LEGAL, MORAL, AND ETHICAL ISSUES

A. Terminal Objective:

Upon completion of the programme, the trainee should have complete understanding of the importance of medico legal considerations for the critically ill, as well as moral and ethical considerations associated with patients and ICU staff.

B. Enabling Objectives:

The trainee shall demonstrate knowledge of:

1. The importance of effective communication with relatives, friends, and staff as to the nature of a patient’s illness, its implications for prognosis, and the interventional management of the patient in the ICU.
2. A compassionate approach to the patient who is deteriorating or dying, and effective methods of dealing with families and friends of those who are experiencing or have experienced death or dying.
3. Ethical and moral considerations fundamental to making decisions regarding the appropriateness of care for the critically ill.
4. The case at risk for medico legal intervention and mechanisms of reducing the likelihood of litigation.
5. The sequence of events that must take place once one is threatened with litigation.
6. The identification of forensic issues.
XVIII. TECHNIQUES AND SKILLS

Understanding of the indications, methods, and inherent complications of the techniques noted here is essential. The precise skills required for each programme depends on local practice.

While the specific performance of any of the tasks may be delegated to those clinicians in tertiary care centers who have special expertise and volume-related experience, the Critical Care trainee is expected to master all fundamental aspects of these techniques.

A. Mandatory Skills:

1. Airway management suctioning techniques and airway toilet: oropharyngeal airways. Access to the airway by all routes under any circumstance: orotracheal intubation, nasotracheal intubation; intubation over a fiberoptic bronchoscope; surgical establishment of an airway; and relative merits and management of different tubes and suction catheters.
2. Mechanical ventilation: fundamentals of circuitry; flow characteristics and dangers of currently available mechanical ventilators; and understanding of the methods of monitoring ventilation, including alarm systems, and specific modes of ventilation.
3. Oxygen and nebulizer therapy: supplementary oxygen equipment, use of special gas mixture, and airway pharmacology.
4. Vascular access: The candidate is expected to have a clear understanding of the risk-benefit ratio for all invasive, as opposed to noninvasive, techniques used to gain vascular access for information gathering Arterial: percutaneous and cut down route—radial, femoral, dorsalis pedis, posterior tibial. Venous: percutaneous—peripheral, central, internal jugular, external jugular, subclavian, femoral, umbilical. Venous: surgical cut down.
5. Basic principles of wound management.
6. Hemodynamic monitoring.
7. Peritoneal tap
8. Chest tube thoracostomy
9. Thoracentesis, pericardiocentesis
10. Temporary pacemaker insertion and management
11. Lumbar puncture
12. ICP monitoring (excluding insertion of the devices); subdural, epidural, and intraventricular monitors
13. Gastroesophageal tube placement for hemostasis (e.g. Sengstaken-Blakemore)
14. Placement of nasogastric or gastric tubes for suction and nutrition
15. Urinary bladder access
16. Fractures—immobilization techniques
17. Gram-stain of body secretions
18. Urinalysis
19. Diagnostic and therapeutic bronchoscopy, including brush and sheath brush
20. Application and use of pneumatic anti-shock garment
21. Renal support: peritoneal dialysis

B. Desirable Skills

1. Vascular access: permanent vascular access catheters
2. Diagnostic and therapeutic bronchoscopy; transbronchial biopsy, transthoracic needle, and bronchoalveolar lavage
3. Renal support: continuous hemofiltration, hemoperfusion, and hemodialysis
4. Intra-aortic balloon counterpulsation
5. Plasmapheresis

XIX. RESEARCH IN CRITICAL CARE

Career-stream trainees in Critical Care are encouraged to complete an additional structured period of research, either at “the bench” or the bedside, particularly if they intend to pursue a future role as a teacher/researcher in an academic center.
# Fellows In-Training Evaluation

**Specialty (______________________________)**

<table>
<thead>
<tr>
<th>Name: ____________________________</th>
<th>SCFHS Registration No.: ____________________________</th>
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**Level of Training:**
- F1  
- F2  
- F3  
- F4  

**Hospital:** ____________________________

**Rotation:** ____________________________  **Date:** From: __________ To: __________

(Enter mark for each item or indicate as Not Applicable)

<table>
<thead>
<tr>
<th>Item</th>
<th>Mark</th>
<th>Unsatisfactory (0 - 4)</th>
<th>Below Average (5)</th>
<th>Average (6 - 7)</th>
<th>Above Average (8 - 9)</th>
<th>Outstanding (10)</th>
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<td>3. Current Literature</td>
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<td>5. Research</td>
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<td><strong>II - Clinical and Technical Skills</strong></td>
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<td>6. Organization of Work</td>
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<td>7. Records and Reports</td>
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<td>8. Interpretation and Utilization of Information</td>
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<td>9. Clinical Judgment and Decision Making</td>
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<td>10. Indications for Procedures</td>
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<td>11. Procedures and Operative Skills</td>
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<td>12. Performance in emergencies</td>
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<td>13. Consultations Skills</td>
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<td>14. Communication &amp; Presentation Skills</td>
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<td>16. Discipline and Reliability</td>
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<td>17. Patient / Family Relations</td>
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<td>18. Inter-professional Relations</td>
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Total Mark = __________  Percentage = Total Mark ÷ Number of Items Evaluated × 10 = __________%

**Comments:** (use back of form for additional comments if needed)

_________________________________________________________________________________________

_________________________________________________________________________________________

Name of Evaluator #1: ____________________________  Signature: ____________________________  Date: __________

Name of Evaluator #2: ____________________________  Signature: ____________________________  Date: __________

Signature of Fellow (I am aware of this evaluation) Signature: ____________________________  Date: __________
Instructions & General Guide for Evaluation:

1- Evaluators must try and evaluate all items indicted on the front table during a given rotation.
2- Evaluators must seek opinions of other colleagues and coworkers when evaluating a candidate.
3- Although evaluation of performance can be affected by subjective factors, evaluators must make every effort to avoid personal bias and seek more objective elements observed during the rotation.
4- If an item cannot be evaluated or not applicable during a given rotation, it will be marked as such and excluded from the final mark.
5- Items not evaluated will not have any marking. The final mark will be calculated as per the given equation.
6- Each item will be marked on a scale of (0 - 10). The table provides the equivalent grade for each mark. For example 5 = below average, 8 or 9 = above average etc.
7- Avoid half mark for each item.
8- All items are to be marked or indicated as “not applicable”.
9- Upon completion, the total mark will be calculated and the equation applied to provide the final percentage.
10- Comments are to be provided for elements or observations other than those on the table.
11- Comments provide the evaluator a chance to express opinion about a given candidate and the fulfillment of a given rotation objectives.
12- The Candidate must sign the evaluation form. Signing the form only indicates awareness of the evaluation and not necessarily agreement with the contents.
13- If a candidate do not agree or has an objection of an evaluation, he/she will indicate such disagreement by stating: “I Do Not Agree” beside the signature. In such case the candidate must provide a separate statement directed to the program director of his/her region explaining the points of disagreement.

Use this space for additional comments if needed:

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N.B: Sign this Page if additional comments are entered

Name of Evaluator #1 : _________________________________  Signature: _________________________ Date: __________________

Name of Evaluator #2 : _________________________________  Signature: _________________________ Date: __________________

Name of Evaluator #3 : _________________________________  Signature: _________________________ Date: __________________

Signature of Fellow ( I am aware of this evaluation ) Signature: _________________________ Date: ___________________
APPENDIX IV

ADULT CRITICAL CARE FELLOWSHIP PROGRAMME

SELECTED CENTRES AND PROGRAMME DIRECTORS

I NATIONAL GUARD HOSPITAL, JEDDAH
Dr. Walid Alyafi
Chairman & Consultant Anesthesiologist and Critical Care
Dept. of Intensive Care
Telephone No.: (02) 624-0000 ext: 21936
Fax No. : (02) 624-0000 ext: 21936
Mobile No. : 0505667676

II KING FAISAL SPECIALIST HOSPITAL & RESEARCH CENTER
Dr. Sulaiman Al Hossaini
Consultant Intensivist
Telephone No.: 442-3908
Fax No. : 442-7499
Mobile No. : 05524268

III NATIONAL GUARD HOSPITAL, RIYADH
Dr. Abdullah Al Shememri
Director General of Academic Affairs
Telephone No.: 252-0088 ext. 2274
Fax No. : 
Mobile No. : 

IV ARMED FORCES HOSPITAL, RIYADH
Dr. Yasser Mandurah
Consultant Intensivist & In-charge of Intensive Care Unit
Telephone No.: 477-7714 ext 3032
Fax No. : 
Mobile No. : 0504640818
V KING FAISAL UNIVERSITY HOSPITAL, AL-KHOBAR
Dr. Hatem Qatub
Chief Consultant Intensivist, College of Medicine
King Faisal University & King Fahad University Hospital
Telephone No.: (03) 8580737
Fax No.: ____________________________
Mobile No.: 0505843075

VI KING ABDULAZIZ UNIVERSITY HOSPITAL, JEDDAH
Dr. Jamal Alhashemi
Associate Professor, Anesthesiology and Critical Care Medicine
College of Medicine
Telephone No.: (02) 6408015
Fax No.: (02) 6408015
Mobile No.: 0505506737