الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

ADULT CRITICAL CARE MEDICINE BOARD


بسم الله الرحمن الرحيم

PREFACE

- The primary goal of this document is to enrich the training experience of postgraduate trainees by outlining the learning objectives for them to become independent and competent future practitioners.
- This curriculum may contain sections outlining some regulations of training; however, such regulations need to be sought from the "General Bylaws" and "Executive Policies" for training published by the Saudi Commission for Health Specialties (SCFHS), which can be accessed online through the official SCFHS website. In the event of discrepancy in regulation statements, then the most recent statement in the most up-to-date bylaws and executive policies will apply.
- As this curriculum is subject to periodic refinements, please refer to the electronic version posted online for the most up-to-date edition at: www.scfhs.org.sa

ACKNOWLEDGEMENT

The curriculum development team acknowledges the valuable contributions and feedback from the Scientific Committee members in the development of this program. We extend special appreciation and gratitude to all members who have been pivotal to the completion of this booklet, especially the Curriculum Group, Curriculum Specialists, and Scientific Council.

I. CONTRIBUTORS

This curriculum was prepared by the Specialty Curriculum Development Committee:
• Prof. Mohammed Al-Shahrani • Dr. Ahmed Fouad Mady • Dr. Asiah Rugaan • Dr. Mosa. Kadom Alshabeeb
Reviewed and Approved by the Specialty Scientific (*Council/Committee*) Members:
• Dr. Khalid Al-Katheri • Dr. Hassan Al-Sharif
Curriculum Review Committee members:
• Dr. Fahad Algarni, BScPT., COMT., MSc., PhD • Dr. Walid Alkeridy, MBBS, MSc, FRCPC
Approved by the Head of Curricula Review Committee:
• Dr. Ali Alyahya ,MD, MME, FRCSC

Previous version contributor list:	
Curriculum Scientific Group	**Curriculum Specialists**
• Dr. Yasser Mandourah • Dr. Amin Yousef • Dr. Khalid Maghrabi • Dr. Haifa M. Algethamy	• Prof. Zubair Amin • Dr. Sami Alshammari

Scientific Committee

- Dr. Walid Alyafi
- Dr. Abudlaziz Alzair
- Dr. Ayman Karabah
- Dr. Abdulazia Aldawood
- Dr. Mohammad Albraak
- Dr. Awaad Alammeri

II. COPYRIGHT STATEMENTS

Correspondence: Saudi Commission for Health Specialties P.O. Box: 94656 Postal Code: 11614 Contact Center: 920019393

E-mail: Curricula@scfhs.org.sa

Website: www.scfhs.org.sa

III. TABLE OF CONTENTS

IV. INTRODUCTION

This document defines the educational goals, objectives, and curriculum of the Adult Critical Care Medicine (CCM) Residency Program in accredited hospitals within the Kingdom of Saudi Arabia. With the rapid development of healthcare in the Kingdom of Saudi Arabia, there is an increasing demand for qualified critical care physicians. This national Residency Program aims to define the educational objectives, body of knowledge, and practical skills required by physicians specializing in CCM. The program was designed to fulfill the subspecialty criteria issued by the Saudi Commission for Health Specialties (SCFHS). Educational standards will be applied as per several internationally adopted frameworks. The Scientific Committee and all Program Directors must abide by the contents of the residency training program approved by the SCFHS. Upon successful program completion, residents will have acquired the knowledge and skills essential for the safe practice of adult CCM. They will also be positioned to provide vision, education, and leadership in the field. The curriculum will be reviewed as necessary.

General Objectives

Upon completion of the educational program, graduate physicians will be competent in the field of critical care medicine. Residents must:

1. Demonstrate the knowledge relating to critical care medicine.
2. Demonstrate the ability to incorporate pertinent perspectives in research methodology, data presentation, analysis, and interpretation.

3. Endeavor to deliver the highest-quality care with integrity, honesty, and compassion as a dedicated professional and consistent with the obligations of a physician.
4. Exhibit appropriate personal and interpersonal professional behavior and practice medicine ethically, prioritizing the needs of individual patients.
5. Take part in continuing education and evaluation throughout the critical care physician's professional life, including an appreciation for the role of research and the need for critical analysis of current scientific and practical developments related to the specialty.

It is expected that all graduates of this program shall be law-abiding individuals who respect the professional codes of conduct toward patients, colleagues, and institutions.

1. Context of Practice

Global and national demands for critical care residency programs are growing; however, comprehensive data to address this problem and the resources available to provide care for critically ill patients are lacking. This global challenge is being resolved, at least in the Kingdom of Saudi Arabia (KSA), one of the largest Middle Eastern countries, with a land area of 2.5 million square kilometers, which has developed over 50 years to become the most modernized country in the region.

With the Kingdom's estimated 30 million residents and an annual growth rate of 2.7%, its healthcare sector must cater to a rapidly increasing population and a simultaneous increase in demand for critical healthcare (1). Currently, there is a need to train and develop intensivists globally, as it is estimated that only one in three critically ill patients admitted to the ICU is being treated by a well-trained intensivist (2).

The Critical Care Residency Program is a unique structural postgraduate training program that will help fulfill the current critical national needs for trained physicians in this field. This program was designed to prepare physicians to practice Critical Care Medicine competently and independently. Specifically, the CanMED framework teaches the fundamental skills, knowledge, and humanistic qualities inherent in Critical Care Medicine practice and provides progressive responsibility for and experience in the application of these principles to enable the effective management of clinical problems.

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

2. Goals and Responsibilities of Curriculum Implementation

Ultimately, this curriculum seeks to guide trainees to become competent in their respective specialties. Accordingly, this goal requires significant effort and coordination from all stakeholders involved in postgraduate training. As adult learners," trainees must be proactive and fully engaged, and exhibit the following: a careful understanding of learning objectives, self-directed learning, problem solving, an eagerness to apply learning through reflective practice from feedback and formative assessment, and self-awareness and willingness to ask for support when needed. The Program Director plays a vital role in ensuring the successful implementation of this curriculum. Moreover, training committee

members, particularly the program administrators and chief residents, significantly impact program implementation. Trainees should share their responsibilities during curriculum implementation. The SCFHS applies the best models of training governance to achieve the highest quality of training. Additionally, academic affairs in training centers and regional supervisory training committees play major roles in training supervision and implementation. The Specialty Scientific Committee will guarantee that the content of this curriculum is constantly updated to match the highest standards in postgraduate education for each trainee's specialty.

What is new in this edition? (Year 2022 additions)

1. Change in number of rotation blocks for the following:
    a. Junior Years
        - Critical care medicine from 15 to 20 blocks
        - Pulmonology medicine from 2 to 1 block
        - Anesthesia rotation from 2 to 3 blocks
        - Internal Medicine (IM) from 2 to 1 block
        - Trauma rotation from 2 to 1 block
        - An additional 1-block radiology rotation, including intervention radiology
    b. Senior Years
        - Critical care medicine from 13 to 15 blocks
        - Research rotation from 2 to 1 block
2. Addition of 1 block hematology rotation in R1 training
3. Combined all internal medicine rotations in:
    c. R1 for a total of 5 blocks:
        - IM (1 block)

- Hematology (1 block)
- Nephrology (1 block)
- Pulmonology (1 block)

4. Addition of objectives and competencies in general IM, cardiology, Hajj, neurocritical care, anesthesia, and hematology rotations
5. Modulating objectives and competencies of anesthesia and trauma surgery rotations in junior year
6. Addition of objectives in first ICU block (R1)
7. Shifting postoperative cardiac surgery ICU from junior to senior year
8. Adding ECMO rotation as part of CVCU rotation.
9. Cancellation of following rotations
    a. General surgery rotations
    b. Subspecialties in anesthesia (neuroanesthesia, cardiac anesthesia, regional anesthesia, thoracic anesthesia, vascular anesthesia, and chronic pain management)
    c. Subspecialties of internal medicine rotation (gastroenterology)

V. ABBREVIATIONS USED IN THIS DOCUMENT

Abbreviation	Description
SCFHS	Saudi Commission for Health Specialties
R(1)- R(3)	(First, second, and third) year of residency
R(4)-R(5)	(Fourth and fifth) year of residency
SMLE	Saudi Medical Licensing Exam
CanMEDs	Canadian Medical Education Directives for Specialists
RCPSC	Royal College of Physician and Surgeon of Canada
OSCE	Objective Structured Clinical Examination
OSPE	Objective Structured Practical Examination
Mini-CEX	Mini-Clinical Experience report
DOPS	Direct Observation of Procedural Skills report
CBD	Case-Based Discussion report
CBE	Competency-Based Education
ITER	In-Training Evaluation Report
FITER	Final In-Training Evaluation Report
COT	Consultation Observation Tool
RTC	Residency Training Committee

Abbreviation	Description
SICU	Surgical Critical Care Unit
CCM	Critical Care Medicine
CCU	Coronary Care Unit
ER	Emergency Department
MICU	Medical Critical Care Unit
ICU	Intensive Care Unit
OR	Operating Room
ACLS	Advanced Cardiovascular Life Support
TEE	Transesophageal Echocardiography
ECMO	Extracorporeal Membrane Oxygenation
ACCM	Adult Cardiac Critical Medicine
FAST	Focused assessment with sonography in trauma
RA	Regional anesthesia
PAP	Pulmonary artery pressure
PAWP	Pulmonary capillary wedge pressure
CAVH	Continuous arteriovenous hemofiltration
CVVH	Continuous veno-venous hemofiltration

VI. PROGRAM ENTRY REQUIREMENTS

1. Program Entry Requirements

A. Admission Requirements

In accordance with and without contradicting the SCFHS training rules and regulations, the following requirements must be fulfilled by any candidate accepted into the training program. Please refer to the SCFHS website for any updates in program entry requirements.

1. All candidates must hold a medical degree, such as an MBBS or its equivalent, from a university recognized by the commission.
2. All candidates must have completed a 12-month rotating internship.
3. All candidates must have passed the Saudi Medical Licensing Exam (SMLE).
4. All candidates must provide a comprehensive CV with references from three (3) consultants, preferably from the field of critical care medicine, who should provide recommendation letters stating the suitability of the candidate for training in critical care medicine.
5. All candidates must provide a letter from a sponsoring organization approving and pledging support for the candidate's total training period, that is, five years, and for sponsored positions.
6. All candidates must be registered as training critical care medicine at the SCFHS.
7. All candidates must have basic life support certification and malpractice insurance.

B. General Training Requirements

1. Trainee should abide by the training regulations and obligations as set by the SCFHS.
2. Training is a full-time commitment; the resident will be enrolled in full-time continuous training for the program duration.
3. The training will be conducted at institutions accredited for training by the Saudi Board of Adult Critical Care Medicine.
4. The training will be comprehensive in the specialties of Critical Care Medicine.
5. Trainees should be actively involved in patient care with gradual progression of responsibility.

VII. LEARNING AND COMPETENCIES

1. Introduction to Learning Outcomes and Competency-Based Education

Training should be guided by well-defined "*learning objectives*" that are driven by targeted "*learning outcomes*" of a particular program to serve specific specialty needs. Learning outcomes should reflect the professional "*competencies*" and tasks that are aimed to be "*entrusted*" to the trainees upon graduation. This ensures that graduates meet the expected demands of the healthcare system and patient care in relation to their particular specialty. *Competency-based education* (CBE) is an approach of "*adult-learning*" that is based on achieving *pre-defined*, *fine-grained, and well-paced* learning objectives that are driven from complex professional competencies.

Professional competencies related to healthcare are usually complex and contain a mixture of multiple learning domains (knowledge, skills, and attitudes). CBE is expected to change traditional methods of postgraduate education. For instance, the time of training, though a precious resource, should not be considered a proxy for competence (i.e., time of rotation in certain hospital areas is not the primary marker of competence achievement). Furthermore, CBE emphasizes the critical role of informed judgment in learners' competency progress, based on a staged and formative assessment driven by multiple workplace-based observations. Several CBE models have been developed for postgraduate education in healthcare (e.g., CanMEDS by the Royal College of Physicians and

Surgeons of Canada (RCPSC), the CBME-Competency model by the Accreditation Council for Graduate Medical Education (ACGME), Tomorrow's Doctors in the UK, and multiple others). The following concepts enhance the implementation of CBE in the curriculum.

- **Competency:** Competency is a cognitive construct that assesses one's potential to perform efficiently in a given situation based on professional standards. Professional roles (i.e., medical expert, health advocate, communicator, leader, scholar, collaborator, and professional) are used to define competency roles to make them mendable for learning and assessment.
- **Milestones**: Milestones are the stages of the developmental journey throughout the competency continuum. Throughout their learning journey, trainees from the junior and senior levels will be assisted in transforming from (novice/supervised) to (master/unsupervised) practitioners. This should not undermine the role of supervisory/regulatory bodies toward malpractice of independent practitioners. Milestones are expected to enhance the learning process by pacing training/assessment to match the developmental level of the trainees (junior vs. senior).
- **Learning-Domains:** Whenever possible, efforts should be directed to annotating learning outcomes with the corresponding domains (K = Knowledge, S = Skills, and A = Attitude). You may have more than one annotation for a given learning outcome.
- **Content-Area Categorization:** It is advisable to categorize learning outcomes into broad content areas related to the practice of the profession. Examples include diagnostic vs. therapeutic, simple vs. complex, and urgent vs. chronic.

- Trainees are expected to progress from a novice level to a master's level in a certain set of professional competencies. The SCFHS endorses the CanMEDS to articulate professional competencies.

A. CanMEDs physician competency framework

Rotations comprise three main components: knowledge, skills, and attitude. On the outcome side, they are blended to fit the frameworks of the CanMED competencies.

1. Duties
2. Safety
3. Learning

The following summarizes key roles for physicians in the CanMEDs 2015 project:

- Medical Expert
- Communicator
- Collaborator
- Leader
- Health Advocate
- Scholar
- Professional

B. Specific (rotation-based) competencies

- Competency-based learning during general critical care rotation
- Competency-based learning during coronary care unit rotation
- Competency-based learning during critical care echocardiography rotation
- Competency-based learning during cardiac surgery ICU rotation
- Competency-based learning during anesthesia rotation
- Competency-based learning during cardiac/neuro anesthesia rotation

- Competency-based learning during emergency medicine rotation
- Competency-based learning during trauma rotation
- Competency-based learning during critical care radiology rotation
- Competency-based learning during research rotation
- Competency-based learning during core internal medicine rotation
- Competency-based learning during elective rotation

2. Program Duration

This is a 5-year postgraduate structured training program in Critical Care Medicine. Training is structured to ensure a coherent and integrated educational program with progressive resident responsibility and entrusted competencies. Education is designed through a process of clinical rotation, clinical exposure, and progressive involvement in direct patient care, with a multitude of formative residents' assessments as they continue to add to their overall knowledge and skills.

The training consists of two parts:

First part (junior): 3 years (144 weeks as a junior resident in Critical Care).

Second part (Senior): 2 years (96 weeks as a senior resident)

PHASE	NAME	Period of Training
JUNIOR	Junior Residency in *Critical Care Medicine*	144 Weeks
	Years 1, 2, and 3	
SENIOR	Senior Residency in *Critical Care Medicine*	96 Weeks
	Years 4 and 5	

Residents are required to satisfactorily complete their allocated rotations each year and pass the end-of-year promotion exam before proceeding to the next year. The sequence of rotations will be determined by the regional training committee.

After successfully completing all five years of training, obtaining the Final In-Training Evaluation Report (FITER) (Appendix 3), and achieving the designated passing mark on the End-of-Year Promotion Exam, candidates will receive a Training Completion Certificate issued by the SCFHS. The candidate is then eligible for the Final Certification Examination of the Saudi Commission of Critical Care Medicine.

Successful candidates in the Final Certification Examination will receive the Saudi Commission Specialty Certification in Critical Care Medicine.

3. Program Rotations

Training Year	1	2	3	4	5	6	7	8	9	10	11	12	13
R1	ICU	ICU	IM	HEMA	PULMO	NEPH	NEPH	*ICU	ICU	ANES	EM	EM	Vac
R2	ICU	ICU	ICU	ICU	CCU	CCU/ ECHO*	ICU	ID	ID	ICU	ICU	ICU	Vac
R3	ICU	ICU	ICU	ICU	RAD/ IR	Trauma	ICU	ICU	ANES	ANES (cardiac/ neuro)	ICU/ HAJ**	ICU	Vac
R4	ICU	ICU	ELE	ICU	ICU	ICU	CVCU/ ECMO	CVCU	Research	ELE	ICU/ **HAJ	ICU	Vac
R5	ICU	ICU	ICU	ELE	ELE	ICU	NICU	NICU	ICU	ICU	ICU	ICU	Vac

1 block= 4 weeks

- *CCU rotations should cover cardiology services in hospitals (wards, ER, etc.).
- ** HAJ rotation 1 block in either R3 or R4 of residency

A. Required rotations for the junior residency period (R1–R3)

The exact sequence of rotations shall be designated by each regional residency program committee. It should be noted that every Resident must complete 4 blocks in general Critical Care Medicine during the first year of training.

Residents are expected to perform 4–7 on-call duties per month with a post-call off day and not more than two weekends per month. Annual leave follows the SCFHS rules and regulations (1 block + 1 public holiday + 1 academic week with approval of the Program Director) and is provided each year.

Residents should not take leave more than 25% at any given rotation.

	Training Year	Mandatory Core rotation*		Elective rotations**		Selective Rotations***	
Junior Residency 144 weeks	R1 (12 blocks + 1 block vacation)	ICU	4 blocks				
		IM and subspecialties	5 blocks				
		Anesthesia	1 block				
		EM	2 blocks				
		Vacation	1 block				
	R2 (12 blocks + 1 block vacation)	ICU	8 blocks				
		ID	2 blocks				
		CCU	1 block				
		CCU/ECHO	1 block				
		Vacation	1 block				
	R3 (12 blocks + 1 block vacation)	ICU	7 blocks				
		Rad/ IR	1 block				
		Trauma	1 block				
		Anesthesia	1 block				
		Anes/ cardiac-neuro	1 block				
				ICU/Haj	1 block		
		Vacation	1 block				

*Mandatory core rotation: Set of rotations that represent program core component and are mandatory.

**Elective rotation: Set of rotations that are related to the specialty, as determined by the scientific council/committee, and the trainee is required to do some of them.

***Selective rotation: Set of other rotations that is selected by the trainee (directed by mentor/program director) to enhance the competency acquisition of the specialty.

B. Required rotations for the senior residency period (4th and 5th years)

The exact sequence of rotations shall be designated by each regional residency program committee. Residents are required to perform on-call duties for each rotation.

Residents are expected to perform 4–7 on-call duties per month. Annual leave follows the SCFHS rules and regulations (1 block + 1 public holiday + 1 academic week with the approval of the Program Director) and is provided each year. Residents should not take leave more than 25% at any given rotation.

1. Electives must meet the defined learning objectives for adult Critical Care Medicine.
2. A supervisor must be identified.
3. Residents must be properly evaluated during their electives.
4. Electives should be performed at hospitals accredited by the SCFHS with the following exceptions and conditions:
    - The elective is not offered in Saudi Arabia.
    - The elective will allow Residents to develop expertise in Critical Care Medicine that cannot otherwise be attained in Saudi Arabia.

	Training Year	Mandatory Core rotation*		Elective rotations**		Selective Rotations***	
Senior Residency 96 weeks	R4 (12 blocks + 1 block vacation)	ICU	6 blocks				
				ICU/Haj	1 block		
				ELE	2 blocks		
		CVCU	1 block				
		CVCU/ ECMO	1 block				
		Research	1 block				
		Vacation	1 block				
	R5 (12 blocks + 1 block vacation)	ICU	8 blocks				
				ELE	2 blocks		
		NICU	2 blocks				
		Vacation	1 block				

4. MAPPING OF LEARNING OBJECTIVES AND COMPETENCY ROLES TO PROGRAM ROTATIONS: (APPENDICES 1&2)

1. General Critical Care Rotation

Recommended Distribution of Rotations: 20 blocks during junior residency and 15 blocks during senior residency

Adult medical and surgical critical care units' rotations provide residents with the opportunity to manage patients with life-threatening conditions that often affect multiple organs and systems. Training should develop Residents' ability to demonstrate integrated medical knowledge and skills to provide patient-cantered, safe, and high-quality care. Residents will develop skills in providing advice to and planning care for critically ill patients, considering the patients' clinical status, surrounding environment, cultural preferences, and available resources. Timely decision making with the ability to organize and participate in teamwork is an essential skill that must be developed.

Residents should be able to independently conduct comprehensive and multidisciplinary rounds to assess patients, synthesize differential diagnoses, and create problem lists and plans for action.

Residency rotation in Critical Care Medicine should produce Critical Care Medicine physicians with the following basic competencies:

Required Domains

A. Knowledge

By the end of this rotation, the Resident should develop competencies in managing the following domains: (K)

1. Shock
    - Hypovolemic
    - Cardiogenic
    - Distributive
    - Obstructive
2. Myocardial infarction and its complications
3. Cardiac arrhythmia, conduction disturbances, and indications for pacemakers
4. Pulmonary embolism
5. Pulmonary edema (cardiogenic and non-cardiogenic)
6. Cardiac tamponade and other acute pericardial diseases
7. Acute valvular disorders
8. Acute aortic and peripheral vascular disorders including arteriovenous fistulae (optional)
9. Acute complications of cardiomyopathies and myocarditis
10. Vasoactive and inotropic therapy
11. Complications of devices and artificial hearts (optional)
12. Complications of angioplasty (optional)
13. Current concepts of the Frank–Starling law of the heart and perfusion for calculating and interpreting hemodynamic parameters
14. Hemodynamic effects caused by ventilator assist devices

15. Thrombolytic therapy
16. Perioperative management of patients undergoing cardiovascular surgery (optional)
17. Recognition, evaluation, and management of hypertensive emergencies

Respiratory, Physiology, Pathology, and Therapy (K)

1. Acute respiratory failure:
    - Acute respiratory distress syndrome (ARDS)
    - Hypercapnic
    - Hypoxemic
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 obstructions
8. Drowning
9. Pulmonary function tests:
    - Pulmonary mechanics
    - Respiratory adequacy (arterial and venous blood gas interpretation)
10. Oxygen therapy
11. Hyperbaric oxygenation
12. Mechanical ventilation:
    - Pressure and volume modes

- Positive end-expiration pressure, intermittent mandatory ventilation, continuous positive airway pressure, high-frequency ventilation, inverse-ratio ventilation, pressure-support ventilation, negative-pressure ventilation
- Extracorporeal membrane oxygenation (ECMO)
- Indications for and hazards of mechanical ventilation
- Barotrauma
- Criteria for weaning and weaning techniques
- Extracorporeal membrane oxygenations (desirable for pediatrics)

13. Airway maintenance (K, S)
    - Emergency airway management
    - Endotracheal intubation
    - Tracheostomy
    - Long-term intubations versus tracheostomy
14. Ventilatory muscle physiology, pathophysiology, and therapy (K, S)

Renal Physiology, Pathology, Pathophysiology, and Therapy (K, S)

1. Renal regulation of fluid balance and electrolytes
2. Renal failure (pre-renal, renal, and post-renal)
3. Derangement secondary to alterations in osmolality and electrolytes
4. Acute acid-base disorders and their management
5. Principles of hemodialysis, peritoneal dialysis, ultrafiltration, continuous arteriovenous hemofiltration (CAVH), and continuous venovenous hemofiltration (CVVH)
6. Interpretation of urine electrolytes
7. Evaluation of oliguria
8. Drug dosing in renal failure

Central Nervous System Physiology, Pathology, Pathophysiology, and Therapy (K)

1. Coma
    d. Metabolic
    e. Traumatic
    f. Infectious
    g. Mass lesions
    h. Vascular anoxic-ischemic
    i. Drug-overdose-induced:
        - Barbiturates
        - Narcotics
        - Tranquilizers
        - Organophosphates
        - β-blockers
        - Controlled drugs
        - Paracetamol
        - Tricyclic antidepressants
        - "Street" drugs
        - Salicylate or acetaminophen
        - Petroleum distillates
        - Heavy metals
        - Industrial products
        - Alcohol
        - Cocaine
2. Hydrocephalus
3. Psychiatric emergencies
4. Preoperative management of patient undergoing neurological surgery (K, S)

5. Brain death evaluation and certification (K, S)
6. Diagnosis and management of persistent vegetative states (K, S)

Infectious Disease Physiology, Pathology, Pathophysiology, and Therapy (K)

1. Antimicrobial agents:
    - Aminoglycosides
    - Antifungal agents
    - Anti-tuberculosis agents
    - Penicillin and other antibiotics
    - Antiviral agents
    - 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 critically ill patients
7. Adverse reactions to antimicrobial agents
8. AIDS
9. Infectious risks to health care workers

Hematological Disorders Secondary to Acute Illness (K)

1. Acute defects in hemostasis:
    - Thrombocytopenia
    - Disseminated intravascular coagulation
    - Primary fibrinolytic therapy
2. Anticoagulation and fibrinolytic therapy
3. Principles of blood component therapy:
    - Platelet transfusion

- Packed red cells, including frozen red cells
- Fresh frozen plasma
- Specific coagulation factor concentrates
- Albumin and plasma protein fraction
- Stroma-free hemoglobin
- White blood cell transfusion
- 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 (optional)
8. Sickle cell crisis
9. Plasmapheresis

Gastrointestinal (GI), Genitourinary (GU), and Obstetric/Gynecological (Ob/Gyn)

Acute Disorders (K)

1. Acute pancreatitis with shock
2. Upper GI bleeding including variceal bleeding
3. Lower GI bleeding
4. Acute and fulminant hepatic failure
5. Toxic mega colon
6. Acute perforations of the GI 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 and amniotic fluid embolism (optional for pediatrics)
13. Hydatidiform mole
14. Perioperative management of patients undergoing GI, GU, or Ob/Gyn surgery
15. Stress ulcer prophylaxis
16. Drug dosing in hepatic failure

Immunology and Transplantation (K, S)

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

Trauma and Burns (K, S)

1. Initial approaches to the management of multisystem trauma
2. Central nervous system trauma (brain and spinal cord)
3. Skeletal trauma including the spine
4. Chest trauma:
    - Blunt
    - Penetrating
    - Cardiac
5. Abdominal trauma (blunt and penetrating)
6. Crush injury

Monitoring, Bioengineering, and Biostatistics

1. Prognostic indices and severity and therapeutic intervention scores (K)

2. Principles of electrocardiographic monitoring, measurement of skin temperature and resistance, and transcutaneous measurement (K)
3. Invasive hemodynamic monitoring (k):
    - Principles of strain gauge transducers
    - Signal conditioners, calibration, and gain adjustment
    - Display techniques
    - Principles of arterial, central venous, and pulmonary arterial pressure catheterization and monitoring
    - Assessment of cardiac function and derived hemodynamic parameters
4. Noninvasive hemodynamic monitoring (S)
5. Electrical safety (S)
6. Thermoregulation (S)
7. Brain monitoring (intracranial pressure, cerebral blood flow, cerebral metabolic rate, and electroencephalograms)
8. Respiratory monitoring (airway pressure, intrathoracic pressure, tidal volume, pulse oximetry, dead-space-to-tidal volume ratio, compliance, resistance, and capnography) (K, S)
9. Metabolic monitoring (oxygen consumption, carbon dioxide production, and respiratory quotient) (K)
10. Use of computers in critical care units (optional) (K, S)

Administrative and Management Principles and Techniques (S)

1. Recommendations for training physicians in Critical Care Medicine
2. Organization and staffing of critical care units
3. Standards for special care units and the Joint Commission on Accreditation of Health Care Organizations
4. Medical record keeping in special care units:
    - Problem-oriented record approach

- System-structure record approach
- Manual versus mechanical (computerized) record generation
- Organization for physician, nursing, technical, and laboratory records within special care units

5. Prioritize the care of 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

Pharmacokinetics and Dynamics: Drug Metabolism and Excretion in Critical Illness (K)

1. Uptake
2. Metabolism
3. Excretion

Ethical and Legal Aspects of Critical Care Medicine (K, S, A)

1. Death and dying
2. Foregoing life-sustaining treatment and orders not to resuscitate
3. Standards of treatment for patients with disabilities and mental retardation
4. Rights of patients and the right to refuse treatment
5. Living wills, advance directives, durable power of attorney (options)

Psychosocial Aspects (K)

1. Awareness of the physiological and social effects of life-threatening illnesses on patients and their families (optional).

Medical Economics (K)

1. Essential principles of hospital financial reimbursement.

B. Skills

The Resident must be proficient in the following procedural skills and understand the indications, contraindications, complications, and pitfalls of these interventions.

By the end of this rotation, Residents should develop competency in managing the following domains:

1. Airway Management:
    - Open airway maintenance in non-intubated, unconscious, paralyzed patients
    - Intubation (oral and nasotracheal)
    - Cricothyrotomy, transtracheal catheterization, and tracheostomy
2. Breathing and Ventilation:
    - Ventilation of bag and mask
    - 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 non-invasive ventilation
    - Airway pressure release ventilation
    - Suction techniques
    - Chest physiotherapy and incentive spirometry (optional)
    - Fiber optic laryngo-tracheobronchoscopy
    - Weaning techniques
    - Management of pneumothorax (needle and chest tube insertion drainage systems)
    - Monitoring of airway pressures
    - Operation of mechanical ventilators
    - Measurement of endotracheal tube cuff pressures

- Interpretation of sputum cultures by smear
- Performance of bedside pulmonary functions tests
- Application of appropriate oxygen therapy

3. Circulation:
    - Arterial puncture and blood sampling
    - Insertion of monitoring lines
        - Central venous
        - Arterial
        - Pulmonary artery catheters
    - Pericardiocentesis
    - Management of arterial and venous air embolism
    - Trans venous pacemaker insertion
    - Cardiac output estimates by thermos-dilution techniques
    - Use of computers and calculators to determine derived parameters including systemic and pulmonary vascular resistance
    - Obtain 12-lead ECGs
    - Dynamic ECG interpretation
    - Infusion of epinephrine, dopamine, norepinephrine, nitroglycerin, dobutamine, isoproterenol, nitroprusside, and other vasoactive drugs
    - Use of infusion pumps for vasoactive drugs
    - Cardioversion
    - Application and regulation of intra-aortic assist devices
    - Application of noninvasive cardiovascular monitoring
    - Transcutaneous pacing/defibrillation
4. Central Nervous System:
    - Lumbar puncture

- Management of intracranial pressure monitors and intracranial hypertension (optional)
- Monitoring of modified EEG
- Application of hypothermia

5. **Renal:**
   - Management of peritoneal dialysis
   - Management of Continuous renal replacement therapy (CRRT)
   - Insertion of hemodialysis catheters
6. **GI Tract:**
   - Insertion of trans-esophageal devices
   - Prevention and management of upper GI bleeding
7. **Hematology:**
   - Insertion of trans-esophageal devices
   - Management of massive transfusions
   - Auto-transfusion
   - Proper ordering and interpretation of coagulation studies
8. **Infection:**
   - ICU sterility techniques and precautions
   - Proper Hand Hygiene
   - Sampling, staining, and interpretation of blood, sputum, urine, drainage, and other bodily fluids.
   - Interpretation of antibiotic levels and sensitivities
9. **Metabolism and Nutrition:**
   - Tube feeding
   - Parental nutrition
   - Monitoring and assessment of metabolism and nutrition
   - Maintenance of temperature homeostasis

10. Monitoring of Bioengineering:

- Utilization, zeroing, and calibration of transducers
- Use of amplifiers and recorders
- Troubleshooting equipment
- Correcting basic electrical safety hazards

11. Trauma:

- Temporary immobilization of fractures
- G-suit applications
- Use of special beds (e.g., circular electrical bed, roto bed, and Flexicare bed)
- Peritoneal lavage

12. ICU Laboratory:

- Blood gas analysis
- Calculation of oxygen content, intrapulmonary shunt, alveolar-arterial gradients, systemic and pulmonary vascular resistance, oxygen transport, and oxygen consumption

C. Attitude

By the end of this rotation, Residents should be able to:

1. Demonstrate effective, appropriate, and timely consultation with another health professional, as required for optimal patient care. (S, A)
2. Arrange appropriate follow-up care services for patients and their families. (S)
3. Collaborate with other clinical teams in multidisciplinary meetings. (S)
4. Fulfill the regulatory and legal obligations required of current practice. (S)
5. Participate in Saudi and international professional organizations. (S)

6. Maintain patient privacy and confidentiality.
7. Manage conflicts of interest. (S)
8. Demonstrate understanding of the professional, legal, and ethical codes of practice. (A)
9. Participate in effective teamwork and demonstrate a respectful attitude toward colleagues and staff members in inter- and intraprofessional teams. (S, A)
10. Demonstrate teamwork to prevent conflicts and be able to identify and negotiate overlapping and shared responsibilities. (S, A)
11. Recognize one's own differences, misunderstandings, and limitations with respect to others' perspectives and opinions. (A)
12. Recognize one's own knowledge gaps in clinical and other professional encounters. (A)
13. Promote patient safety and maintain a safe learning environment. (S, A)
14. Demonstrate a teamwork attitude and promote collaborative learning. (A)
15. Exhibit willingness to learn from and use errors to improve the system or processes of care. (A)
16. Pose medically and scientifically relevant questions amenable to scholarly investigation and address the critique of a given scholarly question. (S, A)
17. Recognize issues where health advocacy is appropriate. (S, A)
18. Respect and empower patient autonomy. (A)

2. Coronary Care Unit (CCU) Rotation

Recommended Distribution of Rotations: 2 blocks during Residency (R2)

This rotation in the Coronary Care Unit is designed to provide Residents with a learning environment for conducting cardiovascular examinations in patients with acute cardiac disorders. The goal of this rotation is to expose Residents to patients who require intensive management and monitoring and to introduce the initial stages of cardiac rehabilitation.

A. Knowledge

By the end of this rotation, the Resident will gain experience in handling patients with acute cardiac disorders, including all modalities of therapy, and will be able to

Medical Expert

1. Manage a wide variety of acute cardiac problems in the CCU including acute coronary syndrome, arrhythmias, syncope, cardiogenic shock, and congestive heart failure. (S)
2. Identification of hemodynamic complications in acute valvular (native and prosthetic) diseases. (K)
3. Describe the basic principles of applying an intra-aortic balloon pump and its indications and contraindications. (K)
4. Define the common pathophysiology and management of patients admitted to cardiac critical care settings who present with: (K)
    - Coronary artery disease, acute myocardial ischemia and infarction, complications of myocardial infarction, and thrombolytic therapy.
    - Valvular heart disease, showing familiarity with the pathophysiological alterations induced by chronic valvular disease in critically ill patients.

- Shock and the use of volume resuscitation, venodilators/constrictors, inotropes, and lusitropes.
- Cardiac tamponade or constrictive pericarditis.
- Dilated, restrictive, and obstructive cardiomyopathy; congestive heart failure; and diastolic dysfunction.
- Aberrant conduction, dysrhythmia, and sudden acute and subacute ventricular and supraventricular arrhythmias.
- Pacemakers and the indications for and applications of the various modes of temporary pacing.
- Aortic dissection, thoracic and thoracoabdominal aortic aneurysm.
- Pulmonary edema.
- Commonly used cardiac drugs, heparin, thrombolytic and antiplatelet agents, and their appropriate dosages.
- Anti-fibrinolytic agents and their mechanism of action.
- Commonly used vasodilators, vasoconstrictors, and inotropic and lusitropic agents, and their dosages and effects.
- Commonly used anti-arrhythmic agents.

5. Discuss the prophylaxis and treatment of subacute bacterial endocarditis (SBE). (K)

Communicator

1. When a patient presents with a cardiac problem, the Resident should be able to:
    - Obtain a complete and thorough history with emphasis on the present problem. (S)
    - Perform a general physical examination, including a detailed examination of the cardiovascular system. (S)
    - Identify and interpret the significance of any abnormal physical findings related to diseases of the cardiovascular system. (S)

2. Document the basic essential components of all clinical encounters by clearly utilizing progress, procedural, and consultation notes. The synthesis and management plans should be recorded at a level consistent with the training level. (S)
3. Be aware of the importance of clear and effective communication with patients as well as the involved family members and other members of the health care team. (A)
4. Refer problem issues or problem cases appropriately. (A)

Collaborator (A)

1. Recognize and integrate the roles of other health care providers into patient management.
2. Consult with other physicians and health care professionals.
3. Work effectively as part of a multidisciplinary team.
4. Act as a leader of a multidisciplinary team.
5. Contribute to the education of medical, nursing, and paramedical staff.
6. Continue to develop respect and appreciation for the importance of communication with allied health care workers and referring physicians in patient care.

Leader

1. Describe the duties of an intensive care specialist and CCU director. (K)
2. Utilize resources to effectively balance patient care and health care economics. (S)
3. Work to develop effective and efficient patient management strategies by: (S)
    - Avoiding the duplication of services
    - Involving other caregivers
    - Using information technology appropriately.

- Knowing the physical requirements of the CCU design
- Contributing to unit activities and encouraging others to do so by instilling enthusiasm among workplace colleagues
- Obtaining an in-depth experience in acute cardiac care by being responsible for the management of patients in the CCU.

Health Advocate (K, A)

1. Recognize the role played by physicians in the care of patients with cardiac disease in the health care system.
2. Apply knowledge of patient autonomy and the religious, ethnic, and psychosocial factors that influence the physician–patient relationship and consider these factors when solving problems and understanding decisions made by patients and their families.

Scholar (K)

1. Accumulate the necessary knowledge to be a competent Critical Care Medicine physician.
2. Apply basic and clinical science to patient care. (K, S)
3. Critically appraise and assess current scientific developments. (S, A)
4. Incorporate evidence-based medicine and appropriate references to the literature in complex cases. (S)
5. Recognize the ongoing need for self-assessment and the role of self-directed learning. (A)

Professional

1. Develop an ethical framework for delivery of the highest quality care. (S)
2. Embrace attitudes conducive to effective relationships between physicians and patients/families, physicians and other physicians, and physicians and allied healthcare workers (A).
3. Understand professional obligations to patients and colleagues (A).

4. Exhibit appropriate personal and interpersonal professional behaviors (A).
5. Act with integrity, honesty, fairness, and compassion to deliver the highest quality healthcare (A).

B. Skills

By the end of this rotation, the Resident will be able to:

1. Interpret and identify different ECG rhythms (ischemia, infarction, arrhythmia, and paced rhythms).
2. Place ECG leads correctly.
3. Perform pacemaker insertion, invasive and noninvasive hemodynamic and cardiac output monitoring, cardioversion, arterial line insertion, and pericardiocentesis under the supervision of a cardiologist.
4. Apply the principles of advanced cardiac life support (ACLS).
5. Interpret ABG and acid-base balance.
6. Apply appropriate monitoring and end points of resuscitation.
7. Distinguish between palliative care and end-of-life care.
8. Assist in temporary pacemaker insertion and removal.
9. Apply aseptic and antiseptic techniques

C. Attitudes

At the end of this rotation, the Resident will be able to:

1. Perform clinical consultations, including the presentation of well-documented assessments and recommendations in written and/or verbal forms in response to requests from other healthcare professionals. (S)
2. Identify and appropriately respond to relevant ethical issues in patient care and medical decision making. (S, A)

3. Prioritize professional duties when faced with multiple patients and problems.
4. Establish therapeutic relationship with patients and their families respectfully, effectively, and efficiently.
5. Demonstrate sensitivity to the preferences of patients and their families when arriving at a management plan.
6. Work well with faculty, nursing staff, and department staff.
7. Respect diversity and cultural, spiritual, emotional, and age-specific differences in patients and other members of the healthcare team.
8. Demonstrate effective listening skills. (S, A)
9. Ensure appropriate informed consent is obtained for procedures. (S, A)
10. Document appropriate pre-procedure assessment. (S)
11. Use effective feedbacks provided by others.
12. Negotiate and resolve conflicts. (S)
13. Participate as a member of the healthcare team.
14. Recognize limitations in the level of training and seek help appropriately as needed.
15. Utilizes subspecialty consultation appropriately. (S, A)
16. Take responsibility and accountability for decisions. (S, A)

3. Critical Care Echocardiography Rotation

Recommended Distribution of Rotations: 1 block during junior Residency

This rotation is designed to provide Residents with skills in the assessment of critically ill patients by identifying and treating the underlying causes of hemodynamic instability in a timely manner, guiding clinical decision-making, and thereby preventing or decreasing mortality and morbidity.

The objective of this rotation is to equip Residents to become competent in the assessment of critically ill patients using focused and goal-directed cardiac examinations via appropriate transthoracic echocardiography (TTE); however, it is not intended to replace detailed TTE by a cardiologist.

A. Knowledge

Medical Expert

At the end of the learning period, Residents are expected to:

1. Identify basic anatomy and pathology of the heart. (K)
2. Explain common variations in anatomy and pathology. (K)
3. Describe the importance of proper patient positioning for optimal cardiac examinations. (K)
4. Describe the basic principles of cardiac transducer orientation and positioning.
5. Define the anatomy and orientation of basic echocardiographic views.
6. Execute a safe and optimal echocardiographic examination via the transthoracic approach in acutely ill patients. (S)
7. Interpret a "focused" and "goal-directed" echocardiographic examination. (S)
8. Provide focused or goal-directed examinations that are usually related to: (S)
    - Left ventricular size and function
    - Right ventricular size and function
    - Pericardial space for fluid and tamponade
    - Fluid status and responsiveness
9. Identify causes of hemodynamic instability: (K)
    - Cardiogenic
    - Distributive
    - Hypovolemic

Communicator (S)

The Resident is expected to be able to:

1. Establish effective communication with patients and their families, and obtain appropriate information relevant to the performance of a planned echocardiographic study. (A)
2. Establish effective communication with medical and non-medical colleagues. (A)
3. Refer problem issues or problem cases appropriately. (A)
4. Communicate effectively and efficiently with colleagues both verbally and through written records (e.g., medical records, discharge summaries, consultation reports, family conferences). (A)

Collaborator (A)

The Resident is expected to be able to:

1. Work cooperatively with other healthcare professionals involved in the care of patients in an echocardiography laboratory.
2. Work effectively as part of a multidisciplinary team.
3. Work collaboratively with paramedical staff.

Leader

1. Triage multiple requests for echocardiographic studies. (S)
2. Disinfect the echocardiography equipment and demonstrate knowledge of the proper care and handling of the equipment.
3. Demonstrate different equipment models, specifications, and use. (K)

Health Advocate

The Resident is expected to be able to:

1. Recognize the risk factors for a variety of common critical cardiac illnesses and counsel families and colleagues in such a way as to minimize the risk. (K)

2. Ensure that patient welfare always takes precedence in the event of medical, political, or ethical conflicts. (A)
3. Identify and minimize the stress placed on patients, their relatives, and hospital staff. (A)

Scholar

The Resident is expected to be able to:

1. Apply basic and clinical science to patient care. (S)
2. Establish a comprehensive self-directed learning and educational strategy. (A)
3. Appreciate the role of critical appraisal in the assessment of current scientific development. (A)
4. Commit to forever push the boundaries of excellence in caring for critically ill patients. (A)

Professional

The Resident is expected to be able to:

1. Develop an ethical framework for the delivery of the highest quality care. (S)
2. Recognize professional obligations to patients and colleagues. (A)
3. Exhibit appropriate personal and interpersonal professional behaviors. (A)
4. Act with integrity, honesty, fairness, and compassion in the delivery of the highest quality healthcare. (A)

B. Skills

At the end of the learning period, Residents are expected to:

1. Manage multiple requests for echocardiographic studies.
2. Order basic diagnostic ECHO procedure.

3. Interpret the radiologic imaging of thoracic abnormalities, such as chest radiography, CMR, and cardiac CT.
4. Disinfect echocardiography equipment and demonstrate the proper care/handling of this equipment.
5. Demonstrate the use of related equipment.
6. Identify and optimize the patient at higher risk

C. Attitude

At the end of the rotation, the Resident is expected to:

1. Recognize the risk factors for a variety of common critical cardiac illnesses and counsel families and colleagues in such a way as to minimize the risk.
2. Prioritize patients' welfare at all times.
3. Identify and minimize the stress placed on patients, their relatives, and hospital staff.
4. Communicate with patients and their families effectively and obtain appropriate information relevant to the performance of a planned echocardiographic study.
5. Address problem issues or cases and make proper referrals when deemed necessary.
6. Communicate effectively and efficiently with colleagues both verbally and through written records (e.g., medical records, discharge summaries, consultation reports, family conferences).
7. Collaborate with other healthcare professionals involved in the care of patients in the echocardiography laboratory.

4. Cardiac Surgery ICU Rotation

Recommended Distribution of Rotations: 2 blocks during senior Residency

The cardiac surgery ICU rotation offers students an opportunity to work with a multidisciplinary care team in the adult critical care unit. During the rotation, students will have the opportunity to practice clinical decision-making and procedural skills within the field of cardiac surgery.

Residents completing rotations in the Cardiac Surgery ICU should achieve competency in the management of routine postoperative cardiac surgery patients.

A. Knowledge

By the end of their rotation, Critical Care Medicine Residents will be able to

Medical Expert

1. Manage routine postoperative cardiac surgery patients, patients undergoing valve replacement or repair (aortic and mitral), and patients undergoing major vascular surgery such as abdominal and thoracic aortic aneurysm repair and aortobifemoral grafting procedures. (S)
2. Recognize postoperative complications, generate a differential diagnosis, and plan appropriate investigation and management. (S)
3. Identify basic uses of intra-aortic balloon pumps and extracorporeal membrane oxygenation. (K)
4. Discuss basic science as applied to the critical postoperative period after coronary artery bypass grafting, valve replacement or repair, and major vascular surgery. (K)
5. Identify neurological sequelae after cardiac surgery. (K)
6. Recognize gastrointestinal complications following major vascular surgery. (K)
7. Recognize parameters used for assessing postoperative blood loss. (K)

8. Describe the significance of temperatures postoperatively in cardiac and vascular patients. (K)

Physiology and Anatomy

1. Describe coronary anatomy and physiology in detail and their relevance to ischemia. (K)
2. Define the important aspects of the anatomy and physiology of the cardiac valves, left and right ventricles (e.g., determinants of cardiac output, autoregulation), circulatory system, aorta, and pulmonary circulation. (K)
3. Identify and differentiate the normal and abnormal conduction pathways, and their clinical significance. (K)
4. Describe cardiac anatomy and physiology in detail and their relevance to ischemia. (K)
5. Describe the complex anatomy, pathology, and natural history of coronary artery disease. (K)
6. Define the important aspects of the anatomy and physiology of the cardiac valves, left and right ventricles (e.g., determinants of cardiac output and autoregulation), circulatory system, aorta, and pulmonary circulation. (K)
7. Differentiate the normal and abnormal conduction pathways and its clinical significance. (K)
8. Explain the advantages and disadvantages of diagnostic tools for evaluating cardiac diseases. (K)
9. Explain the advantages and disadvantages of various treatment options for cardiac diseases. (K)
10. Interpret normal and common abnormalities associated with cardiac diseases, including echocardiography (e.g., identification of valve stenosis and regurgitation). (K)

11. Recognize the risks, benefits, and complications of various treatment modalities. (K)
12. Discuss basic science as applied to the critical postoperative period after coronary artery bypass grafting, valve replacement or repair, and major vascular surgery. (K)

Pharmacology

1. Describe commonly used cardiac drugs, heparin, thrombolytic and antiplatelet agents, and their dosages. (K)
2. Identify the use of blood products (e.g., packed red blood cells [PRBC], fresh frozen plasma [FFP], platelets, cryoprecipitate), blood alternatives (e.g., albumin, synthetic starches), and transfusion reactions and complications. (K)
3. Define commonly available coagulation drugs (e.g., DDAVP, activated factor VII, and protamine) and their indications, contraindications, and complications. (K)
4. Explain commonly used vasodilators, vasoconstrictors, and inotropic and lusitropic agents, and their dosages and effects. (K)
5. Define antiarrhythmic agents (e.g., procainamide, amiodarone, and sotalol) commonly used for prophylaxis and treatment of postoperative atrial fibrillation, supraventricular tachycardia, and ventricular arrhythmias. (K)
6. Describe commonly used cardiac drugs, heparin, thrombolytic and antiplatelet agents, and their dosages. (K)

Communicator

The Resident should be able to:

1. Obtain an accurate and relevant history, and perform a detailed physical examination using effective listening skills. (K)

2. Explain the critical care patients' status and expected progress to their families. (K)
3. Communicate patient information to and outline a management plan for the attending physician in a professional and intelligent manner. (A)
4. Communicate management plans effectively in routine and emergency situations. (A)
5. Discuss the clinical parameters of possible surgical reexploration in a calm and intelligent manner. (K)

Collaborator

1. Recognize and integrate the roles of other healthcare providers in patient management. (A)
2. Differentiate the critical differences between medical and surgical postoperative bleeding and collaborate with surgeons. (A)
3. Recognize the most common complications after cardiac surgery and facilitate interactions with cardiac surgeons and ICU staff. (A)
4. Effectively consult with other physicians and health care professionals. (A)
5. Work effectively as part of a multidisciplinary team. (A)
6. Act as a leader of a multidisciplinary team. (A)
7. Contribute to the education of medical, nursing, and paramedical staff. (A)
8. Continue to develop respect for and appreciation of the importance of communication with allied healthcare workers and referring physicians in patient care. (A)

Leader

1. Discuss the duties of the cardiac surgery intensive care specialist and unit director. (K)

2. Utilize resources to effectively balance patient care and health care economics. (S)
3. Work to develop effective and efficient patient management strategies by:
    - Collaborative care plans in resource optimization. (A)
    - Appropriate time management in coordinating discharge with scheduled surgical admissions and the impact of surgery cancellations due to limited resources on patients and families, the use of waiting lists, and effective human resource allocation. (S)
    - Arranging the discharge of postoperative cardiac patients according to their needs (e.g., step-down or telemetry floors). (S)

Health Advocate

1. Recognize the impact of a collaborative care plan on facilitating patient care. (A)
2. Recognize the importance of pain management, arrhythmia prophylaxis, etc., on hospital length of stay. (K)

Scholar

Residents must develop scholarship in several areas as follows:

1. Identify important determinants of the health and success of cardiac patients during ICU admission for cardiac surgery (K)
2. Identify areas of controversy in the management of Critical Care Medicine patients using clinical observations and literature reviews and seek to practice evidence-based medicine. (K)
3. Contribute to the medical education of other health professionals (e.g., clerks, novice nurses, and respiratory therapists). (A)
4. Apply basic and clinical science to patient care. (S)
5. Recognize the ongoing need for self-assessment and the role of self-directed learning. (A)

Professional

1. Develop an ethical framework for the delivery of the highest quality care. (K)
2. Embrace the attitudes conducive to effective relationships between physicians and patients/families, physicians and other physicians, and physicians and allied healthcare workers. (A)
3. Understand professional obligations to patients and colleagues. (A)
4. Exhibit appropriate personal and interpersonal professional behaviors. (A)
5. Act with integrity, honesty, fairness, and compassion in the delivery of the highest quality healthcare. (A)
6. Remain calm and organized in stressful or emergency situations. (A)

B. Skills

By the end of the rotation, the Resident will be able to:

1. Insert arterial and central venous cannulation, peripheral venous cannulation, and pulmonary artery catheterization. (S)
2. Interpret central venous pressure (CVP) and data from the pulmonary artery catheter (pulmonary artery pressure [PAP], pulmonary capillary wedge pressure [PAWP], and cardiac output) as well as know the indications, complications, and management of these procedures. (S)
3. Describe the basics of introductory trans-esophageal echocardiography (TEE) and its application in critical care patients. (K)
4. Perform laboratory monitoring of the coagulation system in postoperative cardiac or vascular patients. (S)
5. Interpret the radiological imaging of thoracic abnormalities, such as chest radiography, CMR, and cardiac CT. (K)

6. Categorize the patients who underwent surgery based on their preoperative evaluation. (K)
7. Discuss the principles of myocardial protection, cardiopulmonary resuscitation, and e-CPR. (K)
8. Formulate a clear management plan to the common cardiac surgery conditions. (S)
9. Take patient's consent in accordance with approved standards. (S)
10. Interpret ABG results and acid-base balance. (S)
11. Assist in cardiac surgery procedures. (S)
12. Manage routine postoperative cardiac surgery patients, patients undergoing valve replacement or repair (aortic and mitral), and patients undergoing major vascular surgery such as abdominal and thoracic aortic aneurysm repair and aortobifemoral grafting procedures. (S)
13. Recognize postoperative complications and generate a differential diagnosis to plan appropriate investigation and management. (S)
14. Demonstrate basic use of intra-aortic balloon pumps and extracorporeal membrane oxygenation. (S)

C. Attitudes

1. Perform a clinical consultation, including the presentation of well-documented assessments and recommendations in written and/or verbal forms in response to requests from other healthcare professionals. (S)
2. Establish therapeutic relationships with patients and their families respectfully, effectively, and efficiently. (A)
3. Demonstrate sensitivity to the preferences of patients and their families when arriving at a management plan. (A)

4. Respect diversity and cultural, spiritual, emotional, and age-specific differences in patients and other members of the healthcare team. (A)
5. Ensure appropriate informed consent is obtained for procedures. (S)
6. Demonstrate the ability to prioritize professional duties. (A)
7. Effectively use feedbacks provided by others. (A)
8. Communicate any critical concerns or complications related to the procedure performed with other teams and formulate management plans. (A)
9. Ensure adequate follow-up is arranged for procedures performed. (S)
10. Demonstrate medical expertise as needed in situations other than patient care, such as providing expert legal testimony or advising governments. (A)

5. Anesthesia Rotation

Recommended Distribution of Rotations: 3 blocks during junior residency (R1-R3)

The anesthesia rotation is intended to provide Residents with the necessary cognitive and technical skills in the operating room and is assigned to theater lists in the fields of general surgery; orthopedics; gynecology; urology; Ear, Nose, and Throat; dentistry; vascular surgery; plastic surgery; ophthalmology; off-site anesthesia (e.g., radiology); and accidents and emergency anesthesia on a daily or weekly basis.

A. Knowledge

Medical Expert

By the end of this rotation, the Resident will be able to:

1. Explain the adult anatomy and physiology of the following systems, and the pathophysiology of the disease states that affect them: (K)
    - Cardiovascular

- Upper airway and respiratory
- Central and peripheral nervous
- Hepatic
- Renal
- Endocrine
- Hematologic

2. Identify risk factors for postoperative complications and modify anesthetic plans to minimize complications. (K)
3. Explain the principles of the function of all anesthetic equipment, including the anesthetic machine, mechanical ventilator, safe delivery of anesthetic gases, and monitoring equipment. (K)
4. Recognize the pharmacology of anesthesia, analgesia, and sedation. (K)
5. Define and describe the airway. (K)
6. Describe the benefits and risks of hemotherapy. (K)
7. Recognize the anticipated complications in surgical patients. (K)
8. Describe the methods of resuscitation of shock. (K)
9. Identify treatment options for common complications. (K)
10. Recognize prevention and treatment of infectious complications. (K)

Communicator

1. Establish a therapeutic relationship with patients and family members as appropriate, including:
    - Encouraging patient participation in decision-making in consultative, elective, and emergency situations, as well as in more challenging situations such as patient anger or confusion, language or ethnocultural differences, or extremes of age (A)
    - Listening to patients, answering their questions, and attempting to alleviate their anxiety (A)

- Demonstrating respect and empathy in relationships with patients (A)

2. Gather sufficient information from patients, family members, and medical personnel to identify all issues with implications for perioperative management, including: (A)
    - The medical and surgical status of the patient
    - Patient expectations, beliefs, and concerns (in addition to medical problem information), while also considering the influence of age, sex, and background (ethnocultural, spiritual, and socioeconomic) on medical problems.
3. Impart sufficient information to patients and appropriate family members or delegates to afford a complete understanding of the implications of the planned procedure, alternatives, risks, and benefits. (A)
4. Obtain complete informed consent for anesthetic care. (S)
5. Be able to break bad news to patients and family members. (A)

Collaborator

By the end of this rotation, the Resident should be able to:

1. Effectively perform duties in the clinical environment using the full abilities of all team members. (S)
2. Coordinate care of adult patients with other members of the OR team, post anesthesia care unit, ICU staff, and other physicians. (A)
3. Manage urgent and crisis situations, such as cardiac arrest, trauma, anaphylaxis, and malignant hyperthermia, as a team member or team leader. (A)
4. Resolve conflicts or provide feedback where appropriate. (A)
5. Consult with other physicians and allied health professionals to provide optimal perioperative care. (A)

6. Communicate effectively with other team members. (A)

Leader

By the end of this rotation, the Resident should be able to:

1. Demonstrate knowledge of the management of operating rooms. (K)
2. Demonstrate knowledge of the contributors to anesthetic expenditures. (K)
3. Demonstrate knowledge of the national guidelines concerning anesthetic practice and equipment. (K)
4. Record appropriate information for the anesthetics and consultations provided. (S)
5. Demonstrate knowledge of the principles of quality assurance and be able to conduct morbidity and mortality reviews. (K)
6. Utilize personal and external resources effectively to balance patient care, continuing education, practice, and personal activities. (S)
7. Manage assigned rooms/slate in terms of maintaining the schedule or changing the schedule in response to emergencies, delays, additional cases, etc. (S)
8. Manage after-hour scheduling of cases, including prioritization and adaptation to changes. (S)
9. Schedule other Residents to various listed assignments with Senior Resident. (S)
10. Use limited health resources appropriately, including:
    - Time for patient assessment, OR equipment preparation, anesthesia induction and emergence, OR changeover (S)
    - Expenses for anesthesia resources, including cost-effective choices of drugs, techniques, equipment, and invasive monitoring (S)

11. Participate in the assessment of patient care outcomes and practices, including quality assurance. This will include:
    - Maintaining a personal record of experience and outcomes (A)
    - Participating in any appropriate case reviews (A)
12. Explain how an anesthetic department is structured and managed.

Health Advocate

By the end of this rotation, the Resident should be able to:

1. Provide direction to health administrators regarding compliance with national practice guidelines and equipment standards for anesthesia. (A)
2. Recognize opportunities for anesthesiologists to advocate for resources for pain management, emerging medical technologies, and new healthcare practices. (A)
3. Recognize individual and systemic issues that affect anesthetic care and safety in adult patients. (A)
4. Communicate identified concerns and risks to patients, other healthcare professionals, and administration as necessary. (A)
5. Intervene on behalf of individual patients and the system as a whole regarding quality of care and safety. (A)
6. Identify and react to risks to health care providers such as:
    - Substance abuse among anesthesiologists and other health care providers (A)
    - Hazards in the workplace environment (A)
7. Implement standards and guidelines related to anesthetic practice and equipment. (S)

Scholar

By the end of this rotation, the Resident should be able to:

1. Develop and maintain a personal learning strategy that will continue after acquiring certification. (A)
2. Seek out and critically appraise the literature to support clinical care decisions and apply new evidence-based knowledge. (S)
3. Contribute to the appropriate application, dissemination, and development of new knowledge. (S)
4. Teach medical students, other Residents, faculty members, health professionals, and patients using the principles and methods of adult learning. (A)

Professional

The Resident should be able to:

1. Deliver the highest-quality patient care with integrity, honesty, and compassion. (A)
2. Fulfill the ethical and legal aspects of patient care. (A)
3. Maintain patient confidentiality. (A)
4. Demonstrate appropriate interpersonal and professional behavior. (A)
5. Recognize personal limitations through appropriate consultation (with staff supervisors, other physicians, and other health professionals) and show appropriate respect for those consulted. (A)
6. Recognize conflicts in patient care situations, professional relationships, and value systems and demonstrate the ability to discuss and resolve differences in opinions. (A)
7. Accept constructive feedback and criticism, and implement appropriate advice. (A)
8. Continually review one's own personal and professional abilities, and demonstrate continuing development of skills and knowledge through education. (A)

9. Identify physical and mental health problems in oneself and others, including chemical dependence, stress, depression, and ways to deal with them (A)

B. Skills

1. Perform basic and advanced airway management including: (S)
   a) Bag mask ventilation
   b) Direct laryngoscopy
   c) Use of different intubation techniques in cases of difficult intubation (e.g., laryngeal mask airway, GlideScope).
2. Insert awake fiber optic intubation. (S)
3. Appropriately administer a complete spectrum of anesthetic and analgesic agents for the induction and maintenance of anesthesia, considering the relative advantages and disadvantages of each approach, and tailoring that approach to the specific anesthetic goals for each case. (S)
4. Appropriately select a complete spectrum of drugs for cardiovascular support and resuscitation during anesthesia and the perioperative period, considering the relative advantages and disadvantages of each approach, and tailoring that approach to the specific anesthetic goals for each case. (S)
5. Perform specific techniques (under supervision) for the administration of general, local, and regional anesthesia with a sufficient range of choices to meet the anesthetic goals of all patients within the scope of the practice defined above. (S)
6. Manage complications as they occur in the perioperative period. (S)
7. Assess the suitability of discharge to the ICU, intermediate care, ward, and home settings. (S)
8. Execute plans to alleviate impediments to recovery in the perioperative period, such as: (S)

a) Postoperative nausea/vomiting
b) Pain
c) Functional impairment

9. Effectively use the anesthesia machine to provide anesthesia care, including being able to perform an appropriate safety inspection of the machine. (S)
10. Identify equipment malfunction before and during anesthesia care. (S)
11. Assess information from appropriate monitors, including invasive and noninvasive blood pressure amplifiers, 5-lead ECGs, neuromuscular monitors, oximeters, end-tidal gas monitors, temperature, urine output, and invasive monitors of cardiac output and filling. (S)
12. Identify sources of error in the above monitoring equipment. (S)
13. Administer appropriate fluids and blood products, taking into account the indications, contraindications, and correct procedures for these products. (S)
14. Manage complications of fluid and blood product administration throughout the perioperative period. (S)
15. Appropriately assess the patient and his/her risks and then formulate and implement an appropriate individualized plan for perioperative management, considering the implications of the patient's underlying problem, surgical procedure, and coexisting patient factors such as other medical problems, anxiety, discomfort, culture, language, ethnicity, age, and sex. (S)
16. Appropriately modify management in response to monitoring information and changes in patient, anesthetic, or surgical factors. (S)
17. Provide specialized anesthetic care to pregnant patients undergoing obstetric and non-obstetric procedures, geriatric patients, and ambulatory patients. (S)

18. Initiate appropriate, individualized perioperative pain management strategies. (S)
19. Manage adult patients in a variety of settings, including: (S)
    a) Elective, urgent, and emergency/trauma procedures
    b) Sites distant from the operating room
    c) Unforeseen emergencies (e.g., malignant hyperthermia, anaphylaxis)
20. Perform all the technical skills (initially under supervision and then independently) necessary to manage adult patients in the perioperative period, including: (S)
    a) Routine and difficult airway management
    b) Techniques of monitored anesthesia care (MAC)
    c) Local and regional anesthesia
    d) General anesthesia techniques including those related to induction, maintenance, and emergence
    e) Peripheral and central venous access invasive monitoring
    f) Resuscitation of critically ill adult patients (with reference to ACLS and ATLS procedures and protocols)

C. Attitudes

1. Identify and appropriately respond to relevant ethical issues arising in patient care and medical decision making (A)
2. Demonstrate ability to explain the procedure and answer all related questions and concerns raised by patients and their families. (A)
3. Ensure appropriate informed consent is obtained for procedures. (A)
4. Document appropriate pre-procedure assessment. (S)
5. Document and disseminate information related to the procedures performed and their outcomes in the form of post-procedure notes and official procedural reports. (S)

6. Communicate any critical concerns or complications related to the procedure performed with other teams and formulate management plans. (A)
7. Ensure adequate follow-up is arranged for procedures performed. (S)
8. Demonstrate medical expertise as needed in situations other than patient care, such as providing expert legal testimony or advising governments. (A)
9. Give effective feedbacks to members of the healthcare team. (A)
10. Make active use of feedback provided by others. (A)
11. Recognize limitations in the level of training and seek help appropriately as needed. (A)
12. Work well with faculty, nursing staff, and department staff. (A)
13. Utilize subspecialty consultation appropriately. (A)
14. Demonstrate responsibility and accountability for decisions. (A)

6. Cardiac /Neuro Anesthesia

Recommended Distribution of Rotations: 1 block during junior Residency (R3)

The cardiac anesthesia rotation is designed to address all issues related to anesthesia management in patients undergoing cardiac surgery, such that Residents can participate in the perioperative care of patients.

Residents are expected to become competent in the preoperative management of patients with cardiovascular diseases during this rotation. However, this rotation is not intended to produce anesthesiologists capable of independently managing anesthesia during cardiac surgery.

A. Medical Knowledge

Medical Expert

- Cardiology

At the end of this rotation, Residents should be able to:

1. Describe the basic science applied in the preoperative, intraoperative, and postoperative periods of cardiac surgery. (K)
2. Categorize normal coronary anatomy and variants, normal cardiac physiology, and the effects of disease states on normal physiology. (K)
3. Describe the anatomy and physiology of the cardiac valves, left and right ventricles, atria, major cardiac vessels, and circulatory system in both normal and diseased states. (K)
4. Identify normal conduction pathways of the heart and their clinical significance in diseases. (K)
5. Recognize the altered respiratory physiology of an immediately postoperative ventilated patient with significant surgical incisions and pain (e.g., sternotomy, large abdominal incisions). (K)
6. Identify common physiological changes occurring in the postoperative period and their impact on end-organ function (neurological, renal, cardiac, hepatic, and GI). (K)
7. Enumerate the principles and pitfalls of noninvasive and invasive blood pressure monitoring. (K)
8. Pharmacology: Resident will be able to identify:
    a) Commonly prescribed medications for cardiac surgery patients and their effects on disease and anesthetic management. (K)
    b) Commonly used cardiac anesthetics and dosages. (K)
    c) Effects of heparin, antiplatelet agents, and anesthetics. (K)
    d) Use of protamine for heparin reversal along with side effects and complications. (K)

e) Antifibrinolytic agents and their mechanisms of action and indications. (K)

f) Blood products (e.g., PRBC, FFP, platelets, cryoprecipitate) and blood alternatives (e.g., albumin, starch), as well as transfusion reactions and complications. (K)

g) Coagulation drugs (e.g., DDAVP, activated factor VIIa) and their indications, contraindications, dosages, and complications. (K)

h) Commonly used vasodilators, vasoconstrictors, and inotropic agents, and their indications, dosages, and side effects. (K)

i) Appropriate use of pain medications, nonsteroidal anti-inflammatory drugs, and RA techniques in patients undergoing cardiac surgery (K)

j) Pharmacology of perioperative risk-reduction strategies (e.g., lipid-lowering agents, β-blockers, aspirin). (K)

- Neurology

The Resident should be able to:

1. Demonstrate knowledge of the basic sciences applicable to neuroanesthesia, including neuroanatomy, neurophysiology, and neuropharmacology. (K)
2. Understand the pathway and physiology of cerebrospinal fluid (CSF) circulation and the factors affecting it and demonstrate knowledge of the anatomy of cerebral circulation, the factors affecting it, and methods for controlling ICP. (K)
3. Perform anesthesia techniques safely to avoid an increase in ICP during induction, intubation, and emergence from anesthesia. (S)
4. Demonstrate the impact of commonly performed neurosurgical procedures on anesthetic management. (K)
5. Demonstrate clinical knowledge and skills necessary for the practice of neuroanesthesia including:

- Preoperative neurological assessment (using the Glasgow Coma Scale, classification of subarachnoid hemorrhage, and basic neurological exam) (K)
- Intraoperative support (special positioning, i.e., sitting, prone, park-bench, lateral, and knee-chest). (K)
- Understanding the basic principles of neurophysiological monitoring (EEG, evoked potentials [somatosensory and brainstem auditory], and transcranial Doppler). (K)

6. Conduct cerebral oximetry and ICP monitoring methods. (S)
7. Demonstrate knowledge of specific interventions, including systemic arterial hypotension/hypertension, CSF drainage, ICP management, hypothermia, and precordial Doppler monitoring of air embolus. (K)
8. Management of specific perioperative complications such as seizures, cerebral ischemia, intracranial hypertension, intraoperative aneurysm rupture, air embolism, cranial nerve dysfunction, and neuroendocrine disturbances (e.g., diabetes insipidus, syndrome of inappropriate antidiuretic hormone secretion). (S)
9. Postoperative management of neurological patients in the post-anesthesia care unit, ICU, and neuroobservation unit.
    - Demonstrate competence in all technical procedures commonly employed in neuroanesthesia practice, including airway management (basic and advanced), cardiovascular resuscitation, neuroresuscitation, and invasive monitoring (arterial line, central line, and lumbar puncture drain placement). (S)
    - Develop and implement a rational anesthetic management plan for each of the following neurosurgical procedures: (S)
        - Craniotomy for mass lesions (tumor, abscess, hematoma)
        - Cerebrovascular procedures (aneurysm, AVM, carotid vascular disease)

- CSF shunting procedures
- Trans-sphenoidal surgery
- Stereotactic procedures
- Awake craniotomy
- Neuro-radiological procedures (embolization, thrombolytic therapy, and MRI)
- Spine surgery

Communicator

By the end of this rotation, the Resident should be able to:

1. Establish a therapeutic relationship with patients and their families within the limited time available. (A)
2. Obtain and collate a relevant history from patients and families. (S)
3. Demonstrate empathy, consideration, and compassion in communicating with patients and their families. (A)
4. Communicate with medical/surgical colleagues, nurses, and paramedical personnel regarding the anesthetic management of patients. (S)
5. Demonstrate appropriate written communication skills through accurate, legible, and complete documentation of anesthetic records, patient charts, and notes during consultations. (S)

Collaborator

By the end of this rotation, the Resident should be able to:

1. Demonstrate the ability to function in the clinical environment using the full abilities of all team members (surgical, nursing, ICU, etc.). (S)
2. Develop an anesthetic plan for their more complicated neurosurgical patients in consultation and in concert with surgery, nursing, and ICU staff. (S)

3. Understand and value the skills of other specialists and healthcare professionals. (A)
4. Understand the limits of their knowledge and skills. (A)
5. Understand, accept, and respect the opinions of others on the team. (A)
6. Function in the OR as a member of the team and work in a positive, constructive manner, respecting the importance of the roles of all team members. (A)

Leader

By the end of this rotation, the Resident should be able to:

1. Demonstrate the ability to manage the operating room. (S)
2. Ensure that the necessary equipment, monitoring, and medications are available for each case. (S)
3. Prepare for anticipated complications. (S)
4. Conduct all activities in an effective, efficient, and timely manner to avoid OR delays. (S)
5. Utilize personal resources effectively to balance patient care, continuing education, and personal activities. (S)
6. Utilize information technology to optimize patient care and lifelong learning. (S)

Health Advocate

By the end of this rotation, the Resident should be able to:

1. Recognize opportunities for Critical Care Medicine Specialists to advocate for neurosurgical patients, particularly with regard to patient safety. (A)
2. Adopt a leadership role in the postoperative care of patients by anticipating and arranging post-anesthesia unit, ICU, or neuro-observation unit care. (A)

Scholar

By the end of this rotation, the Resident should be able to:

1. Be responsible for developing, implementing, and regularly reevaluating a personal continuing education strategy. (S)
2. Contribute to the development of new knowledge through facilitation/participation in ongoing departmental research activities. (S)
3. Prepare in advance for scheduled OR cases through additional reading and patient chart reviews/assessments. (S)

Professional

By the end of this rotation, the Resident should be able to:

1. Demonstrate a commitment to executing his/her professional responsibilities with integrity, honesty, and compassion. (A)
2. Demonstrate appropriate personal and interpersonal professional behaviors and boundaries. (A)
3. Recognize the limitations of his/her personal skills and knowledge by appropriately consulting other physicians when caring for patients. (A)

B. Skills

1. Monitoring: The Resident will be able to:
    a) Interpret ECGs for ischemia, infarction, arrhythmias, and paced rhythms. (S)
    b) Recognize the limitations and sensitivity/specificity of ECGs as ischemia monitors. (S)
    c) Perform arterial and central venous cannulation (with ultrasound), peripheral venous cannulation, and pulmonary artery catheterization; interpret CVP and data from pulmonary artery catheters (e.g., PAP, PCWP, cardiac output); know the indications, complications, and management; and know the basics of

introductory TEE, including techniques of probe insertion and several basic views and their implications and applications in critical care patients. (S)

d) Perform laboratory monitoring of the coagulation system (e.g., partial thromboplastin time, international normalized ratio, and fibrinogen) as applied to cardiac patients. (S)

e) Assess the adequacy of mechanical ventilation using clinical parameters and laboratory arterial blood gas analysis. (S)

f) Recognize the parameters used to assess intraoperative blood loss and medical and surgical methods for treating blood loss. (S)

g) Discuss the significance of temperature management during the intraoperative period, including hypothermic techniques, and the importance of normothermia during beating-heart procedures. (K)

h) Recognize the indicators of volume status (especially during weaning from bypass), including findings from invasive monitors, TEE, and clinical indicators (e.g., urine volume). (S)

i) Use appropriate intraoperative blood work for the management of patient care and learn new monitoring devices (e.g., noninvasive cardiac output and bispectral index) and their potential applications during cardiac surgery. (S)

2. Clinical Assessment and Management: The Resident will be able to:

a) Complete a detailed history and physical examination, order appropriate laboratory and ancillary investigations, and provide a management plan for cardiac surgery patients. (S)

b) Confer current indications and recommendations for SBE prophylaxis. (K)

c) Manage medical bleeding. (S)

d) Correct common metabolic and electrolyte disturbances in the intraoperative period. (S)

e) Apply the basic principles of cardiac support devices, including intra-aortic balloon pumps and ECMO. (S)

f) Manage patients with complications of: (S)

- Coronary artery disease, acute myocardial ischemia and infarction, complications of myocardial infarction, and thrombolytic therapy
- Valvular heart disease and valve replacement or repair
- Aortic dissection and thoracic and thoracoabdominal aortic aneurysm
- Shock and the use of volume resuscitation, venodilators/constrictors, inotropes, and lusitropes
- Emergencies requiring ACLS
- Cardiac tamponade and constrictive pericarditis
- Dilated, restrictive, and obstructive cardiomyopathy, congestive heart failure, and diastolic dysfunction
- Aberrant conduction, dysrhythmia, and sudden acute and sub-acute ventricular and supraventricular arrhythmia
- Pacemakers and the indications for and applications of the various modes of temporary pacing
- Pneumohemothorax
- Pulmonary edema and pneumonia
- COPD, asthma, and sleep apnea in ventilated patients
- Heparin-induced thrombocytopenia and heparin resistance
- Neurologic risk stratification during cardiopulmonary bypass procedures
- Renal failure and its management
- Diabetes and endocrine control, and the implications of hyperglycemia

C. Attitudes

1. Perform a clinical consultation, including the presentation of well-documented assessments and recommendations in written and/or verbal forms in response to a request from other healthcare professionals. (A)
2. Identify and appropriately respond to relevant ethical issues arising in patient care and medical decision making. (A)
3. Demonstrate sensitivity to the preferences of patients and their families when arriving at a management plan. (A)
4. Demonstrate compassionate and patient-centered care. (A)
5. Demonstrate ability to explain the procedure and answer all related questions and concerns raised by patients and their families. (A)
6. Work well with faculty, nursing staff, and department staff. (A)
7. Respect diversity and cultural, spiritual, emotional, and age-specific differences in patients and other members of the healthcare team. (A)
8. Effectively use feedbacks provided by others. (A)
9. Negotiate and resolve conflicts. (A)
10. Participate as a member of the healthcare team. (A)
11. Recognize limitations in the level of training and seek help appropriately as needed. (A)
12. Utilize subspecialty consultation appropriately. (S)
13. Demonstrate responsibility and accountability for decisions. (A)
14. Demonstrate medical expertise as needed in situations other than patient care, such as providing expert legal testimony or advising governments. (A)

7. Emergency Medicine Rotation

Recommended Distribution of Rotations: 2 blocks during junior residency

The course is designed to expose Residents to the initial assessment and management of common medical and surgical emergencies. The instruction is cantered on bedside clinical supervision by faculty in a busy Emergency Department. A comprehensive didactic schedule is tailored to include lecture- and simulation-based sessions.

A. Knowledge

Medical Expert

At the end of this rotation, the Resident will be able to:

1. Identify common medical and surgical emergencies in adults and their management during emergency situations.
2. Describe the clinical manifestations of patients in shock.
3. Enumerate strategies for managing toxin exposure, substance abuse, and drug overdoses in patients.
4. Discuss the natural history of disease and illness.
5. Discuss the pathophysiology of disease and injury.
6. Explain ways to identify acute illness and injury promptly.
7. Discuss the following basic principles:
    a) Specific clinical presentations in ED
    b) Principles of resuscitation
    c) Principles of investigation
    d) Diagnosis and management procedures
    e) Requirements for follow-up care
    f) Principles of ED organization with respect to the corporate hospital structure
    g) Quality assurance, risk management, and standards of care
    h) Relationship between the ED and the EMS

Communicator

The Resident is expected to be able to:

1. Obtain a focused medical history from the patients or their families. (S)
2. Discuss a wide variety of medical conditions and their treatments with patients and their families in a language that they can understand. (S)
3. Establish and maintain a therapeutic relationship with patients, their families, and the medical team while fostering an environment of understanding, trust, empathy, and confidentiality. (A)
4. Accurately describe the patient's clinical condition to consultants using appropriate medical terminology. (S)
5. Initiate appropriate telephone consultations with other specialists at local and remote locations. (S)
6. Keep thorough and accurate written medical records. (S)

Collaborator

The Resident should be able to:

1. Work collaboratively with allied healthcare professionals in the emergency room. (S)
2. Develop a care plan for a patient they have assessed, including investigation, treatment, and continuing care, in collaboration with the members of the interdisciplinary team. (S)
3. Consult judiciously and effectively. (S)
4. Collaborate with other healthcare professionals to ensure the smooth transition of patient care within or outside the hospital. (S)

Leader

The Resident is expected to be able to:

1. Manage the care of multiple patients while working in the emergency department. (S)
2. Triage patients and manage emergency department flow. (S)

3. Obtain a focused history and perform a physical examination in a time-limited emergency room environment. (S)
4. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served. (S)
5. Work effectively as a member of a team. (A)
6. Practice principles of managing disasters. (K)

Health Advocate

The Resident should be able to:

1. Engage in opportunities for patient counseling and education regarding patients' diseases. (S)
2. Access relevant consultation and investigation. (S)
3. Expedite patient transfer from the emergency department. (S)
4. Ensure follow-up of care and enhance care continuity. (S)

Scholar

The Resident should be able to:

1. Identify his/her own learning needs and make use of available learning resources. (K)
2. Integrate critical appraisal of the literature into the bedside approach. (S)
3. Apply appropriate clinical evidence to patient care. (S)

Professional

The Resident is expected to be able to:

1. Treat all patients with dignity and respect. (A)
2. Be punctual for shifts, meetings, and educational events. (A)
3. Follow through on assigned tasks. (A)
4. Demonstrate integrity in all interactions with colleagues. (A)

5. Be respectful, honest, and compassionate when dealing with patients, families, and other professionals. (A)

B. Skills

At the end of this rotation, the Resident will be able to:

1. Obtain a concise and accurate patient history.
2. Perform a physical examination on patients with undifferentiated acute emergencies.
3. Implement appropriate plans of management for patients presenting with an acute emergency.
4. Develop an organized approach to resuscitation, ensuring the maintenance of the airways, breathing, and circulation.
5. Perform initial management of compromised airways, including intubation of the trachea and the use of various airway adjuncts.
6. Complete initial management of patients with cardiac arrhythmias and acute coronary syndrome.
7. Perform initial assessment and management of patient with shock.
8. Develop approaches for assessing patients with toxin exposure, substance abuse, and drug overdose.
9. Manage wide variety of acute medical conditions including:
    j. Environmental exposure (heat stroke, hypothermia, carbon monoxide poisoning, burns, and drowning or near drowning)
    k. Central nervous system disorders (acute stroke, seizure disorders, meningitis, and coma)
    l. Cardiovascular disease (hypertensive emergencies/urgencies, pulmonary edema, dissecting aortic aneurysm, and acute ischemic syndrome)

m. Respiratory diseases (acute asthma exacerbation, chronic obstructive pulmonary disease [COPD] exacerbation, pneumonia, acute respiratory distress, and acute thromboembolic disorder)
n. Gastrointestinal (GI) disorders (upper GI hemorrhage, hepatic encephalopathy, and acute liver failure)

10. Initially manage acute abdomen, trauma, and fractures and interpret the related radiological imaging.

C. Attitudes

1. Exhibit punctuality and be prepared for work.
2. Dress appropriately.
3. Treat patients, family, staff, and other personnel with respect.
4. Protect staff, family, and patient confidentiality.
5. Be sensitive to patient's pain, emotional state, and gender/ethnicity issues.
6. Accept responsibility and is accountable.
7. Demonstrate a responsive positive attitude toward feedback from other team members, patients, families, and peers.
8. Demonstrate respect for diversity and cultural, spiritual, emotional, and age-specific differences in patients and other members of the healthcare team.
9. Demonstrate ability to effectively use the feedback provided by others.
10. Participate as a member of the healthcare team.

8. Trauma Rotation

Recommended Distribution of Rotations: 1 block during junior Residency

The goal of the trauma rotation is to develop Residents' knowledge, skills, and attitudes necessary to evaluate, diagnose, and manage trauma patients. This rotation is designed so that Critical Care Medicine Residents

will gain competency and confidence in dealing with trauma patients in emergency and Critical Care Units. The general objective for the rotating Resident is to be exposed to an integral healthcare system that specializes in the care of trauma patients.

A. Knowledge

Medical Expert

At the end of this rotation, the Resident will be able to:

1. Document good patient history and physical examination (comprehensive, accurate, and concise with relevant details). (S)
2. Identify the appropriate testing required to develop a comprehensive diagnostic and treatment plan (e.g., diagnostic tests used in a cost-effective manner with an understanding of their limitations and predictive value). (S)
3. Formulate an appropriate differential diagnosis. (S)
4. Identify management strategies and diagnosis of respiratory failure. (K)
5. Recognize nutritional requirements of trauma patients. (K)
6. Describe the different types of shock, treatment and resuscitation. (K)
7. Enumerate methods to manage acute kidney injuries. (K)
8. Discuss essential medications used in acute trauma care, including indications, contraindications, and adverse effects. (K).
9. Identify use of appropriate blood product transfusion. (K)
10. Identify injury mechanisms and their possible impact on patients' presentation. (K).
11. Read and interpret a chest x-ray. (S)
12. Describe the benefits and risks of hemotherapy. (K)
13. Identify the basic knowledge of the pathophysiology of severely injured patients. (K)

14. Describe anticipated complications in severely injured patients (e.g., brain injury, flailing chest, compartment syndrome, rhabdomyolysis, coagulopathy, and wound management). (K)
15. Prioritize treatment of an injured patient. (K)
16. Practice initial assessment and management. (S)
17. Participate in triage. (S)
18. Perform resuscitation. (S)
19. Perform airway management. (S)
20. Detail the procedure in the management of oxygenation. (K)
21. Detail the procedure in the management of ventilation. (K)
22. Explain shock pathophysiology. (K)
23. Explain hemorrhagic shock. (K)
24. Participate in the initial management of hemorrhagic shock. (S)
25. Evaluate fluid resuscitation and organ perfusion. (K)
26. Participate in blood replacement. (S)
27. Identify the classifications of head injuries. (K)
28. Recognize brain death. (K)
29. Distinguish classifications of spinal cord injuries. (K)

Communicator

The Resident is expected to be able to:

1. Demonstrate the ability to council patients and families in acute trauma settings (S)
2. Ensure appropriate patient disposition, referral, and follow-up. (S)
3. Demonstrate appropriate conduct in dealing with issues of patient confidentiality and informed consent. (A)
4. Communicate effectively with a multidisciplinary team involved in patient care. (A)
5. Keep thorough and accurate written medical records. (S)

Collaborator

The Resident is expected to be able to:

1. Work collaboratively with a multidisciplinary team caring for trauma patients. (S)
2. Develop a care plan for patients they ha assessed, including investigation, treatment, and continuing care, in collaboration with members of the interdisciplinary team. (S)
3. Consult judiciously and effectively. (S)
4. Collaborate with other healthcare professionals to ensure the smooth transition of patient care within or outside the hospital. (S)

Leader

The Resident is expected to be able to:

1. Utilize resources effectively to balance patient care and personal learning needs. (S)
2. Multitask appropriately and effectively, prioritize tasks appropriately, and understand the principles of effective delegation. (S)
3. Delegate responsibilities or accept delegated tasks appropriately. (S)
4. Develop team leadership skills. (S)
5. Improve the ability to obtain a focused history and perform a physical examination. (S)
6. Work effectively as a member of a team. (A)
7. Understand the principles of managing disasters. (K)

Health Advocate

The Resident is expected to be able to:

1. Ensure timely access to relevant consultations and investigation. (S)
2. Appropriately advocate on behalf of patients. (A)
3. Explain injury prevention. (S)

4. Promote and participate in patient safety. (S)

Scholar

The Resident is expected to be able to:

1. Critically appraise trauma-related literature and apply the knowledge obtained from current literature to daily practice. (S)
2. Demonstrate continual self-learning. (A)
3. Integrate critical appraisal conclusions into clinical care. (S)
4. Attend and participate in divisional academic activities. (S)

Professional

The Resident should be able to:

1. Deliver the highest quality care with integrity, honesty, and compassion. (A)
2. Exhibit appropriate personal and interpersonal professional behaviors. (A)
3. Demonstrate sensitivity to age, sex, culture, and ethnicity when dealing with patients and their families. (A)
4. Display teamwork and respect for all members of the healthcare team. (A)
5. Maintain patient privacy and dignity and act with personal integrity. (A)

B. Skills

1. Perform initial assessment and management of patients with multiple traumas. (S)
2. Exhibit proficiency in trauma resuscitation and wound care.(S)
3. Perform primary and secondary surveys of trauma victims. (S)
4. Accomplish an organized approach using the principles of FAST ultrasonography and indications for peritoneal lavage. (S)

5. Perform intercostal tube insertion properly and demonstrate the indication and complication of insertion. (S, K)
6. Utilize the principles of post trauma care and monitoring (K).
7. Apply the principles of advanced cardiac life support (ATLS). (K)
8. Monitor end points of resuscitation. (K)
9. Analyze end points of resuscitation. (K)
10. Distinguish between palliative care and end-of-life care. (K)
11. Manage fluid and electrolytes administration. (S)
12. Take patient's informed consent. (S)
13. Identify patients at a higher risk and interpret ABG and acid–base balance. (S)
14. Participate in emergency resuscitation. (S)
15. Manage emergency transfusion. (S)
16. Explain principles of spine immobilization and logrolling. (K)
17. Assess and manage compartment syndrome. (S)
18. Identify arterial injury. (K)
19. Detail treatment principles for patients with spinal cord injuries. (K)
20. Trainees must be able to identify and respond appropriately to urgent cases, such as (K).
    - Acute infectious outbreaks like COVID-19 pandemic
    - Appropriate monitoring and end points of resuscitation
    - Acute common cardiac disorders (e.g., acute myocardial infarction, dysrhythmias, heart failure, tamponade)
    - Infectious emergencies
    - Metabolic and electrolyte emergency
    - Basic major disaster and triage management

C. Attitudes

1. Perform clinical consultations, including the presentation of well-documented assessments and recommendations in written and/or verbal form in response to requests from other healthcare professionals. (S)
2. Establishes therapeutic relationships with patients and their families respectfully, effectively, and efficiently. (A)
3. Demonstrate sensitivity to the preferences of patients and their families when arriving at a management plan. (A)
4. Work well with faculty, nursing and department staff. (A)
5. Respect diversity and cultural, spiritual, emotional, and age-specific differences in patients and other members of the healthcare team. (A)
6. Demonstrate effective listening skills. (S)
7. Effectively use feedbacks provided by others. (S)
8. Negotiate and resolve conflicts. (A)
9. Participate as a member of the healthcare team. (A)
10. Recognize limitations in the level of training and seek help appropriately as needed. (A)
11. Utilize subspecialty consultation appropriately. (S)
12. Demonstrate responsibility and accountability for decisions. (A)

9. Critical Care Radiology Rotation

Recommended Distribution of Rotations: 1 block during junior Residency (R3)

This rotation is designed to familiarize Residents with the applications, indications, and interpretation of various radiological examinations required for the management of critically ill patients in the intervention radiology division.

A. Knowledge

Medical Expert

At the end of this rotation, the resident will be able to:

1. Interpret chest radiography and CT scans of the thorax with emphasis on: (S)
    - Interstitial vs. air space disease
    - Congestive heart failure
    - Pleural effusion
    - Lobar collapse
    - Hilar adenopathy
    - Pulmonary hypertension
    - Pulmonary fibrosis
    - Solitary lung nodule
    - Barotrauma
2. Identify indications for and read abdominal radiographs and CT scans of the abdomen, with emphasis on (S)
    - Small bowel obstruction
    - Large bowel obstruction
    - Bowel edema/inflammation
    - Liver masses/cysts
    - Renal masses/cysts
3. Interpret CT scans of the head, with emphasis on: (S)
    - Masses/cysts
    - Hemorrhage
    - Ischemic infarcts
    - Brain edema
    - Hydrocephalus

4. Enumerate the indications for and use of ultrasound of the abdomen and chest. (K)
5. Determine the presence of significant pleural effusion or ascites. (K)
6. Explain the indications for: (K)
    - MRI
    - Bone/gallium scans
    - Other nuclear medicine scans

Communicator

The Resident should be able to:

1. Interact efficiently with other healthcare professionals and discuss the indications and results of various radiological tests. (K)
2. Obtain important clinical information related to radiological studies. (S)
3. Communicate important positive findings to the referring physician. (S)

Collaborator

The Resident is expected to be able to:

1. Identify the necessity and benefits of consulting other physicians and healthcare professionals. (S)
2. Collaborate with healthcare providers to address patient needs and provide the most suitable radiological study. (S)
3. Collaborate with radiology premedical staff to identify the optimal radiological study. (S)

Leader

The Resident should be able to:

1. Use technology to optimize patient care. (S)
2. Use health care resources effectively. (S)

3. Work effectively and efficiently. (A)
4. Understand the dynamics and work flow of the radiology department. (K)

Health Advocate

The Resident is expected to be able to:

1. Educate and counsel patients and their families regarding factors that influence their health. (A)
2. Provide timely access for emergency cases. (S)
3. Promote and understand radiation safety. (K)

Scholar

The Resident should be able to:

1. Critically appraise sources of medical information. (S)
2. Engage in evidence-based clinical practice. (S)
3. Understand the specificity, sensitivity, and limitations of each radiological study. (S)

Professional

The Resident is expected to be able to:

1. Deliver the highest-quality care with integrity, honesty, and compassion. (A)
2. Exhibit appropriate personal and interpersonal professional behavior. (A)
3. Maintain patient privacy and dignity and act with personal integrity. (A)
4. Recognize and resolve ethical issues as they arise in clinical practice. (A)
5. Recognize and address unprofessional behavior in clinical practice. (A)

B. Skills

Focused Learning Objectives:

At the end of the rotation, the Resident will be able to

1. Determine causes and ultrasound findings in respiratory failure due to various causes including:
    o. Pleural effusion
    p. Pneumothorax
    q. Alveolar-interstitial syndrome (e.g., congestive heart failure, acute respiratory distress syndrome)
    r. Normal aeration pattern (e.g., PE, obstructive lung disease)
    s. Lobar collapse
2. Interpret general critical care ultrasound images for assessment of pneumothorax, pleural effusion, and ascites.
3. Perform ultrasound-guided procedures (e.g., pleurocentesis, paracentesis).
4. Execute FAST exam, which is a limited ultrasound examination directed solely at identifying the presence of free intraperitoneal and pericardial fluid and hemothorax in trauma patients.
5. Intervention Radiology rotation:
    - Use of Angiograms/interventional radiology procedures
    - Basic skills of interventional procedures under ultrasound guidance like vascular access, PICC line insertions, dialysis catheter insertion, and pleural and peritoneal tapping.

C. Attitudes

1. Demonstrate the ability to prioritize professional duties when faced with multiple patients and problems.
2. Demonstrate compassionate and patient-centered care.

3. Demonstrate the ability to explain the procedure and answer all related questions and concerns raised by patients and their families.
4. Exhibit punctuality and be prepared for work.
5. Dress appropriately.
6. Treat patients, family, staff, and other personnel with respect.
7. Protect staff, family, and patient confidentiality.
8. Be sensitive to patient's pain, emotional state, and gender/ethnicity issues.
9. Accept responsibility and be accountable.
10. Demonstrate a responsive positive attitude toward feedback from other team members, patients, families, and peers.
11. Respect diversity and cultural, spiritual, emotional, and age-specific differences between patients and other members of the healthcare team.
12. Effectively use the feedback provided by others.
13. Participate as a member of the healthcare team. (S)

10. Research Rotation

Recommended Distribution of Rotations: 1 block during senior Residency

This rotation is designed to provide Residents with supervised experience in performing research projects or reviewing research literature. Residents will have faculty research mentors. Residents should complete the mandatory research methodology course provided by the SCFHS.

Residents must demonstrate an awareness of the basic principles of clinical practice and incorporate research into improving the care of critically ill patients.

A. Knowledge

Medical Expert

At the end of this rotation, the Resident will be able to:

1. Discuss the principles and processes for the development and implementation of clinical trials. (K)

2. Explain the different types of study designs and their roles in answering different types of clinical questions, including randomized clinical trials, cohort studies, case-control studies, systematic reviews, and clinical guidelines. (K)
3. Apply common statistical principles and tests and explain their usefulness. (S)
4. Identify the importance of good record-keeping in research. (K)
5. Describe clinical uncertainty in clinical decision-making. (K)
6. Describe the concept of EBM and the interactions among research evidence, clinical expertise, and patient values and preferences. (K)
7. Describe the impact of the study design on the validity and implementation of the study results. (K)
8. Describe the quality of evidence based on methodological rigors. (K)

Communicator

The Resident is expected to be able to:

1. Communicate with patients and their families as it pertains to research. (S)
2. Communicate with medical and non-medical colleagues. (S)
3. Coordinate research with colleagues from different disciplines. (S)

Collaborator

The Resident should be able to:

1. Consult with other physicians and health care professionals. (S)
2. Work effectively as part of multidisciplinary team. (A)
3. Act as a leader of a multidisciplinary team. (S)

Leader

1. Create a stimulating research environment. (S)
2. Delegate responsibilities in a fair and non-threatening manner. (S)

3. Instill enthusiasm among colleagues in the workplace. (S)
4. Utilize resources to effectively balance patient care and health care economics. (S)

B. Skills

1. Prepare protocols involved in hypothesis and observational research.
2. Organize a laboratory research project.
3. Utilize the principles of evidence-based medicine techniques.
4. Prepare a workable research protocol, including a proposal for ethics committee review.
5. Generate a data base.
6. Prepare a draft manuscript and abstract.

C. Attitudes

1. Apply ethical considerations in research involving humans and animal subjects.
2. Make decisions based on clinical judgment and patient preferences when evidence is lacking or conflicting. (S)
3. Practice patient advocacy in disposition.
4. Protect staff, family, and patient interests and confidentiality.
5. Seek feedback and immediately self-correct.
6. Coordinate a teamwork strategy.
7. Accept responsibility and be accountable.
8. Demonstrate positive responsive attitudes toward feedback from other team members, patients, families, and peers.

11. Core Internal Medicine and Subspecialties Rotations

Recommended Distribution of Rotations: 7 blocks

Description of Rotation:

The Critical Care Medicine Resident will rotate within the Department of Internal Medicine for 7 blocks with 1 block rotation in general internal medicine, 2 blocks in the infectious disease's subspecialty, 1 block in pulmonary medicine, 2 blocks in nephrology, and 1 block in hematology.

Rotation in Pulmonary Medicine (1 block)

The goal of this rotation is for residents to gain experience in evaluating and managing inpatients with a broad spectrum of pulmonary diseases.

A. Knowledge

Medical Expert:

By the end of the rotation the resident will be able to:

1. Describe the epidemiology, genetics, natural history, and clinical expression of pulmonary disorders encountered in the inpatient and outpatient settings. (K)
2. Discuss common procedures used in general medical services, including paracentesis, thoracentesis, and lumbar puncture. (K)
3. Summarize approaches to the evaluation of common pulmonary disease presentations. (K)
4. Interpret diagnostic tests used to evaluate patients with suspected pulmonary disease. (S)
5. Critically appraise the literature pertinent to the evaluation of inpatients (or outpatients during clinic rotation) with pulmonary disease. (S)

Scholar

1. Effectively use technology to manage information, support patient care decisions, and enhance patient and physician education. (S)

2. Integrate and apply knowledge obtained from multiple sources for the care of inpatients with pulmonary disease. (S)
3. Critically assess the scientific literature. (S)
4. Set and assess individualized learning goals. (S)
5. Analyze clinical experience and employ a systematic methodology for improvement. (S)
6. Learn from errors and use errors to improve the system or processes of care. (A)

Collaborator

1. Discuss how the healthcare system affects the management of inpatients with pulmonary diseases. (K)
2. Collaborate with other health care providers. (S)
3. Determine the cost-effectiveness of alternative proposed interventions. (K)
4. Design cost-effective plans based on knowledge of best practices. (S)
5. Demonstrate awareness of the impact of diagnostic and therapeutic recommendations on the healthcare system, cost of the procedure, insurance coverage, and resources utilized. (K)

Communicator

1. Exercise empathy in all patient encounters. (A)
2. Demonstrate effective skills in listening to and speaking with patients, families, and other members of the healthcare team. (A)
3. Communicate the patient's and his/her family's views and concerns to the attending physician. (S)
4. Demonstrate competency in documentation, including histories and physical, progress, and discharge notes. (S)

5. Counsel patients, families, and colleagues regarding side effects and appropriate use of specific medications, and provide written documentation when appropriate. (S)

Professional

1. Prompt and prepared for rounds and/or clinic. (A)
2. Recognize the importance of patient primacy, privacy, autonomy, informed consent, and equitable respect and care for all. (A)
3. Respect patients, patients' families, staff, and colleagues. (A)
4. Model ethical behavior by reporting any key clinical findings to the attending and referring providers, following through on clinical questions, laboratory testing, and other patient care issues, and recognizing potential conflicts of interest. (A)
5. Demonstrate integrity, honesty, and openness in discussions of therapeutic options with patients and respect for patients' preferences and cultural differences. (A)
6. Respond to phone calls, pages, and messages in a timely manner. (A)

Leader

1. Efficiently carry out patient care tasks allocated during ward rounds. (S)
2. Recognize personal limitations and seek help when appropriate. (A)
3. Utilize personal resources effectively to balance patient care, continuing education, and personal activities. (S)
4. Understand and judiciously allocate health care resources. (K)
5. Work efficiently and effectively within a health care system. (A)
6. Utilize information technology for optimal patient care and personal scholarship. (S)

Health Advocate

General Requirements

1. Identify the important determinants of health affecting patients. (K)
2. Contribute effectively to improving the health of patients and communities. (S)
3. Respond to issues where advocacy is appropriate. (A)
4. Educate patients and families about and promote the importance of long-term healthy behaviors and preventive healthcare (e.g., smoking cessation, screening tests, vaccinations, exercise, and nutrition). (S)
5. Respect and empower patient autonomy. (A)
6. Promote fair health care. (A)
7. Apply the principles of quality improvement and quality assurance. (S)

B. Skills

By the end of the rotation the resident will be able to:

1. Effectively obtain a comprehensive history and perform a complete physical examination of patients with respiratory symptoms or known pulmonary diseases.
2. Appropriately interpret laboratory, imaging, and pathologic studies used in the evaluation of pulmonary diseases.
3. Construct a comprehensive treatment plan and assess patient response to therapy.
4. Counsel patients concerning their diagnosis, planned diagnostic testing, and recommended therapies.
5. Utilize validated instruments in the assessment of function and quality of life to monitor and adjust therapy.

C. Attitudes

1. Establish therapeutic relationships with patients and their families respectfully, effectively, and efficiently.
2. Be sensitive to the preferences of patients and their families when arriving at a management plan.

3. Work well with faculty, nursing staff, and department staff.
4. Respect diversity and cultural, spiritual, emotional, and age-specific differences in patients and other members of the healthcare team.
5. Use feedbacks provided by others.
6. Negotiate and resolve conflicts.
7. Participate as a member of the healthcare team.
8. Recognize limitations in the level of training and seek help appropriately as needed.
9. Utilize subspecialty consultation appropriately. (S)
10. Demonstrate responsibility and accountability for decisions.

Rotation in Nephrology (2 blocks)

The goal of this rotation is for Residents to gain experience in evaluating and managing patients with a range of renal disorders.

The rotation is designed to familiarize Residents with the basic mechanisms, manifestations, diagnostic plans, and management of acute and chronic kidney disease.

A. Knowledge

Medical Expert

By the end of the rotation the resident will be able to:

1. Describe the pathophysiology, clinical presentation, and targeted therapy for renal disorders encountered in inpatient settings. (K)
2. Describe the structure and function of the kidneys. (K)
3. Summarize approaches to the evaluation of common presentations of renal disorders. (K)
4. Interpret diagnostic tests used in the evaluation of inpatients with suspected renal disorders. (S)

5. Critically appraise and cite literature pertinent to the evaluation of inpatients with renal disorders. (S)
6. Recognize and manage the derangement secondary to alterations in osmolality and electrolytes(K,S)
7. Analyze and interpret the acute acid-base disorders (K,S)
8. Demonstrate the Principles of hemodialysis, peritoneal dialysis, and ultrafiltration (k)

Scholar

1. Effectively use technology to manage information, support patient care decisions, and enhance both patient and physician education. (S)
2. Integrate and apply knowledge obtained from multiple sources to the care of inpatients. (S)
3. Critically assess the scientific literature. (S)
4. Set and assess individualized learning goals. (S)
5. Analyze clinical experience and employ a systematic methodology for improvement. (S)
6. Learn from errors and use them to improve the system or care processes. (S)

Collaborator

1. Discuss how the health care system affects the management of outpatients with renal disorders. (S)
2. Effectively collaborate with other health care providers, including nursing. (S)
3. Determine cost-effectiveness of alternative proposed interventions. (K)
4. Design cost-effective plans based on knowledge of best practices. (S)

5. Demonstrate awareness of the impact of diagnostic and therapeutic recommendations on the healthcare system, cost of the procedure, insurance coverage, and resources utilized. (K)

Communicator

1. Exercise empathy in all patient encounters. (A)
2. Demonstrate effective listening and speaking skills with patients, families, and other members of the healthcare team. (A)
3. Accurately communicate patients' and their families' views and concerns to the attending physician. (S)
4. Demonstrate competency in documentation, including histories and physical, progress, and discharge notes. (S)
5. Counsel patients, families, and colleagues regarding side effects and appropriate use of specific medications, and provide written
6. documentation when appropriate. (S)

Professional

1. Be prompt and prepared for rounds and/or clinic. (A)
2. Recognize the importance of patient primacy, privacy, autonomy, informed consent, and equitable respect and care for all. (A)
3. Respect patients, patients' families, staff, and colleagues. (A)
4. Model ethical behavior by reporting any key clinical findings to the attending and referring providers, following through on clinical questions, laboratory testing, and other patient care issues, and recognizing potential conflicts of interest. (A)
5. Demonstrate integrity, honesty, and openness in discussions of therapeutic options with patients and respect for patients' preferences and cultural differences. (A)
6. Respond to phone calls, pages, and messages in a timely manner. (A)

Leader

1. Efficiently carry out patient care tasks allocated during ward rounds. (S)
2. Recognize personal limitations and seek help when appropriate. (A)
3. Utilize personal resources effectively to balance patient care, continuing education, and personal activities. (S)
4. Understand and judiciously allocate health care resources. (S)
5. Work efficiently and effectively within a health care system. (S)
6. Utilize information technology for optimal patient care and personal scholarship. (S)

Health Advocate

1. Identify the important determinants of health affecting patients. (S)
2. Contribute effectively to improving the health of patients and communities. (K)
3. Recognize and respond to those issues where advocacy is appropriate. (A)
4. Educate patients and families about and promote the importance of long-term healthy behaviors and preventive healthcare (e.g., smoking cessation, screening tests, vaccinations, exercise, nutrition). (A)
5. Respect and empower patient autonomy. (A)
6. Promote fair health care. (A)
7. Apply the principles of quality improvement and quality assurance. (K)

B. Skills

By the end of the rotation the resident will be able to:

1. Effectively obtain comprehensive history and perform a complete physical examination in patients with renal symptoms, abnormal creatinine clearance, or acute or chronic renal disorders.
2. Construct an appropriate differential diagnosis.

3. Interpret laboratory, imaging, and pathological studies used in the evaluation of renal disorders.
4. Construct a comprehensive treatment plan and assess patient response to therapy.
5. Competently prescribe the different modes of continuous renal replacement therapy (CRRT). (K,S)
6. Properly adjust drug dosing in renal failure.
7. Counsel patients concerning their diagnosis, planned diagnostic testing, and recommended therapies.
8. Describe the appropriate use of validated instruments in the assessment of pain, function, and quality of life to monitor and adjust therapy.

C. Attitudes

1. Establish therapeutic relationship with patients and their families respectfully, effectively, and efficiently.
2. Be sensitive to the preferences of patients and their families when arriving at a management plan.
3. Work well with faculty, nursing staff, and department staff.
4. Respect diversity and cultural, spiritual, emotional, and age-specific differences in patients and other members of the healthcare team.
5. Demonstrate effective listening skills.
6. Use feedbacks provided by others.
7. Negotiate and resolve conflicts.
8. Participate as a member of the healthcare team.
9. Recognize limitations in the level of training and seek help appropriately as needed.
10. Utilize subspecialty consultation appropriately.
11. Demonstrate responsibility and accountability for decisions.

Rotation in Infectious Disease (2 blocks)

The infectious disease rotation is designed to provide Residents with opportunities to manage common infectious diseases. The goal of this rotation is to equip residents to understand the extensive systemic manifestations of infectious diseases and provide an opportunity to acquire knowledge in microbiology and the management of diseases caused by a variety of infectious microorganisms.

A. Knowledge

Medical Expert

At the end of this rotation the resident will be able to:

1. Describe the epidemiology, genetics, natural history, and clinical expression of infectious diseases encountered in inpatient settings.
2. Describe the functions and interplay of factors related to host defense, microbial infection, and treatment. (K)
3. Summarize approaches to the evaluation of common presentations of infectious diseases (e.g., AIDS, pneumonia, urinary tract infections, and sepsis). (K)
4. Interpret diagnostic tests used to evaluate patients with suspected infectious diseases. (S)
5. Demonstrate the ability to critically appraise and cite literature pertinent to the evaluation of inpatients with infectious diseases. (S)

Scholar

1. Effectively use technology to manage information, support patient care decisions, and enhance both patient and physician education. (S)
2. Integrate knowledge obtained from multiple sources to the care of inpatients. (S)
3. Critically assess the scientific literature. (S)

4. Set and assess individualized learning goals. (S)
5. Analyze clinical experience and employ a systematic methodology for improvement. (S)
6. Develop and maintain a willingness to learn from errors and use them to improve the system or processes of care. (S)

Collaborator

1. Discuss how healthcare systems affect the management of outpatients with infectious diseases. (K)
2. Collaborate with other healthcare providers, including nurses, counselors, and Ministry of Health staff, in the care of patients with infectious diseases. (S)
3. Determine the cost-effectiveness of alternative proposed interventions. (S)
4. Design cost-effective plans based on knowledge of best practices. (S)
5. Demonstrate awareness of the impact of diagnostic and therapeutic recommendations on the healthcare system, cost of the procedure, insurance coverage, and resources utilized. (S)

Professional

1. Exhibit punctuality for all assigned duties. (A)
2. Incorporate the principles of patient primacy, privacy, autonomy, informed consent, and equitable respect in patient care (K)
3. Demonstrate respect for patients and their families, staff, and colleagues. (A)
4. Model ethical behavior by reporting back to the attending and referring providers' key clinical findings, following through on clinical questions, laboratory testing, and other patient care issues, and recognizing potential conflicts of interest. (A)

5. Demonstrate integrity, honesty, and openness in discussions of therapeutic options with patients and respect for patients' preferences and cultural differences. (A)
6. Respond to phone calls, pages, and messages in a timely manner. (S)
7. Design cost-effective plans based on knowledge of best practices. (S)

Communicator

1. Approach patients with an empathetic and understandable manner. (A)
2. Demonstrate effective listening and speaking skills with patients, families, and other members of the healthcare team. (S)
3. Accurately communicate the patient's and his/her family's views and concerns to the attending. (S)
4. Compose clear consultation reports and interval notes/letters in a timely manner, including a precise diagnosis whenever possible and a differential diagnosis when appropriate, and recommend follow-ups or additional studies. (S)
5. Counsel patients, families, and colleagues regarding side effects and appropriate use of specific medications, and provide written documentation when appropriate. (S)
6. Exercise empathy in all patient encounters. (A)
7. Demonstrate competency in documentation, including histories and physical, progress, and discharge notes. (S)

Leader

1. Efficiently carry out patient care tasks allocated during ward rounds. (S)
2. Recognize personal limitations and seek help when appropriate. (A)
3. Utilize personal resources effectively to balance patient care, continuing education, and personal activities. (S)

4. Understand and judiciously allocate health care resources. (S)
5. Work efficiently and effectively within a health care system. (S)
6. Utilize information technology for optimal patient care and personal scholarship. (S)

Health Advocate

1. Identify the important determinants of health affecting patients. (K)
2. Contribute effectively to improving the health of patients and communities. (S)
3. Recognize and respond to those issues where advocacy is appropriate. (S)
4. Educate patients and families about and promote the importance of long-term healthy behaviors and preventive healthcare (e.g., smoking cessation, screening tests, vaccinations, exercise, and nutrition). (S)
5. Respect and empower patient autonomy. (A)
6. Promote fair health care. (A)
7. Apply the principles of quality improvement and quality assurance. (S)

B. Clinical Skills

At the end of this rotation the resident will be able to:

1. Obtain a comprehensive history and perform a complete physical examination of patients with infectious symptoms or chronic infectious diseases.
2. Construct an appropriate differential diagnosis.
3. Select and interpret laboratory, imaging, and pathological studies used in the evaluation of infectious diseases appropriately.
4. Construct a comprehensive treatment plan and assess patient response to therapy.
5. Counsel patients concerning their diagnosis, planned diagnostic testing, and recommended therapies.

6. Describe the appropriate use of validated instruments in the assessment of pain, function, and quality of life to monitor and adjust therapy.

C. Attitudes

1. Perform clinical consultations, including the presentation of well-documented assessments and recommendations in written and/or verbal forms in response to requests from other healthcare professionals. (S)
2. Establish therapeutic relationships with patients and their families respectfully, effectively, and efficiently.
3. Identify and appropriately respond to relevant ethical issues arising in patient care and medical decision making
4. Be sensitive to the preferences of patients and their families when arriving at a management plan.
5. Work well with faculty, nursing and department staff.
6. Respect diversity and cultural, spiritual, emotional, and age-specific differences in patients and other members of the healthcare team.
7. Demonstrate effective listening skills.
8. Use feedbacks provided by others.
9. Negotiate and resolve conflicts.
10. Participate as a member of the healthcare team.
11. Recognize limitations in the level of training and seek help appropriately as needed.
12. Demonstrate responsibility and accountability for decisions.

Rotation in Hematology (1block)

The goal of this rotation is to provide Residents with adequate knowledge and practical exposure to gain experience in evaluating and managing inpatients with various blood disorders.

A. Knowledge

Medical Expert

At the end of this rotation the resident will be able to:

1. Describe the pathophysiology, diagnostic techniques, and treatment approaches for hematological conditions encountered in inpatient settings. (K)
2. Describe the functions and interplay of factors related to hemostasis and bleeding. (K)
3. Summarize approaches to the evaluation of common presentations of the following conditions: Anemia, Thrombocytopenia, Polycythemia, Thrombocytosis, and Neutropenia with Fever. (K)
4. Interpret diagnostic tests used to evaluate inpatients with suspected hematological conditions. (S)
5. Critically appraise and cite literature pertinent to the evaluation of inpatients with haematological conditions. (S)

Scholar

1. Effectively use technology to manage information, support patient care decisions, and enhance patient and physician education. (S)
2. Apply knowledge obtained from multiple sources to the care of inpatients. (S)
3. Critically assess the scientific literature. (S)
4. Set and assess individualized learning goals. (S)

5. Analyze clinical experience and employ a systematic methodology for improvement. (S)
6. Develop and maintain a willingness to learn from errors and use them to improve the system or processes of care. (A)

Collaborator

1. Discuss how the healthcare system affects the management of outpatients with hematological disorders. (S)
2. Demonstrate effective collaboration with other healthcare providers, including nurses, counselors, and transfusion medicine specialists, in the care of patients with hematological disorders. (S)
3. Determine the cost-effectiveness of alternative proposed interventions. (S)
4. Design cost-effective plans based on knowledge of best practices. (S)
5. Demonstrate awareness of the impact of diagnostic and therapeutic recommendations on the healthcare system, cost of the procedure, insurance coverage, and resources utilized. (K)
6. Collaborate with other healthcare providers, including nursing staff, therapists, counselors, surgeons, and consultants, in the care of patients with hematological conditions. (S)

Communicator

1. Approach patients with an empathetic and understandable manner. (A)
2. Demonstrate effective skills in listening to and speaking with patients, families, and other members of the healthcare team. (S)
3. Reliably and accurately communicate patients' and their families' views and concerns to the attending physician. (A)
4. Compose clear consultation reports and interval notes/letters in a timely manner, including a precise diagnosis whenever possible,

differential diagnoses when appropriate, and recommendations for follow-up or additional studies. (S)

5. Counsel patients, families, and colleagues regarding the side effects and appropriate use of specific medications and provide written documentation when appropriate. (S)
6. Exercise empathy in all patient encounters. (A)
7. Demonstrate competency in documentation, including histories and physical, progress, and discharge notes. (S)

Professional

1. Be prompt and prepared for rounds or clinic. (A)
2. Recognize the importance of patient primacy, privacy, autonomy, informed consent, and equitable respect and care for all.(A)
3. Respect patients, patients' families, staff, and colleagues. (A)
4. Model ethical behavior by reporting any key clinical findings to the attending and referring providers, following through on clinical questions, laboratory testing, and other patient care issues, and recognizing potential conflicts of interest. (A)
5. Demonstrate integrity, honesty, and openness in discussions of therapeutic options with patients and respect for patients' preferences and cultural differences. (A)
6. Respond to phone calls, pages, and messages in a timely manner. (S)

B. Skills

At the end of this rotation the resident will be able to:

1. Obtain a comprehensive history and perform a complete physical examination of patients with hematological conditions.
2. Construct an appropriate differential diagnosis.
3. Select and interpret CBCs/differentials and blood smear results

4. Construct a comprehensive treatment plan and assess patient response to therapy.
5. Counsel patients concerning their diagnosis, planned diagnostic testing, and recommended therapies.
6. Describe the appropriate use of validated instruments to monitor and adjust therapy to assess pain, function, and quality of life.

C. Attitudes

1. Exhibit punctuality and be prepared for work.
2. Dress appropriately.
3. Treat patients, family, staff, and other personnel with respect.
4. Protect staff, family, and patient confidentiality.
5. Be sensitive to patient's pain, emotional state, and gender/ethnicity issues.
6. Accept responsibility and b accountable.
7. Have a responsive, positive attitude toward feedback from other team members, patients, families, and peers.
8. Respect diversity and cultural, spiritual, emotional, and age-specific differences in patients and other members of the healthcare team.
9. Effectively use the feedback provided by others.
10. Participate as a member of the healthcare team.

12. Elective Rotation (4 blocks)

Elective rotation is designed to provide Residents with the flexibility and opportunities to explore career possibilities, gain experience in aspects of Critical Care Medicine beyond the core curriculum, and study certain areas in greater depth.

Residents are free to identify and choose specific electives in accordance with their individual training objectives, subject to the approval of the

program director. It is expected that electives will be undertaken in Saudi Arabia, excluding exceptional circumstances in which residents prove that the national facilities are insufficient to meet their training objectives.

The objectives of the elective experience are to provide flexibility and opportunities to explore career possibilities, gain experience in aspects of Critical Care

Medicine beyond the core curriculum, and study certain areas in greater depth.

Knowledge, skills, and attitudes are further developed in the Residents' choice of area across the curriculum.

For each elective, the Resident must identify a supervisor responsible for monitoring his/her experience and evaluating his/her performance. Both the Resident and supervisor are responsible for ensuring a mutual understanding of the learning activities designed to meet the objectives of the elective.

Recommended elective rotations include but are not limited to:

Thoracic surgery

The thoracic surgery rotation is valuable for Residents planning careers in trauma and critical care. This rotation provides significant early exposure for residents interested in pursuing specialized training in thoracic surgery.

A. Knowledge

Medical Expert

By the end of this rotation, the trainee will be able to:

1. Describe the anatomy and physiology of the lungs, pleural space, and esophagus. (K)

2. Demonstrate clinical and technical skills and decision-making capabilities in thoracic surgical patients relevant to general surgical practice. (S)
3. Differentiate between the pathologies of ARDS, emphysema, and pulmonary fibrosis. (K)
4. Interpret diagnostic imaging of the chest, including CT and chest radiography. (S)
5. Describe pulmonary physiology, and ventilation and gas exchange. (K)
6. Describe analgesia, including pharmacology, effectiveness, and side effects. (K)
7. Describe the pharmacology of drugs commonly used in the management of thoracic diseases. (K)
8. Describe endoscopic, radiological, and surgical approaches for evaluating and diagnosing respiratory diseases. (K)
9. Interpret hematology and biochemical investigations, chest radiography, and ECG 2 CT, including contrast-enhanced CT imaging, MRI and PET, respiratory function tests, ventilation/perfusion scans, and blood gases. (S)
10. Enumerate the laboratory procedures used in the diagnosis of diseases of the chest, including endoscopy and functional studies of the lungs and esophagus. (K)
11. Discuss the principles of oncology, including radiation therapy and chemotherapy. (K)
12. Explain and recognize pneumothorax, pleural effusion, hemothorax, and chylothorax. (K)
13. Describe the etiology, physiology, and surgical options for the correction of common chest wall deformities.
14. Explain the clinical, physiological, and imaging techniques for assessing diaphragmatic abnormalities. (K)

15. Describe the etiology, pathology, and physiology of common lung diseases. (K)

Communicator

The Resident should develop communication skills in order to:

1. Elicit relevant information and perspectives from patients, families, and healthcare teams. (S)
2. Communicate effectively with patients and families. (S)
3. Give formal presentations at rounds and lead discussions on patients' surgical condition. (S)
4. Keep accurate and efficient records. (S)
5. Obtain informed consent. (S)
6. Communicate treatment plans to all members of the team. (S)

Collaborator

1. Residents should also participate in interdisciplinary rounds and other activities involving other health care professionals. (S)
2. Recognize roles and interact effectively with other physicians and healthcare workers. (S)
3. Consult effectively with other physicians and health care professionals. (S)
4. Demonstrate a team approach to health care. (A)
5. Work with others to assess, plan, provide, and integrate care for surgical patients. (A)

Leader

The Resident is expected to be able to:

1. Utilize resources effectively to balance patient care, personal learning needs, and external activities. (S)

2. Complete surgical notes and dictations appropriately and in a timely fashion. (S)
3. Order tests and procedures and book ORs appropriately and efficiently. (S)
4. Multitask appropriately and effectively, prioritize tasks appropriately, and understand the principles of effective delegation. (S)
5. Delegate responsibilities or accept delegated tasks appropriately. (S)
6. Develop team leadership skills. (S)
7. Employ information technology appropriately for patient care. (S)

Health Advocate

The Resident should be able to:

1. Understand when and how to appropriately advocate on behalf of patients. (K)
2. Identify the important determinants of health affecting patients. (K)
3. Demonstrate an understanding of injury prevention. (K)
4. Promote and participate in patient safety. (S)

Scholar

The Resident is expected to be able to:

1. Critically appraise general surgical literature and apply current literature to daily practice. (S)
2. Demonstrate the capacity for continual self-learning. (A)
3. Discuss the principles of surgery and the application of basic science to surgical treatment. (S)
4. Facilitate learning in patients, staff, students, and other healthcare professionals through formal and informal teaching opportunities. (S)
5. Integrate critical appraisal conclusions into clinical care. (S)
6. Attend and participate in divisional academic activities. (S)

Professional

The Resident should be able to:

1. Deliver the highest quality care with integrity, honesty, and compassion. (A)
2. Exhibit appropriate personal and interpersonal professional behaviors. (A)
3. Cultivate an ethical relationship with colleagues, patients, and relatives. (A)
4. Demonstrate sensitivity to age, gender, culture, and ethnicity in dealing with patients and their families. (A)
5. Understand the legal issues related to surgical consent, confidentiality, and refusal of treatment. (S)
6. Display teamwork and respect for all members of the healthcare team. (S)
7. Maintain patient privacy and dignity and act with personal integrity. (A)

B. Skills

At the end of this rotation the resident will be able to:

1. Perform physical examination with an emphasis on aspects related to thoracic surgery.
2. Formulate a differential diagnosis for common thoracic surgical problems.
3. Formulate a plan of management for common surgical problems, including investigation and treatment.
4. Recognize acutely ill or injured patients and develop a systematic approach to their assessment and management.
5. Develop familiarity with the conduct of common thoracic operations.
6. Participate in postoperative care of thoracic surgical patients.

7. Perform the following procedures:
    - General conduct of a surgical procedure, including scrubbing and sterile technique
    - Chest tube placement
    - Thoracentesis
    - Simple suturing
    - Knot-tying
8. Obtain work-ups of some or most of these specific disease entities:
    - Carcinoma of the lung (including staging, pathology, and management)
    - Pneumothorax, hemothorax, and pleural effusions
    - End-stage lung disease, including lung transplantation
    - Infections of the thorax, including empyema, lung abscess, and mediastinitis
    - Penetrating and blunt chest trauma
    - Mediastinal neoplasms
    - Esophageal carcinoma

C. Attitudes

1. Establish therapeutic relationship with patients and their families respectfully, effectively, and efficiently.
2. Be sensitive to the preferences of patients and their families when arriving at a management plan.
3. Work well with faculty, nursing and department staff.
4. Respect diversity and cultural, spiritual, emotional, and age-specific differences in patients and other members of the healthcare team.
5. Demonstrate effective listening skills. (S)
6. Use feedbacks provided by others.
7. Negotiate and resolve conflicts.
8. Participate as a member of the healthcare team.

9. Recognize limitations in the level of training and seek help appropriately as needed.
10. Utilize subspecialty consultation appropriately.
11. Demonstrate responsibility and accountability for decisions.

Neuro Anesthesia

Rotations in neuroanesthesia will provide the Resident with a theoretical basis and clinical experience in the anesthetic management of patients undergoing central nervous system and spinal surgeries. This includes preoperative evaluation, intraoperative management, and postoperative care utilizing the most recent medical/anesthetic knowledge. Clinical experience will provide exposure to a variety of basic and complex procedures for treating patients with neurological diseases and will involve graded independence and responsibility.

A. Knowledge

Medical Expert

At the end of this rotation the resident will be able to:

1. Describe the basic science applicable to neuroanesthesia, including neuroanatomy, neurophysiology, and neuropharmacology. (K)
2. Describe the methods of resuscitation of shock. (K)
3. Identify basic knowledge of treatment of common complications. (K)
4. Recognize prevention and treatment of infectious complications. (K)
5. Recognize the pathway and physiology of cerebrospinal fluid (CSF) circulation and the factors affecting it. (K)
6. Discuss the anatomy of cerebral circulation, factors affecting it, and methods for controlling ICP. (K)

Communicator

By the end of this rotation, the Resident should be able to:

1. Establish a therapeutic relationship with patients and their families within the limited time available. (S)
2. Obtain and collate a relevant history from patients and families. (S)
3. Demonstrate empathy, consideration, and compassion in communicating with patients and their families. (A)
4. Communicate effectively with medical/surgical colleagues, nurses, and paramedical personnel regarding the anesthetic management of patients. (S)
5. Demonstrate appropriate written communication skills through accurate, legible, and complete documentation of anesthetic records, patient charts, and notes during consultations. (S)

Collaborator

By the end of this rotation, the Resident should be able to:

1. Demonstrate the ability to function in the clinical environment using the full abilities of all team members (surgical, nursing, ICU, etc.). (S)
2. Develop an anesthetic plan for their patients in consultation and in concert with surgery, nursing, and ICU staff for more complicated neurosurgical patients. (S)
3. Understand and value the skills of other specialists and healthcare professionals. (S)
4. Understand the limits of their knowledge and skills. (A)
5. Respect the opinions of others on the neuro team. (A)
6. Function in the OR as a member of the neuroteam and work in a positive, constructive manner, respecting the importance of the roles of all team members. (A)

Leader

By the end of this rotation, the Resident should be able to:

1. Demonstrate the ability to manage their operating room: (S)
2. Ensure that the necessary equipment, monitoring, and medications are available for each case. (S)
3. Prepare for anticipated complications. (S)
4. Conduct all activities in an effective, efficient, and timely manner to avoid OR delays. (S)
5. Utilize personal resources effectively to balance patient care, continuing education, and personal activities. (S)
6. Utilize information technology to optimize patient care and lifelong learning. (K)

Health Advocate

By the end of this rotation, the Resident should be able to:

1. Recognize opportunities for Critical Care Medicine Specialists to advocate for neurosurgical patients, particularly with regard to patient safety. (K)
2. Adopt a leadership role in the postoperative care of patients by anticipating and arranging post-anesthesia unit, ICU, or neuro-observation unit care. (S)

Scholar

By the end of this rotation, the Resident should be able to:

1. Take responsibility for developing, implementing, and regularly reevaluating a personal continuing education strategy. (S)
2. Contribute to the development of new knowledge through facilitation/participation in ongoing departmental research activities. (S)

3. Prepare in advance for scheduled OR cases through additional reading and patient chart reviews/assessments. (S)

Professional

By the end of this rotation, the Resident should be able to:

1. Demonstrate a commitment to executing his/her professional responsibilities with integrity, honesty, and compassion. (A)
2. Demonstrate appropriate personal and interpersonal professional behaviors and boundaries. (A)
3. Recognize the limitations of his/her personal skills and knowledge by appropriately consulting other physicians when caring for patients. (A)

B. Skills

At the end of this rotation the Resident will be able to:

1. Perform anesthesia techniques safely to avoid an increase in ICP during induction, intubation, and emergence from anesthesia.
2. Demonstrate commonly performed neurosurgical procedures on anesthetic management.
3. Perform skills necessary for the practice of neuro anesthesia including:
    - Preoperative neurological assessment (using the Glasgow Coma Scale, classification for subarachnoid hemorrhage, and basic neurological examination)
    - Intraoperative support (special positioning, i.e., sitting, prone, park-bench, lateral, and knee-chest).
    - Basic principles of neurophysiological monitoring (EEG, evoked potentials [somatosensory and brainstem auditory], and TCD).
4. Conduct cerebral oximetry and ICP monitoring methods.

5. Perform specific interventions, including systemic arterial hypotension/hypertension, CSF drainage, ICP management, hypothermia, and precordial Doppler monitoring of air emboli.
6. Manage specific perioperative complications such as seizures, cerebral ischemia, intracranial hypertension, intraoperative aneurysm rupture, air embolism, cranial nerve dysfunction, and neuroendocrine disturbances (e.g., diabetes insipidus, syndrome of inappropriate antidiuretic hormone secretion).
7. Manage postoperative neurological patients in the post-anesthesia care unit, ICU, and neuroobservation units.
8. Perform technical procedures commonly employed in neuro anesthesia practice, including airway management (basic and advanced), cardiovascular resuscitation, neuroresuscitation, and invasive monitoring (arterial line, central line, and lumbar puncture drain placement).
9. Develop a rational anesthetic management plan for each of the following neurosurgical procedures:
    - Craniotomy for mass lesions (tumor, abscess, hematoma)
    - Cerebrovascular procedures (aneurysm, AVM, carotid vascular disease)
    - CSF shunting procedures
    - Trans sphenoidal surgery
    - Stereotactic procedures
    - Awake craniotomy
    - Neuro radiological procedures (embolization, thrombolytic therapy, and MRI)
    - Spine surgery

C. Attitudes

1. Establish therapeutic relationship with patients and their families respectfully, effectively, and efficiently.
2. Be sensitive to the preferences of patients and their families when arriving at a management plan.
3. Work well with faculty, nursing staff, and department staff.
4. Respect diversity and cultural, spiritual, emotional, and age-specific differences in patients and other members of the healthcare team.
5. Demonstrate effective listening skills.
6. Use feedback provided by others.
7. Negotiate and resolve conflicts.
8. Participate as a member of the healthcare team.
9. Recognize limitations in the level of training and seek help appropriately as needed.
10. Utilize subspecialty consultation appropriately.
11. Demonstrate responsibility and accountability for decisions.

Cardiac anesthesia

The cardiac anesthesia rotation is designed to help Residents understand all issues related to anesthesia management in patients undergoing cardiac surgery, such that they can participate in the perioperative care of these patients.

Residents are expected to become competent in the preoperative management of patients with cardiovascular diseases during this rotation. It is not intended to produce anesthesiologists capable of independently managing anesthesia during cardiac surgery.

A. Knowledge

Medical Expert

At the end of this rotation the resident will be able to:

1. Describe the basic science applied during the preoperative, intraoperative, and postoperative periods of cardiac surgery. (K)
2. Identify normal coronary anatomy and variants, normal cardiac physiology, and the effects of disease states on normal physiology. (K)
3. Describe anatomy and physiology of the cardiac valves, left and right ventricles, atria, major cardiac vessels, and circulatory system in both normal and diseased states. (K)
4. Identify normal conduction pathways of the heart and their clinical significance in diseases. (K)
5. Identify embryological circulation, development of the heart, and fetal physiology as they apply to adult congenital heart disease. (K)
6. Define altered respiratory physiology of the immediately postoperative ventilated patient with significant surgical incisions and pain (e.g., sternotomy, large abdominal incisions). (K)
7. Describe common physiological changes occurring in the postoperative period and their impact on end-organ function (neurological, renal, cardiac, hepatic, and GI). (K)

Monitoring

The Resident should be able to:

1. Interpret ECGs for ischemia, infarction, arrhythmias, and paced rhythms. They must be able to recognize the limitations and sensitivity/specificity of ECGs as monitors of ischemia. (S)
2. Define principles of noninvasive and invasive blood pressure monitoring and their pitfalls. (K)

3. Perform arterial and central venous cannulation (with ultrasound), peripheral venous cannulation, and pulmonary artery catheterization; interpret CVP and data from pulmonary artery catheters (e.g., PAP, PCWP, cardiac output); know the indications, complications, and management; and know the basics of introductory TEE, including techniques of probe insertion and several basic views and their implications and applications in critical care patients. (S)
4. Understand laboratory monitoring of the coagulation system (e.g., partial thromboplastin time, international normalized ratio, and fibrinogen) in cardiac patients. (K)
5. Assess the adequacy of mechanical ventilation using clinical parameters and laboratory arterial blood gas analysis. (S)
6. Assess intraoperative blood loss and medical and surgical methods for treating blood loss. (S)
7. Demonstrate the significance of temperature management during the intraoperative period, including hypothermic techniques, and the importance of normothermia during beating-heart procedures. (S)
8. Recognize indicators of volume status (especially during weaning from bypass), including findings from invasive monitors, TEE, and clinical indicators (e.g., urine volume). (S)
9. Use appropriate intraoperative blood work for the management of patient care and learning of new monitoring devices (e.g., noninvasive cardiac output, bispectral index) and their potential applications during cardiac surgery. (S)

Communicator

By the end of this rotation, the Resident should be able to:

1. Demonstrate effective communication with patients and families (e.g., description of procedures, informed consent, anesthetic options, and risks). (S)

2. Demonstrate effective communication with the OR (e.g., cardiac surgeons, nurses, perfusionists) and postoperative teams, particularly during the initiation, conduct, and removal of cardiopulmonary bypass. (S)
3. Provide clear and concise written consultation and anesthetic records. (S)

Collaborator

By the end of this rotation, the Resident should be able to:

1. Recognize the need to utilize other specialists in the care and management of critical care patients. (S)
2. Foster healthy team relationships. (S)

Leader

By the end of this rotation, the Resident should be able to

1. Manage OR time by efficiently conducting anesthesia, continuing education, and personal activities. (S)
2. Make effective use of health care resources. (S)

Health Advocate

By the end of this rotation, the Resident should able to

1. Demonstrate knowledge of risk reduction strategies, including the use of ultrasound and sterile techniques for invasive lines. (S)

Scholar

By the end of this rotation, the Resident should be able to:

1. Demonstrate a commitment to continuous personal education, including the use of information technology. (S)
2. Critically review the literature on cardiac anesthesia and describe the principles of research relevant to cardiac patients. (S)
3. Assist in the education of other members of the OR team. (S)

Professional

By the end of this rotation, the Resident should be able to:

1. Always demonstrate respectful and compassionate behavior toward patients, their families, and other healthcare providers. (A)
2. Demonstrate an appropriate sense of responsibility to themselves and their patients. (A)
3. Remain calm and organized in stressful or emergency situations. (A)
4. Demonstrate appropriate interactions with colleagues and staff. (A)

B. Skills:

Clinical Assessment and management

At the end of this rotation the resident will be able to:

1. Complete a detailed history and physical examination, order appropriate laboratory and ancillary investigations, and provide a management plan for cardiac surgery patients.
2. Discuss the current indications and recommendations for SBE prophylaxis.
3. Manage medical bleeding.
4. Correct common metabolic and electrolyte disturbances in the intraoperative period.
5. Apply the basic principles of cardiac support devices including intra-aortic balloon pumps and ECMO.
6. Discuss the pathophysiology and management of patients with complications of:
    - Coronary artery disease, acute myocardial ischemia and infarction, and complications of myocardial infarction and thrombolytic therapy
    - Valvular heart disease and valve replacement or repair

- Aortic dissection and thoracic and thoracoabdominal aortic aneurysm
- Shock and the use of volume resuscitation, venodilators/constrictors, inotropes, and lusitropes
    - Emergencies requiring ACLS
    - Cardiac tamponade and constrictive pericarditis
    - Dilated, restrictive, and obstructive cardiomyopathy, congestive heart failure, and diastolic dysfunction
    - Aberrant conduction, dysrhythmia, sudden acute and sub-acute ventricular and supraventricular arrhythmia
    - Pacemakers and the indications for and applications of the various modes of temporary pacing
    - Pneumohemothorax
    - Pulmonary edema and pneumonia
    - COPD, asthma, and sleep apnea in ventilated patients
    - Heparin-induced thrombocytopenia and heparin resistance
    - Neurologic risk stratification during cardiopulmonary bypass procedures
    - Renal failure and its management
    - Diabetes and endocrine control, and the implications of hyperglycemia

C. Attitudes

1. Give effective feedbacks to members of the healthcare team
2. Actively use the feedback provided by others.
3. Recognize limitations in the level of training and seek help appropriately as needed.
4. Respect diversity and cultural, spiritual, emotional, and age-specific differences in patients and other members of the healthcare team.
5. Infuse evidence-based medicine into clinical activities

6. Teach medical students as needed.
7. Lead team members as needed
8. Participate as a member of the healthcare team.
9. Work well with faculty, nursing staff, and department staff.
10. Utilize subspecialty consultation appropriately.
11. Demonstrate responsibility and accountability for decisions.

ECMO

Extracorporeal membrane oxygenation (ECMO) is a life-supporting mechanical system that temporarily takes over the heart and lungs of critically ill patients, allowing them to rest and recover. The machine's pumps and oxygenators remove carbon dioxide from the blood, replace it with life-saving oxygen, and return it to the patient's circulatory system.

ECMO education is mainly offered in Cardiac Centers, Cardiac ICUs, and specific Ministry-assigned ECMO centers.

I. Hajj rotation

The Hajj elective rotation is designed to expose Residents to experience in the provision of healthcare services for mass-gathering sessions at various locations of Makkah.

A. Knowledge

Medical Expert

At the end of this rotation, the Resident will be able to:

1. Identify common medical and surgical emergencies in adults and their management. (K, S)
2. Discuss the pathophysiology of disease and injury. (K, S)
3. Explain ways to identify acute illness and injury promptly. (K, S)
4. Discuss the following basic principles: (K, S)

- Specific clinical presentations in mass gatherings
- Principles of resuscitation
- Principles of investigation
- Diagnosis and management procedures
- Requirements for referral
- Quality assurance, risk management, and standards of care

Communicator

The Resident is expected to be able to:

1. Obtain a focused medical history from the patients or their families. (S)
2. Discuss a wide variety of medical conditions and their treatments with patients and their families in a language that they can understand. (K, S)
3. Establish and maintain a therapeutic relationship with patients, their families, and the medical team, while fostering an environment of understanding, trust, empathy, and confidentiality. (A)
4. Accurately describe a patient's clinical condition to consultants using appropriate medical terminology. (S)
5. Initiate appropriate telephone consultations with other specialists at local and remote locations. (S)
6. Keep thorough and accurate written medical records. (S)

Collaborator

The Resident should be able to:

1. Work collaboratively with allied healthcare professionals. (A)
2. Develop a care plan for the patients they have assessed, including investigation, treatment, and continuing care, in collaboration with members of the interdisciplinary team. (S)
3. Consult judiciously and effectively. (A)

4. Collaboration with other healthcare professionals to ensure a smooth transition of patient care outside the hospital. (A)

Leader

The Resident is expected to be able to:

1. Effectively manage the care of multiple patients while working in an expected emergency situation. (A)
2. Obtain a focused history, and perform physical examinations in a time-limited environment. (S)
3. Make clinical decisions and judgments based on sound evidence to benefit individual patients and the population served. (S)
4. Work effectively as a member of a team. (A)
5. Discuss the principles of managing disasters. (K, S)

Health Advocate

The Resident should be able to:

1. Ensure timely access to relevant consultation and investigation. (A)
2. Expedite patient transfer when needed. (S)
3. Ensure follow-up of care and enhance care continuity. (S)

Scholar

The Resident should be able to:

1. Identify his/her own learning needs and use available learning resources. (A)
2. Demonstrate critical thinking and integrate the critical appraisal of literature into a management approach. (A)
3. Apply appropriate clinical evidence to patient care. (K, S)

Professional

The Resident is expected to be able to:

1. Treat all patients with dignity and respect. (A)

2. Follow through on assigned tasks. (A)
3. Demonstrate integrity in all interactions with colleagues. (A)
4. Be respectful, honest, and compassionate when dealing with patients, families, and other professionals. (A)

B. Skills

1. Obtain a concise and accurate patient history. (S)
2. Perform a physical examination on patients with undifferentiated acute emergencies. (S)
3. Implement appropriate management plans for patients presenting with acute emergencies. (K, S)
4. Develop an organized approach to resuscitation, ensuring the maintenance of the airways, breathing, and circulation. (S)
5. Complete initial management of patients with cardiac arrhythmia and acute coronary syndrome. (K, S)
6. Perform initial assessment and management of patients with shock. (S)
7. Manage a wide variety of acute medical conditions including: (K, S)
    - Environmental exposure (heat stroke, hypothermia, poisoning)
    - Central nervous system disorders (acute stroke, and seizure disorders)
    - Cardiovascular disease (hypertensive emergencies/urgencies, pulmonary edema, dissecting aortic aneurysm, and acute ischemic syndrome)
    - Respiratory diseases (acute asthma exacerbation, chronic obstructive pulmonary disease [COPD] exacerbation, acute respiratory distress, and acute thromboembolic disorder)
    - Gastrointestinal (GI) disorders (upper GI hemorrhage, hepatic encephalopathy, and acute liver failure)

8. Initially manage acute abdomen, trauma, and fractures and interpret the related radiological imaging.

C. Attitudes

1. Treat patients, family, staff, and other personnel with respect.
2. Be sensitive to patients' pain, emotional state, and gender/ethnicity issues.
3. Accept responsibility and be accountable.
4. Document and disseminate information related to the procedures performed and their outcomes in the form of post-procedure notes and official procedural reports.
5. Responsive positive attitude toward feedback from other team members, patients, families, and peers.
6. Respect diversity and cultural, spiritual, emotional, and age-specific differences in patients and other members of the healthcare team.
7. Effectively use the feedback provided by others.
8. Participate as a member of the healthcare team.

Hematology

The elective rotation in hematology is designed to expose Residents to patients with hematological conditions based on the clinical and basic scientific aspects of hematological diseases. The focus is on diagnostic accuracy as well as the appropriate use of radiographic and laboratory testing.

The goal of this experience will be for Residents to gain experience in the evaluation and management of inpatients with a broad spectrum of hematologic diseases and in the treatment of patients with a broad spectrum of cancers.

A. Knowledge

Medical Expert

At the end of this rotation the resident will be able to:

1. Describe the epidemiology, genetics, natural history, and clinical expression of hematological illnesses encountered in inpatient settings. (K)
2. Identify the functions and interplay of factors related to hemostasis and bleeding. (K)
3. Summarize approaches to the evaluation of common presentations of hematologic illnesses (e.g., bleeding, clotting, cytopenia). (K)
4. Critically appraise and cite literature pertinent to the evaluation of inpatients with haematological disorders. (S)
5. Describe the epidemiology, genetics, natural history, and clinical expression of different types of cancers encountered in inpatient settings. (K, S)
6. Summarize approaches to the evaluation of common cancer presentations. (S)
7. Describe epidemiology, pathology, clinical presentation, diagnosis, and treatment of common complications of cancer, chemotherapy, and radiation therapy, including but not limited to tumor lysis syndrome, leukostasis, cord compression, neutropenic fever, and pain crises. (K)

Scholar

1. Effectively use technology to manage information, support patient care decisions, and enhance both patient and physician education. (S)
2. Integrate and apply knowledge obtained from multiple sources to the care of inpatients. (S)
3. Critically assess scientific literature. (S)
4. Set and assess individualized learning goals. (S)

5. Analyze clinical experience and employ a systematic methodology for improvement. (S)
6. Develop and maintain a willingness to learn from errors and use them to improve the system or processes of care. (A)

Collaborator

1. Discuss how the healthcare system affects the management of outpatients with hematological disorders. (S)
2. Collaborate with other healthcare providers, including nurses, counselors, and transfusion medicine specialists, in the care of patients with hematological disorders. (S)
3. Determine the cost-effectiveness of alternative proposed interventions. (S)
4. Design cost-effective plans based on knowledge of best practices. (S)
5. Demonstrate awareness of the impact of diagnostic and therapeutic recommendations on the healthcare system, cost of the procedure, insurance coverage, and resources utilized. (S)
6. Demonstrate effective collaboration with other healthcare providers, including nursing staff, therapists, counselors, surgeons, and consultants in the care of patients with hematological conditions. (S)

Communicator

1. Approach patients in an empathetic and understandable manner. (A)
2. Demonstrate effective skills in listening to and speaking with patients, families, and other members of the healthcare team. (A)
3. Reliably and accurately communicate patients' and their families' views and concerns to the attending physician. (A)
4. Compose clear consultation reports and interval notes/letters in a timely manner, including a precise diagnosis whenever possible,

differential diagnoses when appropriate, and recommendations for follow-up or additional studies. (S)

5. Counsel patients, families, and colleagues regarding the side effects and appropriate use of specific medications and provide written documentation when appropriate. (S)
6. Exercise empathy in all patient encounters. (A)
7. Demonstrate competency in documentation including histories and physical, progress, and discharge notes. (S)

Professional

1. Prompt and prepared for rounds or clinic. (A)
2. Recognize the importance of patient primacy, privacy, autonomy, informed consent, and equitable respect and care for all. (A)
3. Respect patients, patients' families, staff, and colleagues. (A)
4. Model ethical behavior by reporting any key clinical findings to the attending and referring providers, following through on clinical questions, laboratory testing, and other patient care issues, and recognizing potential conflicts of interest. (S)
5. Demonstrate integrity, honesty, and openness in discussions of therapeutic options with patients and respect for patients' preferences and cultural differences. (S, A)
6. Respond to phone calls, pages, and messages in a timely manner. (S, A)

B. Skills

At the end of this rotation the resident will be able to:

1. Interpret diagnostic tests used in the evaluation of inpatients with suspected hematologic disorders.
2. Interpret diagnostic tests used in the evaluation of inpatients with suspected cancer.

B. Attitudes

1. Arrange appropriate follow-up care services for patients and their families.
2. Collaborate with other clinical teams in multidisciplinary meetings.
3. Fulfill the regulatory and legal obligations required of current practice. (S, A)
4. Participate in Saudi and international professional organizations. (S)
5. Maintain patient privacy and confidentiality.
6. Manage conflicts of interest. (S)
7. Demonstrate understanding of the professional, legal, and ethical codes of practice.
8. Give effective feedbacks to members of the healthcare team. (S, A)
9. Recognize limitations in the level of training and seek help appropriately as needed. (A)
10. Infuse evidence-based medicine into clinical activities. (S, A)
11. Utilize subspecialty consultation appropriately. (S)
12. Demonstrate responsibility and accountability for decisions. (A)

Gastroenterology

The goal of this rotation will be for Residents to gain experience in evaluating and managing inpatients with a broad spectrum of GI diseases.

A. Knowledge

Medical Expert

At the end of this rotation the resident will be able to:

1. Describe the epidemiology, genetics, natural history, and clinical expression of GI illnesses encountered in inpatient settings. (K)
2. Identify the structure and function of the GI tract, liver, and biliary systems. (K)

3. Summarize approaches to the evaluation of common presentations of GI illness (e.g., GI bleeding, diarrhea, jaundice/transaminitis). (K)

Scholar

1. Effectively use technology to manage information, support patient care decisions, and enhance both patient and physician education. (S)
2. Integrate and apply knowledge obtained from multiple sources to the care of inpatients. (S)
3. Demonstrate an ability to critically assess scientific literature. (S)
4. Set individualized learning goals. (S)
5. Analyze clinical experience and employ a systematic methodology for improvement. (S)
6. Develop and maintain a willingness to learn from errors and use them to improve the system or processes of care. (A)

Collaborator

1. Discuss how the healthcare system affects the management of outpatients with GI diseases. (K, S)
2. Collaborate with other healthcare providers, including nutritionists and GI surgeons, in the care of patients with GI illnesses. (S)
3. Determine the cost-effectiveness of alternative proposed interventions. (S)
4. Design cost-effective plans based on knowledge of best practices. (S)
5. Demonstrate awareness of the impact of diagnostic and therapeutic recommendations on the healthcare system, cost of the procedure, insurance coverage, and resources utilized. (S)

Communicator

1. Approach patients in an empathetic and understandable manner. (A)
2. Listen and speak to patients, families, and other members of the healthcare team. (A)

3. Reliably and accurately communicate patients' and their families' views and concerns to the attending physician. (S, A)
4. Compose clear consultation reports and interval notes/letters in a timely manner, including a precise diagnosis whenever possible and a differential diagnosis when appropriate, and recommend follow-up or additional studies. (S)
5. Counsel patients, families, and colleagues regarding side effects and appropriate use of specific medications and provide written documentation when appropriate. (S)

Professional

1. Exhibit punctuality for all assigned duties. (A)
2. Incorporate the principles of patient primacy, privacy, autonomy, informed consent, and equitable respect in patient care (S)
3. Demonstrate respect for patients and their families, staff, and colleagues. (A)
4. Model ethical behavior by reporting back to the attending and referring providers' key clinical findings, following through on clinical questions, laboratory testing, and other patient care issues, and recognizing potential conflicts of interest. (A)
5. Demonstrate integrity, honesty, and openness in discussion of therapeutic options with patients and respect for patients' preferences and cultural differences. (A)
6. Respond to phone calls, pages, and messages in a timely manner. (S, A)

Leader

1. Efficiently carry out patient care tasks allocated during ward rounds. (S)
2. Recognize personal limitations and seek help when appropriate. (A)

3. Utilize personal resources effectively to balance patient care, continuing education, and personal activities. (S)
4. Judiciously allocate health care resources. (S, A)
5. Work efficiently and effectively within a health care system. (A)
6. Utilize information technology for optimal patient care and personal scholarship. (S)

Health Advocate

1. Identify the important determinants of health affecting patients. (S)
2. Contribute effectively to improving the health of patients and communities. (S)
3. Recognize and respond to those issues where advocacy is appropriate. (A)
4. Educate patients and families about and promote the importance of long-term healthy behaviors and preventive healthcare (e.g., smoking cessation, screening tests, vaccinations, exercise, and nutrition). (S)
5. Respect and empower patient autonomy. (A)
6. Promote fair health care. (A)
7. Apply the principles of quality improvement and quality assurance. (S)

B. Skills

At the end of this rotation the resident will be able to:

1. Distinguish patients with functional bowel disorders from those with other “organic” bowel diseases. (K, S)
2. Interpret diagnostic tests used in the evaluation of outpatients with suspected GI illness.
3. Critically appraise and cite literature pertinent to the evaluation of outpatients with GI disorders.

4. Construct a comprehensive history and perform a complete physical examination of patients with GI symptoms, abnormal liver function tests, or acute or chronic GI disorders.
5. Construct an appropriate differential diagnosis.
6. Interpret laboratory, imaging, and pathological studies used in the evaluation of GI disorders.
7. Construct a comprehensive treatment plan and assess patient response to therapy.
8. Counsel patients concerning their diagnosis, planned diagnostic testing, and recommended therapies.
9. Demonstrate the appropriate use of validated instruments in the assessment of pain, function, and quality of life to monitor and adjust therapy.

C. Attitudes

1. Give effective feedback to members of the healthcare team
2. Actively use feedback provided by others.
3. Recognize limitations in the level of training and seek help appropriately as needed.
4. Demonstrate effective, appropriate, and timely consultation with another health professional, as required for optimal patient care.
5. Arrange appropriate follow-up care services for patients and their families.
6. Collaborate with other clinical teams in multidisciplinary meetings. (S)
7. Fulfill the regulatory and legal obligations required of current practice. (S)
8. Maintain patient privacy and confidentiality.
9. Manage conflicts of interest.
10. Discuss professional, legal, and ethical codes of practice. (S)

Vascular surgery

This rotation is designed to expose the Residents to all stages of patient care. The objective of this rotation is to acquaint Residents with the evaluation, operative management, and postoperative care of patients undergoing general and vascular surgeries. When appropriate, students follow individual patients whose cases are particularly educational. Supplemental reading for such cases is encouraged.

A. Knowledge

Medical Expert

At the end of this rotation the resident will be able to:

1. Define the pathophysiology, clinical presentation, and management of common vascular problems including arterial and venous disorders. (K)
2. Perform basic clinical examinations and evaluate patients referred for vascular interventions. (S)
3. Identify the drugs used in the treatment of common vascular disorders. (S)
4. Classify antiplatelet, anticoagulant, and thrombolytic drugs. (K)
5. Perform non-surgical management, including endovascular stenting. (S)
6. Distinguish vascular grafts and vascular instruments. (K)
7. Recognize potential complications and appropriately deliver timely management. (K)

Communicator

The Resident should develop communication skills to be able to:

1. Elicit relevant information and perspectives from patients, families, and the health care team. (S)

2. Establish rapport, trust, and a therapeutic relationship with patients and their families. (S)
3. Communicate effectively with patients and families. (S)
4. Provide formal presentations during rounds and lead discussions on patients' surgical conditions. (S)
5. Keep accurate and efficient records. (S)
6. Obtain informed consent. (S)
7. Communicate treatment plans to all members of the team. (S)

Collaborator

1. Participate in interdisciplinary rounds and other activities involving other healthcare professionals. (S)
2. Recognize the roles of and interact effectively with other physicians and health care workers. (S)
3. Consult effectively with other physicians and health care professionals. (S)
4. Demonstrate a team approach to health care. (S)
5. Work with others to assess, plan, provide, and integrate care of surgical patients. (S)

Leader

The Resident is expected to be able to:

1. Utilize resources effectively to balance patient care, personal learning needs, and external activities. (S)
2. Complete surgical notes and dictations appropriately and in a timely fashion. (S)
3. Order tests and procedures and book ORs appropriately and efficiently. (S)
4. Multitask appropriately and effectively, prioritize tasks appropriately, and understand the principles of effective delegation. (S)

5. Delegate responsibilities or accept delegated tasks appropriately. (S)
6. Develop team leadership skills. (S)
7. Employ information technology appropriately for patient care. (S)

Health Advocate

The Resident should be able to:

1. Understand when and how to advocate appropriately on behalf of patients. (S, A)
2. Identify the important determinants of health affecting patients. (K)
3. Demonstrate an understanding of injury prevention. (K, A)
4. Promote and participate in patient safety. (S)

Scholar

The Resident is expected to be able to:

1. Critically appraise the general surgical literature and apply current literature to daily practice. (S)
2. Demonstrate continual self-learning. (S, A)
3. Discuss the principles of surgery and the application of basic science to surgical treatment. (K)
4. Facilitate the learning of patients, staff, students, and other healthcare professionals through formal and informal teaching opportunities. (S)
5. Integrate critical appraisal conclusions into clinical care. (S)
6. Attend and participate in divisional academic activities. (S)

Professional

The Resident should be able to:

1. Deliver the highest-quality care with integrity, honesty, and compassion. (A)
2. Exhibit appropriate personal and interpersonal professional behaviors. (A)

3. Cultivate an ethical relationship with colleagues, patients, and relatives. (A)
4. Demonstrates sensitivity to age, gender, culture, and ethnicity in dealing with patients and their families. (A)
5. Understand legal issues related to surgical consent, confidentiality, and refusal of treatment. (A)
6. Display teamwork and respect for all members of the healthcare team. (A)
7. Maintain patient privacy and dignity and act with personal integrity. (A)

B. Skills

At the end of this rotation the resident will be able to:

1. Manage risk factor reduction for the following common conditions:
    - Abdominal aortic aneurysms
    - Carotid artery disease
    - Chronic critical limb ischemia
    - Chronic venous disease
    - Associated complex medical problems in patients with peripheral vascular disease
2. Execute vascular access in patients with chronic renal failure.
3. Interpret results obtained from a handheld Doppler
4. Interpret angiographic investigations of the carotid arteries and upper and lower limbs.
5. Interpret CT scans in patients with abdominal aortic aneurysms.

C. Attitudes

1. Demonstrate effective, appropriate, and timely consultation with another health professional, as required for optimal patient care. (S, A)

2. Arrange appropriate follow-up care services for patients and their families. (S)
3. Collaborate with other clinical teams in multidisciplinary meetings. (S)
4. Fulfill the regulatory and legal obligations required of current practice (S)
5. Participate in Saudi and international professional organizations (S)
6. Maintain patient privacy and confidentiality (A)
7. Manage conflicts of interest (S)
8. Demonstrate an understanding of the professional, legal and ethical codes of practice (S)

Mandatory Workshops and Courses

The following courses are integral to the program, allowing candidates to improve both their theoretical knowledge and practical skills: Consultants in the specialties indicated should provide these courses.

The presentation format should be a mixture of more than one educational tool (e.g., didactic lectures, problem-based learning, small-group exercises, hands-on workshops for task training, and low- or moderate-to-high-fidelity simulation training) according to the objectives of each course.

Mandatory workshops and courses are as follows:

1. Basic Life Support (BLS)
2. Advanced Cardiovascular Life Support (ACLS)
3. Research Methodology and Statistics
4. Communication Skills
5. Advanced Airway Management
6. Professionalism and Ethics
7. Crisis Resource Management in Critical Care

8. Advanced Trauma Life Support (ATLS)
9. Fundamental Critical Care Support (FCCS)
10. Bedside Ultrasonography for Critically Ill Patients
11. E-FAST Workshop
12. Ultrasound-Guided Central Venous Catheter Insertion
13. Examination Preparation

Logbook

1. All Residents are required to maintain a logbook in which they record all clinical and academic activities performed during training (electronic records are highly recommended).
2. The logbook is used, at a minimum, to record the required procedure (see details below and Appendices 4 and 5).
3. Residents are also required to record the number of "clinical case studies" using the Case Based Discussion (CBD) format. During the 5-year program, Residents are expected to complete a minimum of 20 clinical case studies.
4. The completed logbook will be countersigned by the Program Director.

Recommended Procedures during Residency:

Procedure	Learning Objectives	Minimum Number Required	Junior (70%)	Senior (30%)
Central venous catheter	• Describe the basic principles of CVC insertion, including different insertion sites (e.g. subclavian, internal jugular, femoral). • Identify patient conditions at increased risk of complications. • Execute CVC placement including corrective actions and troubleshooting.	60	40	20

Procedure	Learning Objectives	Minimum Number Required	Junior (70%)	Senior (30%)
Arterial line cannulation	• Identify the technique of inserting arterial lines. • Describe the indications for inserting arterial lines. • Identify the indications and complications of arterial lines. • Perform arterial line insertion successfully. • Enumerate the importance of healthcare team coordination to improve outcomes for patients in need of arterial access.	60	40	20
Direct laryngoscopy	• Identify the anatomical structures visualized during direct laryngoscopy. • Describe the technique of direct laryngoscopy. • State the indications of direct laryngoscopy. • Intubate patients successfully. • Describe the importance of unit team coordination to improve patient outcomes.	60	40	20
Percutaneous tracheostomy	• Identify the indications for percutaneous laryngoscopy. • Perform tracheostomy insertion at bedside safely.	15	10	5
Pleural tap	• Identify the anatomical structures relevant to thoracentesis. • Discuss the indications for thoracentesis. • Explain potential complications of thoracentesis. • Perform the procedure aseptically.	30	20	10

Procedure	Learning Objectives	Minimum Number Required	Junior (70%)	Senior (30%)
Ascitic tap	• Identify the anatomical structures relevant to paracentesis. • Discuss the indications for paracentesis. • Explain potential complications of paracentesis. • Perform the procedure aseptically.	20	14	6
Lumbar puncture	• Identify the anatomical structures relevant to lumbar puncture. • Discuss the indications for lumbar puncture. • Explain potential complications of the procedure. • Perform lumbar puncture successfully on indicated patients.	20	15	5
TTE for assessment of critically ill patients	• Understand the basic principles and indications of TTE. • Perform TTE successfully and interpret results.	60	40	20
E-FAST	• Enumerate the basic principle and indications for E-FAST exam. • Explain the limitations of an Extended Focused Assessment with Sonography for Trauma (E-FAST) exam. • Perform the procedure correctly.	50	35	15
Inferior vena cava assessment for volume responsiveness	• Discuss the importance of inferior vena cava assessment in the evaluation of intravascular volume and prediction of fluid responsiveness in critically ill patients. • Perform ultrasonography of the inferior vena cava correctly.	60	40	20

Procedure	Learning Objectives	Minimum Number Required	Junior (70%)	Senior (30%)
Bronchoscopy	• Discuss the indications and contraindications for bronchoscopy. • Explain potential complications of the procedure. • Give proper instructions to the patient prior to the procedure. • Conduct bronchoscopy appropriately.	20	5	15
Chest tube insertion	• Identify the anatomy of the chest cavity that is relevant to chest tube insertion. • Describe the equipment needed for chest tube placement. • State the indications for a chest tube. • Insert chest tube to indicated patient successfully. • Discuss ways on how to effectively monitor proper placement of chest tube.	12	4	8

Optional Procedures during Residency

Procedure	Learning Objectives	Minimum Number Required	Junior	Senior
Spinal Anesthesia	• Describe the indications of spinal anesthesia. • Discuss the techniques on how to inoculate spinal anesthesia correctly. • Identify the complications of spinal anesthesia. • Enumerate ways on how to effectively monitor patients under spinal anesthesia.	5	2	3

Procedure	Learning Objectives	Minimum Number Required	Junior	Senior
	• Perform induction of spinal anesthesia aseptically.			
Epidural anesthesia	• Describe the indications of epidural anesthesia. • Discuss the techniques for inoculating epidural anesthesia correctly. • Identify the complications of epidural anesthesia. • Enumerate ways to effectively monitor patients under epidural anesthesia. • Perform induction of epidural anesthesia aseptically.	5	2	3
Intercostal nerve block	• Describe the indications for an intercostal nerve block. • State the contraindications to an intercostal nerve block. • Identify the equipment needed for the procedure. • Identify ways to perform an intercostal nerve block.	10	5	5
Awake fiber-optic intubation	• Discuss the indications and contraindications for awake fiber-optic intubation. • Describe the strategies for performing the procedure efficiently. • Prepare the needed equipment prior to intubation. • Perform awake fiber-optic intubation on patient safely.	15	5	10

Procedure	Learning Objectives	Minimum Number Required	Junior	Senior
Crico-thyroidotomy	• Describe the anatomical structures involved in a cricothyroidotomy. • Discuss the patient conditions for which a cricothyroidotomy is indicated. • Identify the potential complications associated with cricothyroidotomy. • Perform emergency cricothyrotomy on critically-ill patients safely and effectively.	10	3	7
Pericardiocentesis	• Describe the anatomical structures involved in performing pericardiocentesis. • Identify the technique used in performing pericardiocentesis. • Describe the patient situation for which pericardiocentesis is indicated. • Enumerate the complications of pericardiocentesis. • Perform the procedure successfully. • Discuss ways to effectively monitor patients after the procedure.	5	2	3

VIII. CONTINUUM OF LEARNING

Specialty General Practice	R1–R3 (Junior Level)	R4–R5 (Senior Level)	Consultant
Sub-specialty Non-practicing	Dependent/supervised practice	Independent practice/provide supervision	Independent practice/provide supervision
Obtain basic health science level to core discipline knowledge	• Obtain fundamental knowledge related to core clinical problems of the specialty • Apply knowledge to provide appropriate clinical care related to core clinical problems of the specialty	• Acquire advanced and up-to-date knowledge related to core clinical problems of the specialty	• Acquire advanced and up-to-date knowledge related to core clinical problems of the specialty
Internship to the practice of discipline	• Apply clinical skills such as physical examination and practical procedures related to the core presenting problems and procedures of the specialty	• Analyze and interpret the findings from clinical skills to develop appropriate differential diagnoses and management plan for the patient	• Compare and evaluate challenging, contradictory findings and develop expanded differential diagnoses and management plan

IX. TEACHING METHODS:

To achieve the required competencies, residents must be exposed to a wide range of topics forming the major subjects in the curriculum. Different educational activities can help deliver the required components of these topics. Complementary and additional recommended workshops/courses and simulation sessions are required to provide a holistic approach to these topics. These include the following:

1. Formal teaching and learning activities.
    - Universal topics (10%)
    - Core specialty topics (70%)
    - Residents' selected topics (20%)

2. Practice-based learning
    - Morning report case presentations
    - Morbidity and mortality reviews
    - Journal Club
    - Case presentations
    - Grand round/guest speakers on core specialty topics
    - Joint specialty meetings

3. Work-based learning
    - Daily round-based learning
    - On-call-based learning
    - Workshops and courses

4. Self-directed learning
    - Self-motivation.

- Create S.M.A.R.T goals.
- Understand your learning style.
- Set standards, monitor, and evaluate.
- Practice persistence.

Program-Specific Learning Activities:

This section aims to match the competencies and objectives related to each rotation according to the CanMED roles. Trainees and trainers should collaborate to achieve these objectives during teaching and formative assessments. The expectations should evolve as the training level progresses (training stages and milestones).

1.1. Universal Topics

The SCFHS developed an e-learning platform to deliver high-value interdisciplinary topics of the utmost importance to residents to ensure that all residents receive high-quality teaching and develop essential core knowledge. These topics are common to all specialties and are delivered in a modular manner. An online formative assessment is conducted at the end of each learning unit. Upon completion of all topics, residents undertake a combined summative assessment in the form of context-rich multiple-choice questions (MCQs), in which they must attain minimum competency. Completion of the seven modules is mandatory.

Intent

These are high-value interdisciplinary topics of utmost importance to Residents. The reason for centralizing these topics is to ensure that every Resident receives high-quality teaching and develops essential core knowledge. These topics are common across all specialties.

The topics included here meet one or more of the following criteria:

- Impactful: these are topics that are common or life-threatening

- Interdisciplinary: topics that are difficult to teach in a single discipline
- Orphaned: topics that are poorly represented in the undergraduate curriculum
- Practical: topics that trainees will encounter in hospital practice

Development and Delivery:

Core topics for the postgraduate curriculum will be developed and delivered centrally by the SCFHS through an e-learning platform. A set of preliminary learning outcomes will be developed for each topic. In collaboration with the central team, content experts can modify the learning outcomes. These topics will be didactic in nature and will focus on the practical aspects of care. These topics are more content-intensive than planned workshops or other face-to-face interactive sessions. The suggested duration of each topic is 1.5 hours.

Assessment:

The topics will be delivered in a modular fashion. At the end of each Learning Unit, there will be an online formative assessment. After the completion of all topics, there will be a combined summative assessment in the form of context-rich multiple-choice questions. All trainees must attain minimum competency in the summative assessment. Alternatively, these topics can be assessed in a summative manner within a specialty examination. Some topics include case studies, high-quality images, examples of prescribing drugs in disease states, and Internet resources.

Training Year	Modules		Topics name	
	Number	Name	Number	Name
R1	Module-1	General Hemodynamic Monitoring	Topic 1	Indications for hemodynamic monitoring
			Topic 2	Types of hemodynamic monitoring (invasive vs. noninvasive) for assessing the adequacy of tissue perfusion
			Topic 3	Management of fluid and vasopressors in patients with shock.
			Topic 4	Management of acid-base and electrolyte imbalances
	Module-2	Acute Care	Topic 5	Preoperative assessment
			Topic 6	Postoperative care
			Topic 7	Acute pain management
			Topic 8	Chronic pain management
	Module-4	Medical and Surgical Emergencies	Topic 14	Management of altered level of consciousness
			Topic 15	Management of hypotension and hypertension
			Topic 16	Management of acute breathlessness
			Topic 17	Management of obstetric emergencies
			Topic 18	Management of hematological emergencies
			Topic 19	Management of GI bleeding
			Topic 20	Management of endocrine emergencies

Training Year	Modules		Topics name	
	Number	Name	Number	Name
	Module-5	Ethics and Healthcare	Topic 21	Occupational hazards of health care workers.
			Topic 22	Patient advocacy
			Topic 23	Breaking bad news
			Topic 24	Ethical issues: transplantation/organ harvesting and withdrawal of care
			Topic 25	Ethical issues: treatment refusal and patient autonomy
			Topic 26	Role of doctors in death and dying
R2	Module-6	Topics that Residents Will Encounter in Hospital Practice	Topic 27	Safe drug prescription
			Topic 28	Hospital-acquired infections (HAIs)
			Topic 29	Antibiotic stewardship
			Topic 30	Blood transfusion
R3	Module-7	Bedside Ultrasound for Assessment of Critically Ill Patients	Topic 31	Assessment of hemodynamically unstable patients using bedside ultrasound
			Topic 32	Assessment of the lung and pleura
			Topic 33	Ultrasound-guided central line insertion
			Topic 34	E-FAST examination
R4	Module-3	Airway Management	Topic 9	Identify a patient who needs airway support
			Topic 10	Routine and difficult airway management

Training Year	*Modules*		Topics name	
	Number	Name	Number	Name
			Topic 11	Appropriate use of various airway devices
			Topic 12	Predict and identify patients with difficult airways
			Topic 13	Predict, identify, and manage complications related to airway management
R5				

Module 1 - General Hemodynamic Monitoring

The goal of hemodynamic monitoring is to maintain adequate tissue perfusion. Classical hemodynamic monitoring is based on the invasive measurement of systemic, pulmonary, arterial, and venous pressures, as well as cardiac output.

1. Indications for hemodynamic monitoring
2. Types of hemodynamic monitoring (invasive vs. non-invasive) for assessing the adequacy of tissue perfusion
3. Management of fluid in patients with shock
4. Management of acid-base and electrolyte imbalances

Topic 1: Indications for hemodynamic monitoring:

At the end of the Learning Unit, Residents should be able to:

- Describe the physiology of the cardiovascular system
- Describe different types of shock:
    - Cardiogenic

- Distributive
- Hypovolemic
- Obstructive

- Mention the indications for hemodynamic monitoring
- Describe monitoring-directed management of various type of shock

Topic 2: Types of hemodynamic monitoring (invasive vs. noninvasive) for assessing the adequacy of tissue perfusion:

At the end of the Learning Unit, Residents should be able to:

- Describe the various monitoring devices
- Describe different types of invasive monitoring devices:
  - Pulmonary artery catheter
  - FloTrac Vigileo, EV1000 and similar devices
  - PULSION PiCCO
  - LiDCO
- Describe different types of noninvasive monitoring devices (e.g., TTE, noninvasive cardiac output monitors)

Topic 3: Management of fluid in shocked patient

At the end of the Learning Unit, Residents should be able to:

- Describe physiological basis of water balance in the body
- Assess patients' hydration status
- Identify patients with over- and under-hydration
- Order fluid therapy for a critically ill patient
- Monitor fluid status and response to therapy through physical examinations, laboratory investigations, and hemodynamic monitoring tools

Topic 4: Management of acid-base and electrolyte imbalances

At the end of the Learning Unit, Residents should be able to:

- Describe physiological basis of electrolyte and acid-base balance in the body
- Identify diseases and conditions that are likely to cause or are associated with acid-base and electrolyte imbalances
- Correct electrolyte and acid-base imbalances
- Perform careful calculations, checks, and other safety measures while correcting acid-base and electrolyte imbalances
- Monitor response to therapy through history, physical examination, and selected laboratory investigations

Module 2 - Acute Care

5. Preoperative assessment
6. Postoperative care
7. Acute pain management
8. Chronic pain management

Topic 5: Preoperative Assessment

At the end of the Learning Unit, Residents should be able to:

- Describe the basic principles of preoperative assessment
- Perform preoperative assessments on uncomplicated patients, with a special emphasis on:
    - General health assessment
    - Cardiorespiratory assessment
    - Medications and medical device assessment
    - Drug allergy
    - Pain relief needs
- Categorize patients according to risks

Topic 6: Postoperative Care

At the end of the Learning Unit, Residents should be able to:

- Devise a postoperative care plan, including monitoring of vital signs, pain management, fluid management, medications, and laboratory investigations
- Hand over patients properly to appropriate facilities
- Describe the process of postoperative recovery in a patient
- Identify common postoperative complications
- Monitor patients for possible postoperative complications
- Institute immediate management for postoperative complications

Topic 7: Acute pain management

At the end of the Learning Unit, Residents should be able to:

- Describe the physiological basis of pain perception
- Proactively identify patients who might be in acute pain
- Assess patients with acute pain
- Apply various pharmacological and non-pharmacological modalities available for acute pain management
- Provide adequate pain relief for uncomplicated patients with acute pain
- Identify and refer patients with acute pain who can benefit from specialized pain services

Topic 8: Chronic pain management

At the end of the Learning Unit, Residents should be able to:

- Identify the biopsychosocial and physiological basis of chronic pain perception
- Discuss various pharmacological and non-pharmacological options available for chronic pain management
- Provide adequate pain relief for uncomplicated patients with chronic pain

- Identify and refer patients with chronic pain who can benefit from specialized pain services

Module 3 - Airway Management

9. Identify a patient who needs airway support
10. Routine and difficult airway management
11. Appropriate use of various airway devices
12. Predict and identify patients with difficult airways
13. Predict, identify, and manage complications related to airway management

Topics 9-13: For all the above, the following learning outcomes apply:

At the end of the Learning Unit, Residents should be able to:

- Identify patients at risk of airway compromise
- Identify and assess difficult airways
- Describe the use of different airway management tools:
    - Nasal and oral airways
    - Bag mask ventilation
    - Different types and sizes of laryngoscope
    - Alternative airway adjuncts (e.g., laryngeal mask airway, Combitube)
    - Appropriate use of fiber optic bronchoscope
    - Perform surgical airways
    - Utilize resources to protect patients' airways and provide adequate oxygenation and ventilation

Module 4 - Medical and Surgical Emergencies

14. Management of altered level of consciousness

15. Management of hypotension and hypertension
16. Management of acute breathlessness
17. Management of obstetric emergencies
18. Management of hematological emergencies
19. Management of GI bleeding
20. Management of endocrine emergencies

Topics 14-15: For all the above, the following learning outcomes apply:

At the end of the Learning Unit, Residents should be able to:

- Triage and categorize patients
- Identify patients who need prompt medical and surgical attention
- Generate preliminary diagnoses based on a history and physical examination
- Order and interpret urgent investigations
- Provide appropriate immediate management to patients
- Refer patients to the next level of care, if needed

Module 5 - Ethics and Healthcare

21. Occupational hazards of health care workers
22. Patient advocacy
23. Breaking bad news
24. Ethical issues: transplantation/organ harvesting and withdrawal of care
25. Ethical issues: treatment refusal and patient autonomy
26. Role of doctors in death and dying

Topic 21: Occupation hazards of health care workers (HCWs)

At the end of the Learning Unit, Residents should be able to:

- Recognize common sources and risk factors of occupational hazards among HCWs
- Describe common occupational hazards in the workplace
- Develop familiarity with legal and regulatory frameworks governing occupational hazards among HCWs
- Develop a proactive attitude toward promoting workplace safety
- Protect themselves and colleagues against potential occupational hazards in the workplace

Topic 22: Patient advocacy

At the end of the Learning Unit, Residents should be able to:

- Define patient advocacy
- Recognize patient advocacy as a core value governing medical practice
- Describe the role of patient advocates in the care of patients
- Demonstrate a positive attitude toward patient advocacy
- Be a patient advocate in conflicting situations
- Identify local and national patient advocacy groups

Topic 23: Breaking bad news

At the end of the Learning Unit, the Resident should be able to:

- Elicit patients' main problems; their perception of these problems; and the emotional, social, and physical impact of the problems on patients and their families.
- Tailor information to patients' needs.
- Confirm patients' understanding.
- Elicit and explore patients' reactions to the information given.
- Determine how much patients want to participate in decision making.

- Discuss the treatment options such that patients can understand the implications of said treatment.
- Enable the patient to follow agreed-upon decisions on treatment.
- Discuss further relevant support sources (e.g., psycho-oncology services, counseling, information resources, support groups) that the patient and relatives/carers might find helpful.

Topic 24: Ethical issues: Transplantation/organ harvesting and withdrawal of care:

At the end of the Learning Unit, Residents should be able to:

- Apply key ethical and religious principles governing organ transplantation and withdrawal of care.
- Define legal and regulatory guidelines regarding organ transplantation and withdrawal of care.
- Counsel patients and families in light of applicable ethical and religious principles.
- Guide patients and families to make informed decisions.

Topic 25: Ethical issues: treatment refusal and patient autonomy:

At the end of the Learning Unit, Residents should be able to:

- Predict situations where a patient or family is likely to decline the prescribed treatment.
- Describe the concept of a "rational adult" in the context of patient autonomy and treatment refusal.
- Analyze key ethical, moral, and regulatory dilemmas in treatment refusal.
- Recognize the importance of patient autonomy in the decision-making process.

- Counsel patients and families who decline medical treatment in light of the patients' best interests.

Topic 26: Role of doctors in death and dying: At the end of the Learning Unit, Residents should be able to:

- Distinguish the importance of doctors' roles in the dying process.
- Provide emotional and physical care to a dying patient and his/her family.
- Provide appropriate pain management to a dying patient.
- Refer suitable patients to palliative care services.

Module 6 - Topics that Residents Will Encounter in Hospital Practice

27. Safe drug prescription
28. Hospital-acquired infections (HAIs)
29. Antibiotic stewardship
30. Blood transfusion

Topic 27: Safe drug prescription:

At the end of the Learning Unit, Residents should be able to:

- Recognize the importance of safe drug prescription in health care.
- Describe various adverse drug reactions with examples of commonly prescribed drugs that can cause such reactions.
- Apply the principles of drug–drug, drug–disease, and drug–food interactions in common situations.
- Apply the principles of prescribing drugs in special situations, such as renal failure and liver failure.
- Apply the principles of prescribing drugs for the elderly, children, and pregnant or lactating women.

- Promote evidence-based, cost-effective prescription.
- Discuss the ethical and legal framework governing safe drug prescription in Saudi Arabia.

Topic 28: Hospital acquired infections (HAIs)

At the end of the Learning Unit, Residents should be able to:

- Discuss the epidemiology of HAIs with special reference to HAIs in Saudi Arabia.
- Recognize HAIs as one of the major emerging threats in health care.
- Identify the common sources and set-ups of HAIs.
- Describe the risk factors of common HAIs, such as ventilator-associated pneumonia, methicillin-resistant Staphylococcus aureus, central line-associated bloodstream infections, and vancomycin-resistant enterococcus.
- Identify the role of HCWs in the prevention of HAIs.
- Determine appropriate pharmacological (e.g., selected antibiotic) and non-pharmacological (e.g., removal of indwelling catheters) measures for the treatment of HAIs.
- Propose a plan to prevent HAIs in the workplace.

Topic 29: Antibiotic stewardship

At the end of the Learning Unit, Residents should be able to:

- Recognize antibiotic resistance as one of the most pressing public health threats globally.
- Describe the mechanism of antibiotic resistance.
- Determine what constitutes appropriate and inappropriate use of antibiotics.
- Develop a plan for safe and proper antibiotic usage, including indications, duration, type of antibiotic, and discontinuation.

- Appraise local guidelines in the prevention of antibiotic resistance.

Topic 30: Blood transfusion

At the end of the Learning Unit, Residents should be able to:

- Identify different components of blood products available for transfusion.
- Recognize the indications and contraindications of blood product transfusion.
- Discuss the benefits, risks, and alternatives to transfusion.
- Identify consent for specific blood product transfusion.
- Perform steps necessary for safe transfusion.
- Identify special precautions and procedures necessary during massive transfusions
- Recognize transfusion-associated reactions and provide immediate management

Module 7 - Bedside Ultrasound for Assessment of Critically Ill Patients

31. Assessment of hemodynamically unstable patients using bedside ultrasound
32. Assessment of the lung and pleura
33. Ultrasound-guided central line insertion
34. E-FAST examination

Topic 31: Assessment of hemodynamically unstable patients using bedside ultrasound: At the end of the Learning Unit, Residents should be able to:

- Demonstrate a knowledge of the basic principles of ultrasonography
- Perform focused cardiac examinations to answer specific questions:

- Left ventricle size and function
- Right ventricle size and function
- Pericardial space for cardiac tamponade
- Fluid status and responsiveness

- Demonstrate ability to identify the causes of hemodynamic instability:
  - Cardiogenic
  - Distributive
  - Hypovolemic
  - Obstructive

Ultrasound-guided central line insertion: At the end of the Learning Unit, Residents should be able to:

- Demonstrate knowledge of the anatomy of the central vessels
- Perform ultrasound-guided central line insertion
- Demonstrate knowledge of the common artifacts of ultrasound wave forms

Topic 32: Assessment of the lung and pleura

At the end of the Learning Unit, Residents should be able to:

- Recognize ultrasound findings of respiratory failure due to various causes including:
  - Pleural effusion
  - Pneumothorax
  - Alveolar-interstitial syndrome (e.g., congestive heart failure, acute respiratory
  - distress syndrome)
  - Normal aeration pattern (e.g., PE, obstructive lung disease)
  - Lobar collapse
- Generate general critical care ultrasound images in the assessment of pneumothorax, pleural effusion, and ascites.

Topic 33: Perform ultrasound-guided procedures (e.g., pleurocentesis and paracentesis).

Topic 34: E-FAST examination

At the end of the Learning Unit, Residents should be able to:

- Perform ultrasound machine knobology
- Define basic principles of ultrasonography
- Perform the FAST examination, a limited ultrasound examination directed solely toward identifying the presence of free intraperitoneal and pericardial fluids and hemothorax in trauma patients.

The topics included here meet one or more of the following criteria:

- Impactful: these are topics that are common or life-threatening
- Interdisciplinary: topics that are difficult to teach in a single discipline
- Orphaned: topics that are poorly represented in the undergraduate curriculum
- Practical: topics that trainees will encounter in hospital practice

Development and Delivery: Core topics for the postgraduate curriculum will be developed and delivered centrally by the SCFHS through an e-learning platform. A set of preliminary learning outcomes for each topic will be developed. In collaboration with the central team, content experts can modify the learning outcomes. These topics will be didactic in nature and will focus on the practical aspects of care. These topics are more content-intensive than planned workshops or other face-to-face interactive sessions. The suggested duration of each topic is 1.5 hours.

Assessment:

The topics will be delivered in a modular fashion. At the end of each Learning Unit, there will be an online formative assessment. After

completion of all topics, there will be a combined summative assessment in the form of context-rich multiple-choice questions. All trainees must attain minimum competency in the summative assessment. Alternatively, these topics can be assessed in a summative manner within a specialty examination. Some topics may include case studies, high-quality images, examples of prescribing drugs in disease states, and Internet resources.

3. General Learning Opportunities:

Different educational activities can help deliver the required components of these topics.

Formal teaching will be utilized during the program for 2–3 hours per week. Topics may include interactive lectures, case discussions, simulation sessions, quizzes, and videos. This ensures that residents become well-versed in vital critical care topics and clinical problems.

1.2.1. Practice-based learning

1.2.1.1 Regular educational activities

Morning report

The morning report is a daily meeting activity designed to discuss cases presented to the team during on-call times. The format of the morning report is valuable and based on the rotation. The main objective of the meeting is to share the experiences of patient presentation, assessment, evaluation, and management. Residents should build abilities in the presentation and discussion of clinical cases to generate appropriate differential and working diagnoses and set a patient management plan.

The performance of Residents should be supervised by a senior member of the team who guides them through proper evaluation and management. Different formats of clinical materials can be presented during the morning report including case presentations, data interpretation, radiological imaging, hemodynamic figures, and other appropriate

clinical data. This will be an excellent platform to raise queries and questions and stimulate fellows to do more reading and research on the presented cases. The time designated for the meeting should be adequate to achieve the intended objectives and should be separate from sign-in and sign-out reports.

a. Case presentation

Case presentations are activities provided to Residents to prepare educational cases that they have seen and utilize to present clinical situations with in-depth analyses and reviews. This may include a literature review of the highlighted clinical condition, diagnostic dilemmas, management options, and other predetermined educational objectives. The frequency of the activity should match the number of residents to provide a chance for each to present regularly at least once per month during the training period.

b. Journal Club

The journal Club provides a platform for residents to select, present, and critically appraise pertinent published articles. This activity will enhance residents' ability to evaluate published research, keep track of new updates in the field, and transform research findings into clinical applications. This helps residents apply knowledge gained from evidence-based principles. The frequency of the activity should match the number of residents to provide a chance for each to present regularly at least once per month during the training period.

c. Grand round

The ground round is usually presented by a senior staff member who reviews a topic with a literature review. For Residency training, it provides a chance for residents to prepare a grand round, enhance presentation skills, and build the experience in the field necessary

to develop expertise. In addition to the clinical knowledge gained by presenting a grand round, this practice also develops the personalities of residents to become scholars in their field.

d. Mortality and morbidity reviews and meeting

The objective of residents reviewing mortality and morbidity cases is to build skills in providing professional review of certain situations and conditions, recognize possible corrective actions, and improve quality and patient safety. Attending mortality and morbidity reviews presented by other team members and senior staff is essential for determining system-related issues and errors, recognize complications and methods of prevention, and plan for monitoring parameters and performance improvement. The frequency of the activity should match the number of residents to provide an opportunity for each to present regularly during the training period, at least twice per year.

e. Academic half-day/full day activity

This is a half-day weekly educational activity without any clinical duties. The academic half-day activity is a weekly protected time for residents to attend a presentation on one of the core curriculum topics. The local training committee is responsible for the arrangement of this activity to ensure the exposure of residents to the required topics in the curriculum, and to stimulate them to read and expand their knowledge and skills regarding the topic. In each training region, the participating training center organizes the activity and decides on the venue and time (see Appendix 12).

f. Sign in/sign out meeting

In the sign in/sign out meeting, residents should be given the chance to hand over patients under their care to the receiving team after they concisely highlight the important clinical data, plan of care, and

goal of therapy. Residents are also required to receive handovers from the team caring for the patient, which should be a routine daily activity. This event should be supervised by a consultant at least four times per month for assessment and evaluation.

1.2.2. Work-based learning

a. Daily round-based learning

With daily round-based learning, residents present a focused history and physical examination findings to the rounding team; document historical and physical examination findings in an accepted format, including a complete written database and problem list; and develop a patient management plan in consultation with others.

b. On-call duty-based learning

With on-call duty-based learning, residents will elicit a comprehensive patient history, perform a complete physical examination on admission, clearly write patients' assessments and differential diagnoses of medical problems, and initiate and discuss the plan of management. This includes investigations of the treatment plan with seniors; communication of the plan to the nurse charged with patient care; performance of basic procedures necessary for diagnosis and management; and attending consultations within and outside the department, including emergency consultations and consultations with other specialties.

1.2.3. Workshop and courses

Residents are expected to attend the following workshops once during their training period.

a. Required at entry level

- Basic life support
- ACLS

b. Mandatory

- Fundamental critical care
- Difficult airway management
- Critical care ultrasonography
    - E-FAST workshop
    - Ultrasonography-guided central venous catheter insertion
    - Echocardiogram and TEE principles workshop
- Mechanical ventilation
- Crisis resource management/rapid response team
- Research methodology and statistics

c. Recommended

- Emergency neurological life support
- Evidence-based medicine
- ECMO
- Communication skills workshops
- Professionalism and ethics
- Preparation for examination

1.2.4. Self-directed learning

- Maintenance of a personal portfolio that includes self-assessment, reflective learning, and a personal development plan
- Achievement of personal learning goals beyond the essential core curriculum

- Reading, including web-based materials
- Reading medical journals
- Auditing and conducting research projects
- Attendance at national and international conferences
- Attendance at activities on a regional basis (e.g., symposia, conferences)

1.2.5. Administrative topics (During academic activities)

- Recognition and management of staff stress in the ICU
- Quality monitoring and indicators
- Interprofessional collaboration and communication among critical care team members
- ICU organization and management
- Defining and measuring patient safety in critical care units
- Medical ethics, end-of-life care, and communication with families, including breaking bad news
- Clinical research in the ICU
- Planning and organization for emergency mass critical care

X. ASSESSMENT AND EVALUATION

1. Purpose

Assessment plays a vital role in the success of postgraduate training. Assessment guides trainees and trainers to achieve defined standards, learning outcomes, and competencies. Conversely, assessment also provides feedback to learners and faculty regarding curriculum development and implementation, teaching methods, and the quality of the learning environment. A reliable and valid assessment is essential for assessing curriculum alignment with respect to objectives, learning methods, and assessment tools. Finally, assessment assure patients and the public that health professionals are safe and competent to practise.

The purposes of trainee assessments during the residency are to:

- Enhance learning by providing formative assessments, enabling residents to receive immediate feedback and identifying areas for development
- Provide robust summative evidence that residents are meeting curriculum standards during the training program.
- Assess residents' actual performance in the workplace
- Ensure that residents possess the essential underlying knowledge, skills, and attitudes required for CCM

Residents' evaluations and assessments throughout the program are undertaken per the Saudi Commission's training and examination rules

and regulations. The assessment includes the following areas, described in greater detail presently:

For the sake of the organization, assessments will be further classified into two main categories: *Formative* and *Summative*.

2. Formative Assessment

2.1 General Principles

Trainees, as adult learners, should strive to seek, and develop their performance based on, feedback throughout their journey of competency from "novice" to "mastery" levels. Formative assessment (also referred to as formative assessment) is the component of assessment that is distributed throughout the academic year, primarily aimed at providing trainees with effective feedback. (Appendix 3)

2.2 Formative Assessment Tools

Note: Adult Critical care Formative Assessment tools for the academic year can be updated annually

Learning Domain	Formative Assessment Tools	Important details (e.g., frequency , specifications related to the tool)
Knowledge	• Structured Academic Activities	• Grand rounds at least four times in the academic year. • Present at the Journal Club at least three times in the academic year. • Participate in teaching for junior residents and medical students. • Senior residents are highly encouraged to participate in national/international meetings to present research projects or other topics of individual interest.
Skills	- DOPS: Direct Observation of Procedural Skills	• This assessment is conducted at the beginning of residency training. • The procedures form should be completed during each rotation (Appendix 2). • Residents will perform procedures under the supervision of the attending consultant and receive immediate feedback. • Successful completion of the DOPS form is mandatory for all residents, and it can be part of the logbook. • Each resident shall complete required procedures that can be assessed by DOPS, as defined by the critical care curriculum assessment blueprint. • Failure to submit this form to the local training committee within six months of training will be discussed with the local training Program Director.
	- Logbook	• All residents are required to keep a logbook during training (electronic records are highly recommended). • The purposes of the logbook are to monitor residents' performance on a continual basis, maintain a record of procedures and technical interventions performed, enable residents and supervisor to determine learning gaps, and provide feedback to residents.

Learning Domain	Formative Assessment Tools	Important details (e.g., frequency , specifications related to the tool)
		• For the five-year residency training, residents are required to complete a minimum of 70% of the required procedures in the junior years (R1, R2, and R3); for the senior years (R4, R5) residents, they should ensure that they have finished all required procedures (Appendix 3). • The completed logbook will be countersigned by the Program Director. • The logbook should be submitted a maximum of four weeks before the end of the academic year. • Failure to submit the logbook will be discussed with the Program Director and Scientific Committee. • The completion of logbook is included in the end-of-year total score for each year.
	- Research Activities	Trainees (R1–R3) are required to take the SCFHS E-modules (research and EBP) and give proof of completion or certificate for promotion by the end of the third year of training. R1–R5 Trainees are encouraged to write a research proposal during the program.
	- OSCE: Objective Structured Clinical Examination - Written exam format	Mid-year examination: This assessment is conducted at the mid of each academic year. • To fulfill the training competency, the resident's performance will be evaluated jointly through the mid-year examination for the following competencies: ○ Performance of resident in case-based management approach. ○ Performance on knowledge-based discussion.

Learning Domain	Formative Assessment Tools	Important details (e.g., frequency , specifications related to the tool)
		○ Performance in diagnostic interpretation and timely therapeutic intervention. ○ Performance in communication skills or quality and safety knowledge. ○ Performance in a 10- to 20-minute direct observation assessment of resident for each OSCE station-patient interactions. The examiner should provide timely and specific feedback to resident after the exam completion. End-of-year examination The end of year examination includes 2 parts, written MCQ format followed by OSCE clinical examination. All the residents must complete the requirements for promotion, which include completed ITER for all the rotations in the academic year, DOPS, logbook, midyear examination, research in the junior years, and any other requirements specified by SCFHS, and shall sit for the end of year exam at the end of each year of training in order to be promoted to the next academic year.
Attitude	- ITER: In-Training Evaluation Report	• This assessment is conducted toward the end of each training rotation throughout the academic year. • To fulfill the CanMEDS competencies based on the end-of-rotation evaluation, residents' performance will be evaluated jointly by relevant staff for the following competencies: • Performance of residents' during daily work. • Performance and participation in academic activities. • Performance of diagnostic and therapeutic procedural skills by residents.

Learning Domain	Formative Assessment Tools	Important details (e.g., frequency , specifications related to the tool)
		• Direct observation assessment of resident-patient interactions. Trainers should provide timely and specific feedback to residents after each evaluation. • The CanMEDs-based competencies end-of-rotation evaluation form must be completed within two weeks following the end of each rotation. The Program Director will discuss the evaluation with residents as necessary. The evaluation form will be submitted to the Local Training Supervisory Committee of the SCFHS within four weeks following the end of the rotation. • Annual promotion depends on a satisfactory annual overall evaluation and passing, with the average score for all rotations being no less than 60%.

The evaluation of each component will be based on the following equation:

Percentage	< 50%	50–59.9%	60–69.49%	> 70%
Description	Clear fail	Borderline fail	Borderline pass	Clear pass

To achieve unconditioned promotion, the candidate must score a minimum of "borderline pass" in all used formative assessment tools

- The Program Director can still recommend the promotion of candidates if the above criteria are not met in certain situations.
- In case the candidate scored "borderline failure" in one or two components at maximum, and these scores do not belong to the same area of assessment (for example: both borderline failures should not belong both to skills)
- The candidate must have passed all other components and scored a minimum of clear pass in at least two components.

3. Summative Assessment

3.1. General Principles

Summative assessment is the component of assessment that primarily aims to make informed decisions about trainees' competency. Unlike formative assessment, *summative assessment* does not aim to provide constructive feedback. For further details, please refer to the General Bylaws of Training in Postgraduate Programs and General Assessment Bylaws (available online: www.scfhs.org). In order to be eligible to sit for the final exams, trainees will be granted a "Certification of Training Completion" upon successful completion of all training rotations.

3.1.1. FITER/comprehensive competency report

In addition to the approval of the completion of the clinical requirements (residents' logbook) by the local supervising committee, the FITER is also prepared by the Program Directors for each resident at the end of their final year (Appendix 3.1). This may also involve clinical and oral examinations, and the completion of other academic assignment(s).

3.1.2. Final residency examination

The final examination comprises two parts:

Written examination: This examination assesses the theoretical knowledge base (including recent advances) and problem-solving capabilities of candidates in the specialty of critical care. It is delivered in MCQ and is held at least once a year. The number of exam items, eligibility, and passing scores will be as per the Commission's training, examination rules, and regulations. Examination details and blueprints are published on the Commission's website (www.scfhs.org.sa).

3.2. First Part Examination

Test specifications and content have been reviewed and updated, therefore pass rates are adjusted accordingly.

Final Written Exam Blueprint

No.	Section	Percentage
1	Pulmonary Disease and Mechanical Ventilation	12%
2	Gastrointestinal Disorders	6%
3	Pharmacology and Toxicology	6%
4	Cardiovascular Diseases and Hemodynamics	10%
5	Infectious Disease	8%
6	Renal, Endocrine and Metabolic Disorders	10%
7	Hematologic and Oncologic Disorders	6%
8	Neurologic Disorders	10%
9	Critical Care Radiology	6%
10	Obstetrics and Gynecology Disorders	6%
11	Surgery, Trauma, Burn and Transplantation	10%
12	Professionalism and Ethics	5%
13	Patient safety	5%
Total		100%

Note: Blueprint distributions of the examinations may differ up to +/–5 % in each category

Note: Percentage and content are subject to change at any time. See the SCFHS website for the most up-to-date information.

Final Clinical Exam Format

t. The adult critical care final clinical examination shall comprise 8-10 graded stations, each with 10-minute encounters

u. The 8-10 stations may consists of OSCE and/or SOE stations with one examiner each OSCE and two for SOE stations with two examiners each (the examiner can move between stations if the number of examiners is limited).

v. All stations shall be designed to assess integrated clinical encounters

w. SOE stations are designed with preset questions and ideal answers

x. Each OSCE station is assessed using a predetermined performance checklist. A scoring rubric for post-encounter questions is also set in advance.

Care Dimensions					
	Approach and assessment	Diagnosis	Investigations and data interpretations	Prevention and management	# of stations

Domains of integrated clinical encounter	Patient care	2	1	1	2	6
	Patient safety and procedural skills			1	1	2
	Communication and interpersonal skills	1				1
	Professional behaviors		1			1
	Total Stations	3	2	2	3	10

Note: Blueprint can be changed per the scientific council recommendation and will be published on the Commission website: www.scfhs.org.sa.

Note: The final clinical exam format can be updated annually.

3.3 Certification

Candidates who pass the final written and clinical examinations are awarded the "Saudi Residency in Critical Care Medicine" certificate.

XI. PROGRAM AND COURSE EVALUATION

Program Evaluation

At least annually, Residents and faculty members must systematically evaluate the educational effectiveness of the entire program, including the quality of the curriculum and clinical rotations. Furthermore, the extent to which Residents have met their educational goals must be assessed. Written evaluations by Residents should be used in this process and the results of these evaluations must be kept on file.

Below are the program evaluation forms:

Evaluation form for R1, R2 and R3

	Domain	Unsatisfactory	Satisfactory	Outstanding	NA
		1–3	4–6	7–9	
I	Medical Expert				
	Patient assessment				
	Taking of relevant history and performance of appropriate physical examination				
	Investigation and management of patients with undifferentiated problems				
	Use of evidence-based diagnostic testing/management strategies				
	Management of common diseases				

	Domain	Unsatisfactory	Satisfactory	Outstanding	NA
		1–3	4–6	7–9	
	Performance of procedures				
II	**Communicator**				
	Obtaining a thorough and relevant medical history				
	Bedside presentation of patient problems				
	Communication with patients and their families				
	Obtaining of informed consent for medical procedures and treatments				
	Communication with members of the health care team				
	Communication with referring physicians and consultation of notes, medical evaluations, and discharge summaries				
	Presentation and discussion at teaching and patient care rounds				
III	**Collaborator**				
	Working effectively within the health care team				
	Demonstrating appropriate use of consultative services				
	Recognizing or respecting roles of team members				
IV	**Manager**				

	Domain	Unsatisfactory	Satisfactory	Outstanding	NA
		1–3	4–6	7–9	
	Supervision or implementation of patient care decisions				
	Effective delegation as appropriate				
	Effective and ethical utilization of health care resources				
	Effective time management				
V	**Health Advocate**				
	Understanding health determinants				
	Role of economic/social factors in disease				
	Prevention counseling/use of preventive strategies				
	Advocating for patients and/or profession				
VI	**Scholar**				
	Personal learning				
	Critical review of literature				
	Knowledge of relevant basic science				
	Biochemistry, pathology, physiology/pathophysiology, and pharmacology				
	Teaching of other health care team members				
VIII	**Professional**				

	Domain	Unsatisfactory	Satisfactory	Outstanding	NA
		1–3	4–6	7–9	
	Personal and interpersonal, professional behavior				
	Integrity, honesty, and compassion				
	Recognizing and dealing with ethical issues				
Total Score: _____ x 10= _____					

Comments:

Evaluator	Signature	Date

Director	Signature:	Date:

Resident	Signature:	Date:

Evaluation form for R4 and R5

Number	Criteria	Unsatisfactory	Satisfactory	Outstanding
		1–3	4–6	7–9
I	Knowledge and Academic Activity:			
	Unsatisfactory: Limited knowledge, cannot explain the mechanism of disease, not aware of landmark studies, and has no interest in learning or doing research			
	Satisfactory: Exceptional knowledge of basic and clinical sciences, highly resourceful development of knowledge, immediate recognition of complex relationships, and development of unifying diagnoses			
	1. Basic Science			
	2. Clinical Science			
	3. Current Literature			
	4. Participation in Scientific activities			
II	Clinical and Technical Skills			
	1. Organization of Work			
	Unsatisfactory: Unable to perform tasks in order			
	Outstanding: Can organize complex tasks exceptionally well and utilize time efficiently			
	2. Records and Reports			

Number	Criteria	Unsatisfactory	Satisfactory	Outstanding
		1–3	4–6	7–9
	Unsatisfactory: Incomplete or inaccurate medical interviews, physical examinations, and summaries of other data sources; incomplete reviews			
	Outstanding: Always gathers accurate and appropriate information from interviews, examinations, and other data sources.			
	3. Interpretation and Utilization of Information			
	Unsatisfactory: Fails to analyze clinical data to make accurate medical decisions			
	Outstanding: Always analyzes available information to make diagnostic or therapeutic decisions based on sound clinical judgment, the best available evidence, and patient preferences			
	4. Clinical Judgment and Decision-Making			
	Unsatisfactory: Poor clinical judgment; ignores valid medical evidence and patient preferences in medical decisions			
	Outstanding: Always analyzes available information to make diagnostic or therapeutic decisions based on sound clinical judgment, the best available evidence, and patient preferences			
	5. Indication of Procedures			
	Unsatisfactory: Unable to define appropriate indications of procedures			
	Outstanding: Identify indications at an appropriate time			

Number	Criteria	Unsatisfactory	Satisfactory	Outstanding
		1–3	4–6	7–9
	6. Procedures and Operative Skills			
	Unsatisfactory: Inept or careless; frequent disregard for patient's anxiety and comfort			
	Outstanding: Always proficient and careful; minimizes risk and discomfort to patients; provides proper explanation of purpose and risks of procedure			
	7. Performance in Emergencies			
	Unsatisfactory: Poor judgment and management			
	Outstanding: Handles emergencies in a systematic way and provides rapid evaluation and management			
	8. Supervision and Consultations			
	Unsatisfactory: Unable to supervise; cannot give opinion on consults			
	Outstanding: Direct; teaches and guides junior Residents; performs constructive, informative consultations with appropriate decision making			
III	Attitudes and Ethics			
	1. Discipline and Reliability			
	Unsatisfactory: Unreliable; frequently not around			
	Outstanding: Dependable; always available and ready to help			
	2. Patient Relations			
	Unsatisfactory: Shows a lack of respect, compassion, and honesty			
	Outstanding: Always demonstrates respect, compassion, and integrity			

Number	Criteria	Unsatisfactory	Satisfactory	Outstanding
		1–3	4–6	7–9
	3. Interprofessional Relations			
	Unsatisfactory: Poor communication with and respect for colleagues			
	Outstanding: Respectful; a team player			
	4. Ethical Standards			
	Unsatisfactory: Poor handling of ethical basics			
	Outstanding: Excellent knowledge of ethical principles and applies high ethical standards, taking into consideration cultural and religious factors			
Total Score: _____ x 10= _____				

Comments:

Evaluator	Signature

Director	Signature

Resident	Signature

XII. POLICIES AND PROCEDURES

This curriculum represents the means and materials that outline the learning objectives with which trainees and trainers interact to achieve the identified educational outcomes. The Saudi Commission for Health Specialties (SCFHS) has a full set of bylaws and executive policies (published on its official website) that regulate all training-related processes. General bylaws of training, assessment, and accreditation, as well as executive policies on admission, registration, continuous assessment and promotion, examination, trainees' representation and support, duty hours, and leave, are examples of regulations that need to be applied. The most up-to-date bylaws and policies can be accessed online (via the official SCFHS website) and will serve as the reference for all legal disputes.

Vacation & Conference Leave

All Critical Care Medicine Residents are granted 30 vacation days per year as per the SCFHS rules and regulations. Requests for vacation time must be approved by the Program Director, and must be made at least four weeks in advance. In addition, Residents are granted five working days per year for conference leave. The conference must be approved by the Program Director; however, Residents must have attended at least 75% of the Journal Clubs and other academic activities during the year in order to be eligible.

Residents are encouraged to attend critical care symposia and conferences that are held worldwide. The following courses are mandatory for all Junior Residents (1st, 2nd, and 3rd year) for Provider Course Certification:

1. Ultrasonography (US)
2. Epidemiology
3. Fundamental Critical Care Support (FCCS)
4. Mechanical Ventilation
5. Advanced Cardiovascular Life Support (ACLS)
6. Advanced Trauma Life Support (ATLS)
7. Post-Hospitalization Trauma Life Support
8. Fundamental Disaster Management

Notice of Changes in the Program

The program leadership is responsible for notifying the Executive Director of the Educational Committee within 30 days, in writing, of any major changes in the program that may significantly alter Residents' educational experience, including the following:

1. Changes in the leadership of the department or program.
2. Changes in administrative structure, such as an alteration in the hierarchical status of the program/department within the institution.
3. A drop in the core faculty complement below the required minimum number or if one-third or more of the core faculty leave within 1 year.
4. A drop in program Residents below the minimum approved number of over 1 year.

Note: Should the Educational Committee determine that a significant alteration of educational resources has occurred, an immediate resurvey of the program may be performed.

The Program Director must obtain prior approval for the following changes to the program, as the Educational Committee must determine whether an adequate educational environment exists to support these changes:

1. Addition or deletion of any participating institution to which a Resident will rotate for 2 months or longer.
2. The addition or deletion of any rotation of 2 months or longer.
3. Any change in the length or educational format of the program. Upon review of a proposal for a major change in the program, the Educational Committee may determine that a site visit is necessary.

XIII. APPENDICES

1. Mapping of Milestones (Junior-Level Competency-Matrix)
2. Mapping of Milestones (Senior-Level Competency-Matrix)
3. Final In-Training Evaluation Report (FITER)
    - The FITER is a summative evaluation prepared at the end of the Residency Program, which grants Residents the full range of competencies (knowledge, skills, and attitudes) required of an intensivist and provides readiness to sit for Saudi residency examinations.
    - The FITER provides information that will be considered by the Saudi Examination Board during the deliberation of a candidate whose performance on the Saudi certification examination falls within the borderline category.
    - The FITER is requested by the Saudi Board at the end of residency training .
    - The FITER is completed by the residency training Program Director .
    - The FITER is not a composite of regular in-training evaluations; rather, it is testimony to the evaluation of competencies at the end of a residency education program.
    - FITER will be completed as late as possible during residents' training, but no later than two months before the final exam.
    - The FITER of individual candidates is available only to the Chair of the Examination Committee, who must maintain confidentiality regarding the name of the candidate, the training center, and the Program Director at all times.

        3.1 FITER: (Comprehensive competency report (CCR)

        3.2 FITER: (Medical expert competency)

        3.3 FITER: (Procedures and clinical skills competencies)

3.4 FITER: (Communicator competency)

3.5 FITER: (Collaborator competency)

3.6 FITER: (Manager competency)

3.7 FITER: (Health advocate competency)

3.8 FITER: (Scholar competency)

3.9 FITER: (Professional competency)

4. Direct Observation of Procedural Skills
5. Procedures Logbook
6. Mini-Clinical Evaluation Exercise (Mini-CEX)
7. Case-Based Discussion Rating Form
8. Research Manual
    8.1. Research Evaluation Sheet
9. Presentation Evaluation form
10. Portfolio Assessment
11. In-Training Evaluation Report (ITER)
12. Example illustrating the half-day activities for one year

Appendix 1

Mapping of Milestones

Trainees are expected to progress from novice to mastery level in a certain set of professional competencies. The SCFHS endorses CanMEDs for articulating their professional competencies. The following is a general outline of each competency (adopted from Frank, Snell, and Sherbino J (eds.). The CanMED 2015 Physician Competency Framework. Royal College of Physicians and Surgeons of Canada, Ottawa. 2015):

Junior-Level Competency-Matrix: To Map Competency, Learning Domain, and Milestones

Author advice: Please refer to the pediatric example below for what is expected in this table.

Training Year level	*Competency-Roles* (with annotation of learning domains involved: K: knowledge, S: Skills, A: Attitude)	Competency Matrix Related to Critical Care					
		Obtain a history pertinent to clinical presentation	Perform physical examination and interpret the findings	Conduct a focused and efficient interview on the patient/legal representative and obtain the necessary consents for procedures	Demonstrate integrated medical knowledge and skills to manage the critically-ill patients	Organize and participate in teamwork	Comply with proper documentation process
R 1,2, 3	Professional Expert	Develop a differential diagnosis based on the patient's presentation	Select and interpret appropriate investigations and imaging techniques	Develop and implement initial management plans	Define the natural history and clinical expression of critical care illnesses encountered in the inpatient, ICU, and ER settings.	Identify at-risk patients, perform appropriate physical examinations, formulate a problem list, and institute a course of therapy under the direction of senior personnel	Document daily assessment, prescriptions or transfer orders

Training Year level	*Competency-Roles* (with annotation of learning domains involved: K: knowledge, S: Skills, A: Attitude)	Competency Matrix Related to Critical Care					
		Obtain a history pertinent to clinical presentation	Perform physical examination and interpret the findings	Conduct a focused and efficient interview on the patient/legal representative and obtain the necessary consents for procedures	Demonstrate integrated medical knowledge and skills to manage the critically-ill patients	Organize and participate in teamwork	Comply with proper documentation process
	Communicator	Communicate all the pertinent information obtained to the medical team	Document clinical encounters to adequately convey clinical reasoning and the rationale for decisions	Demonstrate counseling skills and decision aids to help patients or patients' decision makers make informed choices or give informed consent	Communicate using patient-centered approach and demonstrate empathy and respect in all patient encounters	Demonstrate effective communication skills with the other members of the health care team	Write down assessment/orders in the patients' chart or encode in a hospital-based system
	Collaborator	Integrate the patient's perspective and context into the collaborative care plan	Consult other health professionals appropriately with regard to patients' social, rehabilitative, and nutritional concerns	Demonstrate a respectful attitude toward the patient and their families	Demonstrate an effective and safe handover during sign-out or transition of responsibility of care, either within the institution or to a different setting or stage of care.	Participate in effective teamwork and demonstrate a respectful attitude toward other colleagues and staff members of inter- and intra-professional teams	Inter-professional communication with the rest of the medical team

Training Year level	*Competency-Roles* (with annotation of learning domains involved: K: knowledge, S: Skills, A: Attitude)	Competency Matrix Related to Critical Care					
		Obtain a history pertinent to clinical presentation	Perform physical examination and interpret the findings	Conduct a focused and efficient interview on the patient/legal representative and obtain the necessary consents for procedures	Demonstrate integrated medical knowledge and skills to manage the critically-ill patients	Organize and participate in teamwork	Comply with proper documentation process
	Advocate	Holistic patient approach	Maintain patient's privacy and safety during the conduct of physical examinations	Respect patient's right to information		Contribute effectively to improving the health of patients and communities	Apply the principles of quality improvement
	Leader	Promote time management				Properly delegate tasks to your team to manage time effectively	Apply the principles of quality assurance
	Scholar		Use assessment tools and practices in a given learning context		Integrate medical management based on a given learning context	Demonstrate a teamwork attitude and promote collaborative learning	

Training Year level	*Competency-Roles* (with annotation of learning domains involved: K: knowledge, S: Skills, A: Attitude)	Competency Matrix Related to Critical Care					
		Obtain a history pertinent to clinical presentation	Perform physical examination and interpret the findings	Conduct a focused and efficient interview on the patient/legal representative and obtain the necessary consents for procedures	Demonstrate integrated medical knowledge and skills to manage the critically-ill patients	Organize and participate in teamwork	Comply with proper documentation process
	Professional				Demonstrate a commitment to maintaining and enhancing competence, quality improvement, and patient safety		Inter-professional communication

Appendix 2

Mapping of Milestones

Trainees are expected to progress from novice to mastery level in a certain set of professional competencies. The SCFHS endorses CanMEDs for articulating their professional competencies. The following is a general outline of each competency (adopted from Frank, Snell, and Sherbino J (eds.). The CanMED 2015 Physician Competency Framework. Royal College of Physicians and Surgeons of Canada, Ottawa. 2015):

Senior-Level Competency-Matrix: To Map Competency, Learning Domain, and Milestones

Training Year level	*Competency-Roles* (with annotation of learning domains involved: K: knowledge, S: Skills, A: Attitude)	Competency Matrix Related to Critical Care					
		Conduct comprehensive and multidisciplinary rounds independently to assess patients, synthesize differential diagnoses, and create problem lists and plans of action	Establish and implement a plan for post-procedure care	Make effective use of the scope and expertise of other healthcare professionals	Demonstrate clinical and technical skills, and decision-making capabilities in severely ill patients relevant to critical care practice	Provide advice to and plan care for the critically ill patients with consideration for the patients' clinical status, surrounding environment, cultural preferences, and available resources	Access and apply relevant information to clinical practice.
R 4,5	Professional Expert	Discuss integrative nature of disease in critically ill patients and the interdisciplinary approach to the management of such patients	Apply knowledge of the indications, techniques, and complications for core critical care procedures such as: central line insertion, direct laryngoscopy, percutaneous tracheostomy insertion, bronchoscopy, chest tube insertion, etc.	Obvious planned course of procedure with economy of movement and flow	Demonstrate competence in the management of cardiac arrest and the acute resuscitation of a traumatized or acutely ill patient	Discuss integrative nature of disease in critically ill patients and the interdisciplinary approach to the management of such patients	Demonstrate effective procedure preparation, including the use of a pre-procedure time-out or safety checklist as appropriate

Training Year level	*Competency-Roles* (with annotation of learning domains involved: K: knowledge, S: Skills, A: Attitude)	Competency Matrix Related to Critical Care					
		Conduct comprehensive and multidisciplinary rounds independently to assess patients, synthesize differential diagnoses, and create problem lists and plans of action	Establish and implement a plan for post-procedure care	Make effective use of the scope and expertise of other healthcare professionals	Demonstrate clinical and technical skills, and decision-making capabilities in severely ill patients relevant to critical care practice	Provide advice to and plan care for the critically ill patients with consideration for the patients' clinical status, surrounding environment, cultural preferences, and available resources	Access and apply relevant information to clinical practice.
	Communicator	Communicate well with an ICU team (nurses, other Residents, or attending staff) about patient care issues.	Adapt record keeping to the specific guidelines of their discipline and the clinical context	Deliberate suitable information with patients and families, and the healthcare team	Participate in end-of-life discussions with the ICU team and family members	Use strategies to verify and validate the understanding of the patient and family regarding the diagnosis, prognosis, and management plan	Obtain and synthesize relevant history from patients and families, and their communities

Training Year level	*Competency-Roles* (with annotation of learning domains involved: K: knowledge, S: Skills, A: Attitude)	Competency Matrix Related to Critical Care					
		Conduct comprehensive and multidisciplinary rounds independently to assess patients, synthesize differential diagnoses, and create problem lists and plans of action	Establish and implement a plan for post-procedure care	Make effective use of the scope and expertise of other healthcare professionals	Demonstrate clinical and technical skills, and decision-making capabilities in severely ill patients relevant to critical care practice	Provide advice to and plan care for the critically ill patients with consideration for the patients' clinical status, surrounding environment, cultural preferences, and available resources	Access and apply relevant information to clinical practice.
	Collaborator	Demonstrate awareness of the impact of diagnostic and therapeutic recommendations on the health care system	Professional and effective communication with other health care providers	Delegate responsibilities to members of the healthcare team appropriate to their scope of practice and level of expertise	Discuss how the health care system affects the management of inpatient ICU care	Demonstrate awareness of the impact of diagnostic and therapeutic recommendations on the health care system.	Summarize the patient's issues in the transfer summary, including plans to deal with ongoing issues

Training Year level	*Competency-Roles* (with annotation of learning domains involved: K: knowledge, S: Skills, A: Attitude)	Competency Matrix Related to Critical Care					
		Conduct comprehensive and multidisciplinary rounds independently to assess patients, synthesize differential diagnoses, and create problem lists and plans of action	Establish and implement a plan for post-procedure care	Make effective use of the scope and expertise of other healthcare professionals	Demonstrate clinical and technical skills, and decision-making capabilities in severely ill patients relevant to critical care practice	Provide advice to and plan care for the critically ill patients with consideration for the patients' clinical status, surrounding environment, cultural preferences, and available resources	Access and apply relevant information to clinical practice.
	Advocate	Identify the important determinants of health affecting patients	Apply the principles of infection control measures appropriately		Recognize and respond to issues where health advocacy is appropriate	Educate patients and families and promote the importance of long-term healthy behaviors and preventive health care	

Training Year level	*Competency-Roles* (with annotation of learning domains involved: K: knowledge, S: Skills, A: Attitude)	Competency Matrix Related to Critical Care					
		Conduct comprehensive and multidisciplinary rounds independently to assess patients, synthesize differential diagnoses, and create problem lists and plans of action	Establish and implement a plan for post-procedure care	Make effective use of the scope and expertise of other healthcare professionals	Demonstrate clinical and technical skills, and decision-making capabilities in severely ill patients relevant to critical care practice	Provide advice to and plan care for the critically ill patients with consideration for the patients' clinical status, surrounding environment, cultural preferences, and available resources	Access and apply relevant information to clinical practice.
	Leader	Carry out patient care tasks allocated during ward rounds	Promote a culture of teamwork that recognizes, supports, and responds effectively to colleagues in need during patient care	Recognize and professionally respond to unprofessional and unethical behaviors in other staff		Lead the situation for patients' best interest	

Training Year level	*Competency-Roles* (with annotation of learning domains involved: K: knowledge, S: Skills, A: Attitude)	Competency Matrix Related to Critical Care					
		Conduct comprehensive and multidisciplinary rounds independently to assess patients, synthesize differential diagnoses, and create problem lists and plans of action	Establish and implement a plan for post-procedure care	Make effective use of the scope and expertise of other healthcare professionals	Demonstrate clinical and technical skills, and decision-making capabilities in severely ill patients relevant to critical care practice	Provide advice to and plan care for the critically ill patients with consideration for the patients' clinical status, surrounding environment, cultural preferences, and available resources	Access and apply relevant information to clinical practice.
	Scholar	Integrate and apply knowledge obtained from multiple study sources to the care of critically ill patients		Demonstrate a teamwork attitude and promote collaborative learning		Integrate evidence into decision making	
	Professional	Exhibit professional commitment to rounds and in discussion	Demonstrate commitment to the disclosure of error and or adverse events and their impact	Demonstrate ethical behavior by reporting		Demonstrate integrity, honesty, and openness in discussion of therapeutic	

Training Year level	*Competency-Roles* (with annotation of learning domains involved: K: knowledge, S: Skills, A: Attitude)	Competency Matrix Related to Critical Care					
		Conduct comprehensive and multidisciplinary rounds independently to assess patients, synthesize differential diagnoses, and create problem lists and plans of action	Establish and implement a plan for post-procedure care	Make effective use of the scope and expertise of other healthcare professionals	Demonstrate clinical and technical skills, and decision-making capabilities in severely ill patients relevant to critical care practice	Provide advice to and plan care for the critically ill patients with consideration for the patients' clinical status, surrounding environment, cultural preferences, and available resources	Access and apply relevant information to clinical practice.
		with other services		back any key clinical findings to the attending and referring providers; following through on clinical questions,		options with patients and respect for patient's preferences and cultural differences	

Training Year level	*Competency-Roles* (with annotation of learning domains involved: K: knowledge, S: Skills, A: Attitude)	Competency Matrix Related to Critical Care					
		Conduct comprehensive and multidisciplinary rounds independently to assess patients, synthesize differential diagnoses, and create problem lists and plans of action	Establish and implement a plan for post-procedure care	Make effective use of the scope and expertise of other healthcare professionals	Demonstrate clinical and technical skills, and decision-making capabilities in severely ill patients relevant to critical care practice	Provide advice to and plan care for the critically ill patients with consideration for the patients' clinical status, surrounding environment, cultural preferences, and available resources	Access and apply relevant information to clinical practice.
				laboratory testing, and other patient care issues; and recognizing potential conflicts of interest			

Appendix 3.1

Saudi Adult Critical Care Medicine Residency Program

Final in-training evaluation report (FITER)/Comprehensive competency report (CCR)

Resident name: _____

SCFHS number: _____

Evaluation covering the last year as a resident: _____

In the view of the Residency Program Committee, the resident mentioned above has acquired the competencies of the critical care as prescribed in the objectives of training and is competent to practice as a specialist

Yes _____ No _____

The following sources of information were used for this evaluation:

Evaluation source	Yes	No
• Written exams		
• Oral exams		
• Clinical observations (e.g., CBD, ITER) by faculty		
• OSCEs		
• Simulation-based assessment		
• Feedback from healthcare professionals		
• Completion of a scholarly project		
• Other evaluations		

Comments:

Name of Program Director: _____

Date: Signature:

_____ _____

Name of Postgraduate Dean: _____

Date: Signature:

_____ _____

This is to attest that I have read this document

Name of Resident:

_____

SCFHS number: _____

Date: Signature:

_____ _____

Resident's comments:

Note: If, during the period from the date of signature of this document to the completion of training, the Program Committee judges that the candidate's demonstration of competence is inconsistent with the present evaluation, it may declare the document null and void and replace it with an updated FITER. Eligibility for the examination will be dependent on the updated FITER.

Appendix 3.2

FITER: (medical expert competency)

Resident name:

Resident SCFHS number:

	Expectations					
	Rarely meets	Inconsistently meets	Generally meets	Consistently exceeds	Sometime meets	Not applicable
Medical expert						
a. Functions effectively as a consultant, integrating all the CanMEDS roles to provide optimal, ethical, and patient-centered medical care						
b. Demonstrates an understanding of the basic scientific and clinical knowledge relevant to critical care medicine						
c. Elicits histories and physical examinations that are complete, accurate, and well organized						
d. Uses all pertinent information to arrive at complete and accurate clinical decisions						
e. Recognizes and manages emergency conditions resulting in prompt and appropriate treatment						

	Expectations					
	Rarely meets	Inconsistently meets	Generally meets	Consistently exceeds	Sometime meets	Not applicable
f. Demonstrates safe application of equipment, careful monitoring, judicious use of drugs, and the coordinated provision of multidisciplinary care for effective organ system support						
g. Demonstrates safe preparation and execution of patient transportation						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the objectives and give specific examples wherever possible.						

*Rarely meets: < 30%

*Inconsistently meets: 30–59%

*Generally, meets: 60–79%

*Sometimes exceeds: 80–89%

*Consistently exceeds: ≥ 90%

Appendix 3.3

FITER: (procedures and clinical skills competencies)

Resident name:

Resident SCFHS number:

	Expectations					
	Rarely meets	Inconsistently meets	Generally meets	Consistently exceeds	Sometime meets	Not applicable
Procedures and clinical skills						
Demonstrates the ability to perform diagnostic and therapeutic procedures/skills described in the Critical Care Medicine Residency Training Curriculum and presented below						
a. Assessment and maintenance of the airway						
b. Management of the patient requiring endotracheal intubation						
c. Care of the patient requiring prolonged ventilation, including tracheostomy and weaning techniques						
d. Central venous cannulation for resuscitation and hemodialysis with ultrasound guidance						
e. Resuscitation of the patient with dysrhythmia including medication, cardioversion, defibrillation, and pacing						
f. Insertion of arterial lines						

	Expectations					
	Rarely meets	Inconsistently meets	Generally meets	Consistently exceeds	Sometime meets	Not applicable
Procedures and clinical skills						
g. Thoracentesis and thoracostomy tube insertion						
h. Lumbar puncture						
i. Paracentesis						
Obtains appropriate informed consent for procedures and therapies						
Minimizes patients' risks and discomforts						
Identifies and manages complications						
Overall, is proficient in clinical and procedural skills relevant to adult CCM						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the specific objectives and give specific examples wherever possible.						

*Rarely meets: < 30%

*Inconsistently meets: 30–59%

*Generally meets: 60–79%

*Sometimes exceeds: 80–89%

*Consistently exceeds: > 90%

Appendix 3.4

FITER: (communicator competency)

Resident name:

Resident SCFHS number:

	Expectations					
	Rarely meets	Inconsistently meets	Generally meets	Consistently exceeds	Sometime meets	Not applicable
Communicator						
a. Establishes a therapeutic relationship with patients and communicates well with their families. Provides clear and thorough explanations of diagnosis, investigation, and management in a professional manner. Demonstrates empathy and sensitivity to racial, sex, and cultural issues						
b. Prepares documentation that is accurate and timely						
c. Develops diagnostic and therapeutic plans that are understandable to patients and clear and concise for other healthcare personnel, including other consultants						
d. Demonstrates an awareness of the unique and stressful environment of the critical care facility for patients and their families						
e. Communicates effectively with patients and their families, including but not limited to those who may present as dysfunctional, angry, confused, or litigious						
f. Develops a common understanding on issues, problems, and plans of care, including but not limited to end-of-life issues						

	Expectations					
	Rarely meets	Inconsistently meets	Generally meets	Consistently exceeds	Sometime meets	Not applicable
g. Presents clinical summaries and scientific information in a clear and concise manner to a healthcare audience						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the objectives and give specific examples wherever possible.						

*Rarely meets: < 30%

*Inconsistently meets: 30–59%

*Generally meets: 60–79%

*Sometimes exceeds: 80–89%

*Consistently exceeds: > 90%

Appendix 3.5

FITER: (collaborator competency)

Resident name:

Resident SCFHS number:

	Expectations					
	Rarely meets	Inconsistently meets	Generally meets	Consistently exceeds	Sometime meets	Not applicable
Collaborator						
a. Interacts effectively with health professionals by recognizing and acknowledging their roles and expertise						
b. Consults and delegates effectively						
c. Establishes good relationships with peers and other health professionals						
d. Effectively provides and receives information from other health professionals						
e. Manages conflict situations well						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the objectives and give specific examples wherever possible.						

*Rarely meets: < 30%

*Inconsistently meets: 30–59%

*Generally meets: 60–79%

*Sometimes exceeds: 80–89%

*Consistently exceeds: > 90%

Appendix 3.6

FITER: (manager competency)

Resident name:

Resident SCFHS number:

	Expectations					
	Rarely meets	Inconsistently meets	Generally meets	Consistently exceeds	Sometime meets	Not applicable
Manager						
a. Understands and makes effective use of information technology, such as methods for searching medical databases						
b. Makes cost-effective use of healthcare resources based on sound judgment						
c. Prioritizes and uses personal and professional time effectively to achieve a balanced personal and professional life						
d. Demonstrates an understanding of the principles of practice management						
e. Demonstrates the ability to effectively utilize healthcare resources to maximize benefits to all patients, including managing a waiting list for patients outside the critical care unit						

	Expectations					
	Rarely meets	Inconsistently meets	Generally meets	Consistently exceeds	Sometime meets	Not applicable
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the objectives and give specific examples wherever possible						

*Rarely meets: < 30%

*Inconsistently meets: 30–59%

*Generally meets: 60–79%

*Sometimes exceeds: 80–89%

*Consistently exceeds: > 90%

Appendix 3.7

FITER: (health advocate competency)

Resident name:

Resident SCFHS number:

	Expectations					
	Rarely meets	Inconsistently meets	Generally meets	Consistently exceeds	Sometime meets	Not applicable
Health advocate						
a. Understands the specialist's role to intervene on behalf of patients regarding the social, economic, and biological factors that may impact their health						
b. Understands the specialist's role to intervene on behalf of the community regarding the social, economic, and biological factors that may impact community health						
c. Recognizes and responds appropriately in advocacy situations						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the objectives and give specific examples wherever possible.						

*Rarely meets: < 30%

*Inconsistently meets: 30–59%

*Generally meets: 60–79%

*Sometimes exceeds: 80–89%

*Consistently exceeds: > 90%

Appendix 3.8

FITER: (scholar competency)

Resident name:

Resident SCFHS number:

	Expectations					
	Rarely meets	Inconsistently meets	Generally meets	Consistently exceeds	Sometime meets	Not applicable
Scholar						
a. Demonstrates an understanding of, and a commitment to, the need for continuous learning. Develops and implements an ongoing and effective personal learning strategy						
b. Critically appraises medical information by asking relevant questions and determining what information is reliable. Successfully integrates information from a variety of sources						
c. Understands the principles of adult learning and helps others to learn by providing guidance, teaching, and giving constructive feedback						
d. Facilitates the learning of patients, other house staff/students, and other health professionals						
e. Completes the electronic logbook in a timely fashion						

	Expectations					
	Rarely meets	Inconsistently meets	Generally meets	Consistently exceeds	Sometime meets	Not applicable
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the specific objectives and give specific examples wherever possible.						

*Rarely meets: < 30%

*Inconsistently meets: 30–59%

*Generally meets: 60–79%

*Sometimes exceeds: 80–89%

*Consistently exceeds: > 90%

Appendix 3.9

FITER: (professional competency)

Resident name:

Resident SCFHS number:

	Expectations					
	Rarely meets	Inconsistently	Generally meets	Consistently	Sometime meets	Not applicable
Professional						
a. Demonstrates integrity, honesty, compassion, and respect for diversity						
b. Fulfills medical, legal, and professional obligations of the specialty						
c. Meets deadlines and demonstrates punctuality						
d. Monitors patients and provides follow-up						
e. Understands the principles of ethics and applies these in clinical situations						
f. Demonstrates an awareness of limitations and seeks advice when necessary and accepts advice graciously						
g. Demonstrates respect toward other physicians and healthcare workers						
h. Participates in local, provincial, and national professional organizations						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the objectives and give specific examples wherever possible.						

*Rarely meets: < 30%

*Inconsistently meets: 30–59%

*Generally meets: 60–79%

*Sometimes exceeds: 80–89%

*Consistently exceeds: > 90%

Appendix 4: Direct Observation of Procedural Skills

Saudi Commission for Health Specialties
*SCFHS - Adult Critical Care - Fellowship

Evaluated By :evaluator's name
Evaluating :person (role) or moment's name (if applicable)
Dates :start date to end date

* indicates a mandatory response

Direct Observation Of Procedural Skills - DOPS Assessment

*Procedure:

	n/a	Below expectations 1	Borderline 2	Meets expectations 3	Above expectation 4
***Domain & Comments: Professional Approach (to include communication, consent and consideration of the patient.)**	○	○	○	○	○
***Knowledge (indication, anatomy, technique)**	○	○	○	○	○
***Demonstrate appropriate pre-procedure preparation**	○	○	○	○	○
***Appropriate analgesia or/and sedation**	○	○	○	○	○
***Technical Ability**	○	○	○	○	○
***Aseptic Technique**	○	○	○	○	○
***Post Procedure Management**	○	○	○	○	○

	Needs more practice	May need supervision if complications arise	Competent to perform unsupervised
***Overall Ability to perform Procedure:**	○	○	○

*Comments:

*Assessor's position:
- ○ Consultant
- ○ Associate Consultant
- ○ Senior Registrar
- ○ Registrar
- ○ Fellow
- ○ Senior Resident
- ○ Nurse
- ○ Others

Others (specify):

*Complexity of procedure:
- ○ Low
- ○ Average
- ○ High

*Time taken for Feedback & Observation (in minutes):

The following will be displayed on forms where feedback is enabled...
(for the evaluator to answer...)

*Did you have an opportunity to meet with this trainee to discuss their performance?
- Yes
- No

(for the evaluee to answer...)

*Did you have an opportunity to discuss your performance with your preceptor/supervisor?
- Yes
- No

Appendix 5: Procedures Logbook

Procedures Logbook					
Date	Medical record number	Age/Gender	Procedure name	Supervisor	Comments

Required procedures in logbook and DOPS

The following illustrates the procedures, categories, number of required procedures, sites, and number of DOPS.

Procedure	Required number	Site and Type	Required DOPS
Performs US guided central venous catheterization	20	IJV, SCV, femoral	1 for each site
Performs arterial catheterization	10	Radial, femoral	1 for each
Performs pulmonary artery catheterization	10	IJV or SCV	10
Performs emergency airway management	1	Cricothyroidectomy	1 (if possible)
Performs difficult and failed airway management per local protocols	4	Not applicable	2

Procedure	Required number	Site and Type	Required DOPS
Directs laryngoscopy and Intubation	10	Not applicable	2
Pleural tap	6	Not applicable	2
Bronchoscopy (intubated patient)	5	Not applicable	3
Chest tube insertion	5	Not applicable	2
Percutaneous tracheostomy	5	Not applicable	2
US chest	30	Lung and pleural cavity	10
US abdomen	10	Ascites and E-FAST	4
US cardiac	50	Assess contractility, effusion, and chambers and valves	20
US for inferior vena cava assessment	30	For fluid status assessment	10
Performs transthoracic cardiac pacing, transvenous, and percutaneous pacemakers	10	Not applicable	
Cardiac output monitors (e.g., PICO, LIDCO, NICO)	10	---	5

Appendix 6: Mini-Clinical Evaluation Exercise (Mini-CEX)

Saudi Commission for Health Specialties
*SCFHS - Adult Critical Care - Fellowship

Evaluated By : evaluator's name
Evaluating : person (role) or moment's name (if applicable)
Dates : start date to end date

* indicates a mandatory response

Mini-Clinical Evaluation Exercise (Mini-CEX)

*Brief Summary of Case:

	n/a	Below expectations (1)	Borderline (2)	Meets expectations (3)	Above expectation (4)
***1) Medical Interview Skills**	○	○	○	○	○
***2) Physical Examination Skills**	○	○	○	○	○
***3) Counselling and Communications Skills**	○	○	○	○	○
***4) Clinical Judgement**	○	○	○	○	○
***5) Consideration for Patient/Professionalism**	○	○	○	○	○
***6) Organisation/Efficiency**	○	○	○	○	○
***7) Overall Clinical Competence**	○	○	○	○	○

*Comments :

*Which aspects of the encounter were done well?

*Suggested areas for improvement / development?

*Agreed Actions / learning plan:

*Student's reflections on patient and areas of learning:

*Assessor's position:

- Consultant
- Associate Consultant
- Senior Registrar
- Registrar
- Fellow
- Others

Others (specify):

*Time taken for Observation & Feedback (in minutes):

The following will be displayed on forms where feedback is enabled...
(for the evaluator to answer...)

*Did you have an opportunity to meet with this trainee to discuss their performance?

- Yes
- No

(for the evaluee to answer...)

*Did you have an opportunity to discuss your performance with your preceptor/supervisor?

- Yes
- No

Appendix 7: Case-based Discussion Rating Form

Saudi Commission for Health Specialties
*SCFHS - Adult Critical Care - Fellowship

Evaluated By : evaluator's name
Evaluating : person (role) or moment's name (if applicable)
Dates : start date to end date

* indicates a mandatory response

Case based Discussion (CbD)

***Brief description of case including curricula areas covered:**

	n/a	Below expectations 1	Borderline 2	Meets expectations 3	Above expectation 4
***Domain & Comments Clinical Assessment :**	○	○	○	○	○
***Investigations and referrals**	○	○	○	○	○
***Management plan**	○	○	○	○	○
***Follow-up and future planning**	○	○	○	○	○
***Overall clinical judgement**	○	○	○	○	○
***Organisation**	○	○	○	○	○

***comments:**

***Which aspects of the encounter were done well?**

***Suggested areas for improvement / development?**

***Agreed Actions / learning plan:**

***Assessor's position:**

- Consultant
- Associate Consultant
- Senior Registrar
- Registrar
- Fellow
- Other

Others (specify):

***Complexity of Case:**

- Low
- Average
- High

***Time taken for Observation & Feedback (in minutes)**

***Basis for discussion:**

- Outpatient case/record/letter
- Discharge Summary
- Inpatient case/consult/record

The following will be displayed on forms where feedback is enabled...
(for the evaluator to answer...)

*Did you have an opportunity to meet with this trainee to discuss their performance?

- Yes
- No

(for the evaluee to answer...)

*Did you have an opportunity to discuss your performance with your preceptor/supervisor?

- Yes
- No

Appendix 8: Research Manual

Definition of research

Research is the systematic and rigorous investigation of a situation or problem to generate new knowledge or validate existing knowledge. Healthcare research is conducted in various areas and has many potential benefits. These areas include professional practice, environmental issues affecting health, vitality, treatment, theory development, and healthcare economics. Most research conducted in the field of health is clinical research. Clinical research is a branch of health care science that determines the safety and effectiveness (efficacy) of medications, devices, diagnostic products, and treatment regimens intended for human use that may be used for the prevention, treatment, diagnosis, or relief of symptoms of a medical condition.

Types of research

- Basic medical research: The most fundamental areas of medical research include cellular and molecular biology, medical genetics, immunology, neuroscience, and psychology.
- Preclinical research: Preclinical research prepares the groundwork for clinical research involving patients. Typically, the work requires no ethical approval (except for some work with animals), is supervised by people with PhDs rather than medical doctors, and is conducted in a university or company rather than a hospital or surgery.
- Clinical research: Clinical research is conducted with patients as participants. It is generally supervised by doctors in a medical setting such as a hospital and requires ethical approval. The clinical phase of drug testing is called the clinical trial.

Types of clinical study designs

- Meta-analysis: This method combines data from multiple studies. A meta-analysis is a statistical process that combines findings from individual studies.

- Systematic review: This is a summary of the clinical literature. A systematic review is the critical assessment and evaluation of all studies addressing a particular clinical issue. Researchers use an organized method to locate, assemble, and evaluate a body of literature on a particular topic using a set of specific criteria. A systematic review typically includes a description of the findings of a collection of research studies.
- Randomized controlled trial: This is a controlled clinical trial that randomly (by chance) assigns participants to two or more groups. There are various methods for randomizing study participants into groups.
- Cohort study (prospective observational study): This is a clinical research study in which people who presently have a certain condition or receive a particular treatment are followed over time and compared with another group of people who are not affected by the condition.
- Case-control study: Case-control studies begin with outcomes and do not follow people over time. Researchers choose people with a particular result (the cases) and interview the groups or check their records to ascertain their different experiences. They compare the odds of having an experience with a specific outcome with the odds of having an experience without that outcome.
- Cross-sectional study: This involves the observation of a defined population at a single point in time or time intervals. The exposure and outcome are determined simultaneously.
- Case report and series: This is a report on a series of patients with an outcome of interest. No control group is involved.
- Ideas, editorials, and opinions: These are put forth by experts in the field of bioethical training and certification.

Each resident should take an online ethics course that usually requires testing of acquired knowledge and certification. Most universities provide these courses either for free or with a subscription.

Research requirements

Research requirements include the following steps: 1) selection of research, 2) creation of a research team, 3) approval of the project by the local training committee, 4) preparation of a proposal with references, 5) fulfillment of the internal review board (IRB) requirements, 6) IRB approval, 7) data collection, 8) data analysis, 9) writing the paper, and 10) publication.

Research duration components and presentation: During the residents' elective training, one month is allocated for the completion of the individual resident research project. The one month can be in the second year as elective rotation, if possible.

During the year and rotation, the candidate selects the research project, writes the proposal, and applies for IRB approval. Residents should be able to perform the following to present their work on the research day: The candidate should complete the analysis and writing of the final research manuscript. Residents are encouraged to write the research manuscript and to publish it or at least to have evidence of the research manuscript being accepted for publication. They should present the detailed data with the abstract, method of study, results, discussion, and references on the research day.

Evaluation of research and scoring

The final research should be assessed and scored by the Critical Care Residency Scientific Council members. The entire research work should be scored from 0% to 100% per mark distribution. The final score will be calculated as 10% of the total promotion mark for the year. The completion of the end of training research is evaluated using the following score distribution: 20% for the proposal, 15% for IRB approval, 20% for data collection, 10% data analysis, 15% writing manuscript, and 20% for publication in, or at least acceptance from, a well-known journal. The passing mark for research is ≥ 60%. A certificate of completion of training will be issued and signed by the local Program Director and should be submitted to the SCFHS before the written exit exam.

Research days

During each training year, there are one or two research days. Each resident should be ready to present the required components of their research work on these research days.

Journal selection: A local or internationally indexed journal is acceptable. Residents should also be encouraged to publish in international journals.

Appendix 8.1: Research Evaluation Sheet

Saudi Adult Critical Care Medicine

Research Evaluation Sheet

Name of the candidate: _____

Research title: _____

Part	Component	Mark	Candidate's score	Comments
Part-1- Written text evaluation	1. Originality of topic	3		
	2. Abstract/summary	5		
	3. Aims and objectives	5		
	4. Literature review	6		
	5. Methodology	12		
	6. Results (data analysis and presentation)	12		
	7. Discussion, conclusions, and recommendations	5		
	8. Ethical considerations	2		
	9. Style, structure of the text, tables, and diagrams	5		
	10. References	5		

Part	Component	Mark	Candidate's score	Comments
Total written evaluation		60		
Part-2 Presentation PART 11- DEFENSE	1. Presentation	10		
	2. Discussion	30		
Total evaluation		40		
Total cumulative mark		100		

Revision Pass Results:

Evaluator name: _____

Signature: _____

≥ 60% = Pass

< 60% = Revision Recommendation

Correction within _____

Appendix 9: Presentation Evaluation form

Saudi Adult Critical Care Medicine Presentation Evaluation form

Fellow name: _____ Level: _____

Supervisor: _____ Presentation date: _____

Topic: _____

Please use the following scale to evaluate the presentation:

Very weak	Weak	Acceptable	Good	Very good				
1	2	3	4	5				
Medical expert				1	2	3	4	5
- Demonstrated thorough knowledge of the topic								
- Presented at an appropriate level and with adequate details								
- Comments (optional)								
Communicator								
- Provided objectives and an outline								
- Presentation was clear and organized								
- Used clear, concise, and legible materials								
- Used an effective method/style of presentation								
- Established good rapport with the audience								
Collaborator								
- Invited comments from learners and led discussion								
- Worked effectively with staff supervisor in preparing the session								
- Comments (optional)								
Health advocate								

Very weak	Weak	Acceptable	Good	Very good				
1	2	3	4	5				
- Managed time effectively								
- Addressed preventive aspects of care if relevant								
- Comments (optional)								
Scholar								
- Posed an appropriate learning question								
- Accessed and interpreted the relevant literature								
- Comments (optional)								
Professional								
- Maintained patients' confidentiality if clinical material is used								
- Identified and managed relevant conflict of interest								
- Comments (optional)								
Total								

Overall performance: Good ☐ Fair ☐ Needs improvement ☐

Additional comments:

Evaluation completed by: _____

Date: _____

** This feedback was discussed with the resident: Yes ☐ No ☐

Appendix 10: Portfolio Assessment

Saudi Adult Critical Care Medicine Portfolio assessment

This form is to be completed at every rotation during the mentoring /supervision meeting with the Resident

Resident name: _____

Level: _____

Mentor name: _____ Date: _____

Time: _____

Domain		Achievement required	Scoring marks 0 = Poor to 4 = Outstanding					Remarks
Mini-CEX/CBD (2/month)	Minimum number achieved	Did residents complete a minimum of two Mini-CEX/CBD last month?	0	1		2		
	Competency assessment score	What was the average result of the assessment?	0	1	2	3	4	
DOPS (2/month)	Minimum number achieved	Did fellows complete a minimum of two DOPS last month?	0	1		2		
	Competency assessment score	What was the average result of the assessment?	0	1	2	3	4	
Learning contract/objectives (2–3 objectives/week)		Did fellows complete at least one sheet for the learning objectives, for an average of two to three objectives every week with feedback and signed by the trainer?	0	1	2	3	4	

Domain	Achievement required	Scoring marks 0 = Poor to 4 = Outstanding					Remarks
Evidence of self-directed learning	Did fellows show any documentation of self-directed learning (CME/topic review/journal club/presentation/course/workshop/conference/etc.) ?	0	1	2	3	4	
Overall assessment of portfolio		/20					

Clinical rotation: _____ Site of rotation: _____

Duration: _____

Stressed/burned-out: Yes _____ No _____ Recommendation:

Exam preparation: Promotion/final: Yes € No € Recommendation:

Comments:

_____

_____

Original for program secretary/resident file

Copy for the resident

Appendix 9: In-training Evaluation Report (ITER)

In-training evaluation report—Critical Care Fellowship Training Program

Center: _____ **Level of training:** _____
Name: _____ **Registration number:** _____
Rotation: _____ **Period:** _____

It is **mandatory** that this evaluation be discussed with the fellow prior to the end of the rotation.

Roles/competencies	Clear fail (1)	Borderline (2)	Clear pass (3)	Exceeds expectation (4)	N/A
A. Medical expert					
History and physical examination 1. Comprehensive, accurate, and concise with all relevant details					
Diagnostic tests 2. Used in a cost-effective manner and understands limitations and predictive value					
Clinical decision 3. Can formulate an appropriate differential diagnosis					
4. Can analyze, integrate, and formulate effective management strategies					
Medical knowledge 5. Demonstrates broad clinical and basic knowledge of a wide variety of medical problems and develops a plan of secondary prevention					
Emergency management 6. Can identify and respond appropriately to urgent cases					
Evidence-based practice/critical appraisal skills 7. Aware of the role of evidence in clinical decision-making					

8. Can apply relevant information in problem-solving					
9. Demonstrates knowledge of medications used, mechanisms of action, clinically relevant pharmacokinetics, indications, contraindications, and adverse effects.					
Procedural skills 10. Performs diagnostic and therapeutic procedures, understands indications, limitations and complications					
B. Communicator					
11. Communicates effectively with patients, their families, and healthcare providers					
12. Can maintain clear, accurate, and appropriate records					
13. Written orders and progress notes are well organized and legible					
14. Creates discharge summaries that are concise and completed promptly					
C. Collaborator					
15. Works effectively in a team environment with attending, juniors and nursing staff					
D. Leader					
16. Serves in administration and leadership roles as appropriate					
17. Demonstrates appropriate and efficient use of healthcare resources					
E. Scholar					
18. Attends and contributes to rounds, seminars, and other learning events					
19. Accepts and acts on constructive feedback					
20. Contributes to the education of patients, junior residents, house staff, and students					
21. Contributes to scientific research					

Total score: _____ X 25 = _____ (100%)Number of evaluated items _____

Comments:

_____

_____

_____

_____

Fellow name:_____ Signature: _____ Date:_____

Program Director: _____ Signature: _____ Date: _____

Director—Academic Affairs:_____Signature: _____Date: _____

APPENDIX 12

The following is an example illustrating the half-day activities for one year.

	Date	Topics	Presenter
1	05-Oct-22	Basic Ethics – Breaking Bad News.	
2	12-Oct-22	End of Life Care.	
3	19-Oct-22	Sedation, Analgesia, and Muscle Relaxant.	
4	26-Oct-22	ABCDF Bundle for ICU Liberation.	
5	02-Nov-22	Acid Base Disturbance.	
6	09-Nov-22	AKI – Basics.	
7	16-Nov-22	AKI and CRRT.	
8	23-Nov-22	Management of Electrolyte Abnormalities in Critically Ill Patients.	
9	30-Nov-22	Assessment of Trauma Patients in ICU and Environmental Hazard.	
10	07-Dec-22	Resuscitation of Trauma Patients.	
11	14-Dec-22	BURNS and Inhalational Injury.	
12	21-Dec-22	Thoracic and Abdominal Trauma (Blunt and Opened).	

	Date	Topics	Presenter
13	28-Dec-22	Basic Respiratory Physiology.	
14	04-Jan-23	Respiratory Failure (I & II and PBL).	
15	11-Jan-23	Basic Mechanical Ventilation I (Basic Principles) and Non-Invasive Ventilation.	
16	18-Jan-23	Mechanical Ventilation II (ARDS, Asthma, COPD, other specific situation).	
17	25-Jan-23	Airway Management I (Basic Practical Skills).	
18	01-Feb-23	Airway Management II (Advanced).	
19	08-Feb-23	Weaning from Mechanical Ventilation.	
20	15-Feb-23	Antibiotic Therapy (Basic Antimicrobial Therapy).	
21	22-Feb-23	HAI – Prevention and Management (VAC, CLABSI and CAUTI).	
22	01-Mar-23	EGDTs and the New Sepsis Definition.	
23	08-Mar-23	Life Threatening Infection in ICU.	
24	15-Mar-23	GI Bleeding – Upper and Lower.	
25	22-Mar-23	Acute Hepatic Failure (Fulminant Hepatitis), Chronic Hepatic Failure and Liver Cirrhosis.	
26	29-Mar-23	Acute Pancreatitis.	

	Date	Topics	Presenter
27	26-Apr-23	Acute Abdomen, Intra-Abdominal Hypertension & Compartment Syndrome.	
28	03-May-23	Neurological Assessment and Monitoring.	
29	10-May-23	Traumatic Brain Injury – TBI.	
30	17-May-23	Stroke (Ischemic, Hemorrhagic) and Subarachnoid Hemorrhage (Spontaneous and Aneurysm).	
31	24-May-23	Status Epilepticus.	
32	31-May-23	Brain Death (Diagnosis and Maintenance of the Vital Organs for Harvesting).	
33	07-Jun-23	EGG Interpretation (Arrhythmia).	
34	14-Jun-23	Basic ECHO Cardiology in ICU.	
35	21-Jun-23	Acute Coronary Syndrome and Heart Failure (Systolic and Diastolic).	
36	05-Jul-23	ACS (M.I and Unstable Angina).	
37	12-Jul-23	Post Cardiac Arrest Management in ICU.	
38	19-Jul-23	Shock and Vasoactive Medications, Inotropes and Vasopressors.	
39	26-Jul-23	Hemodynamic Monitoring I (Basic PAC, CVP, A-Line).	
40	02-Aug-23	Hemodynamic Monitoring II (Non-Invasive PICCO).	

	Date	Topics	Presenter
41	09-Aug-23	Fluid Resuscitation / De-Resuscitation & Assessment of Fluid Responsiveness in Critically Ill Patients.	
42	16-Aug-23	Endocrine Emergencies.	
43	23-Aug-23	Blood Sugar Control in Critical Care and DKA Management.	
44	30-Aug-23	Hematology and Oncology Emergencies.	
45	06-Sep-23	Nutrition Support in Critical Care.	
46	13-Sep-23	Obstetric Emergencies in Critical Care.	
47	20-Sep-23	Toxicology (Case Mix).	

References

1. Ministry of Health Statistical Yearbook. https://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx
2. Al-Omari A, Abdelwahed HS, Alansari MA. Critical care service in Saudi Arabia. Saudi Med J. 2015 Jun;36(6):759-61. doi: 10.15537/smj.2015.6.11204. PMID: 25987123; PMCID: PMC4454915.
3. Frank JR, Snell L, Sherbino J, editors. CanMEDs 2015 Physician Competency Framework. Ottawa: Royal College of Physicians and Surgeons of Canada; 2015 https://www.royalcollege.ca/rcsite/documents/canmeds/canmeds-full-framework-e.pdf

4. Bojar, R. Manual of Perioperative Care in Adult Cardiac Surgery. 6th Edition. Wiley- Blackwell. https://www.wiley.com/en-ie/Manual+of+Perioperative+Care+in+Adult+Cardiac+Surgery,+6th+Edition-p-9781119582540
5. Brown, D. (2018) Cardiac Intensive Care 3rd Edition. Elsevier. https://www.elsevier.com/books/cardiac-intensive-care/brown/978-0-323-52993-8
6. Dabbagh, A. Esmailian, F. Aranki, S. (2018) Postoperative Critical Care for Adult Cardiac Surgical Patients 2nd Edition. Springer. https://link.springer.com/book/10.1007/978-3-319-75747-6
7. The Faculty of Intensive Care Medicine. https://www.ficm.ac.uk/
8. Mapping of Adult Critical Care Postgraduate Curricula. SCFHS https://scfhs.org.sa/sites/default/files/2022-02/CBA%20Adult%20Critical%20Care%202020.pdf
9. Family Medicine Residency Program SCFHS. https://fmhub.org/program/