الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

Adult Critical Care Medicine Fellowship Training Program


بسم الله الرحمن الرحيم

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INTRODUCTION

This document defines the educational goals, objectives, and curriculum for the Adult Critical Care Medicine (CCM) Fellowship Program in accredited hospitals within the Kingdom of Saudi Arabia. With the rapid development of healthcare in the kingdom, there is an equally increasing demand for qualified critical care physicians. This national Fellowship Program aims to define the educational objectives, body of knowledge, and practical skills required by physicians specializing in CCM. The program is designed to fulfill subspecialty criteria issued by the Saudi Commission for Health Specialties (SCFHS). Educational standards will be applied per several internationally adopted frameworks. To complement the curriculum, participation in a research/quality project has been introduced as a requirement for program completion. A work-based assessment will be part of the evaluation process to track fellows' progress concerning both skills and knowledge acquisition. The Scientific Committee and all Program Directors must abide by the content of the fellowship training program approved by the SCFHS. Upon successful program completion, fellows 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. This curriculum will be reviewed as necessary.

Mission statement

To set a national standard for adult CCM in the Kingdom of Saudi Arabia through recruitment, accreditation, training, and evaluation of candidates—in collaboration with local training centers—to graduate competent critical care physicians.

What is new in this version?

This version of the Adult CCM Fellowship Program Curriculum follows the competency-based framework adopted by the SCFHS. The following changes are included in this version:

1. All rotations of the training program are described in a competency-based format with clear objectives per CanMEDS—medical expert, communicator, collaborator, manager, health advocate, scholar, and professional
2. Changes to some program rotations (14 months as a core rotation in critical care, two months in the cardiac surgery intensive care unit (CSICU), and six months as electives rotation)
3. A list of the most important clinical topics and procedures in CCM and universal topics has been added
4. The promotion, part one exam, and final examination have been revised per the new examination rules and regulations of the Saudi Commission
5. A new section about mentoring and stress counseling has been added
6. A comprehensive list of mandatory workshops/courses and recommended textbook and journals
7. The methods of assessment have been revised to include formative assessments in the form of continuous evaluation for daily, rotation based in-training evaluation reports (ITERs), workplace-based assessments (Mini-Clinical Evaluation Exercise (Mini-CEX), direct observation of procedural skills (DOPS), case-based discussion (CBD)), and final ITERs (FITERs)

PROGRAM STRUCTURE

1. Program entry requirements

Application requirements

1. Completion of formal residency training and certification by "Saudi Board certificate or equivalent" from a recognized institute in internal medicine, general surgery, anesthesia, emergency medicine, or other specialties accepted by the training committee
2. Passing an interview conducted by the Scientific Committee
3. Obtaining three letters of recommendation from consultants with whom the candidate has recently worked
4. Provision of written permission from a sponsoring organization giving approval for the candidate to undertaken full-time training for the program duration (two years)
5. Registered as a senior registrar at the SCFHS

General training requirements

1. Trainee shall abide by the training regulations and obligations as set by the SCFHS
2. Training is a full-time commitment; the fellow will be enrolled in full-time, continuous training for the program duration
3. The training is to be conducted at institutions accredited for training by the Saudi Board of Adult CCM
4. The training will be comprehensive in the specialties of adult CCM

2. Program duration

This two-year minimum training program is intended to prepare candidates to practice independently as experts in the field of CCM.

3. Program rotations

1. Candidates must finish two years in CCM, which is divided into a 24-month training period as follows:
   a. Fourteen months as a core rotation in critical care
   b. Two months in the CSICU
   c. Six months of elective rotation in:
      - General medicine
      - Infectious disease
      - Pulmonary medicine
      - Nephrology
      - Neurocritical care
      - Emergency room (ER)
      - Transplant
      - Trauma
      - Burn ICU
      - Cardiac care unit (CCU)
      - Radiology

- Research
- Anesthesia (optional for fellows with an anesthesia residency background; mandatory for fellows from other specialties)

2. During the entire program, kindly refer to SCFHS policy and procedure on www.scfhs.org.sa
3. Fellows must conduct at least one research/quality improvement project during their training in the program
4. Fellows, with the exception of anesthesia fellows, must complete a two-month rotation in anesthesia in the first six months of the program
5. Candidates will be exempted from some rotations per their background, and those periods will be used for further training per the discretion of the Program Director and candidates' needs (e.g., those with a pulmonary background will be exempted from the pulmonary rotation)
6. Upon successful program completion, fellows must exhibit specific goals per the Royal College of Physicians and Surgeons of Canada CanMEDS competencies, as described in the next section

Rotations roadmap

Year	Jan	Feb	Mar	April	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1	ICU	ICU	ICU	ICU	Elective	Elective	Vacation	CSICU	CSICU	Elective	Elective	ICU
2	ICU	ICU	Elective	Elective	ICU	ICU	ICU	ICU	ICU	ICU	Vacation	ICU

ICU: intensive care unit, CSICU: cardiac surgery ICU

LEARNING AND COMPETENCIES

CCM rotation

Fellows should demonstrate their ability to integrate medical knowledge and skills to provide patient-centered, safe, and high-quality care. Fellows should develop skills in providing advice to and planning care for critically ill patients considering patients' clinical status, surrounding environment, cultural preferences, and available resources. Timely decision-making with the ability to organize and participate in teamwork are essential skills that must be developed.

Fellows should conduct comprehensive and multidisciplinary rounds independently to assess patients, synthesize differential diagnoses, and create problem lists and plans of action.

Fellowship programs in CCM should produce CCM physicians with basic competencies in each of the following roles:

Medical expert

1. Describe the natural history and clinical expression of critical care illnesses encountered in inpatient, ICU, and ER settings
2. Understand the pathophysiology of commonly observed diseases in critically ill patients
3. Demonstrate a working knowledge of CCM by actively participating in the management of critically ill patients
4. Demonstrate an understanding of the integrative nature of disease in critically ill patients and the interdisciplinary approach to the management of such patients
5. Identify at-risk patients, perform appropriate physical examinations, formulate a problem list, and institute a course of therapy under the direction of senior personnel
6. Prioritize and summarize approaches to the evaluation of common presentations in critical care patients
7. Triage interventions, considering clinical urgency, the potential for unexpected outcomes, and available alternatives
8. Become comfortable in the management of cardiac arrest and acute resuscitation of trauma or acutely ill patients
9. Effectively obtain a relevant history and perform a pertinent physical examination of critically ill patients
10. Demonstrate competence in performing common procedures in the medical and surgical ICU, including central and arterial line insertions, orotracheal intubation, paracentesis, thoracentesis, and lumbar puncture
11. Appropriately select and interpret laboratory, imaging, and pathologic studies used in the evaluation of pulmonary diseases
12. Construct a comprehensive management plan and assess patients' response to therapy
13. Effectively interpret diagnostic tests used in the evaluation of ICU patients such as the interpretation of arterial blood gases, chest x-rays, abdominal films, and computed tomography (CT) scans
14. Demonstrate an ability to critically appraise and cite pertinent literature
15. Perform an appropriately timed consultation and present well-documented assessments and recommendations in written, electronic, and/or oral formats
16. Determine indicated interventions for patient assessment or management

17. Obtain and document informed consent from patients and explain the risks, benefits, and rationale for the options discussed
18. Execute interventions in a skillful and safe manner and adapt to new findings or changing clinical circumstances
19. Counsel patients concerning their diagnosis, diagnostic testing, and recommended therapies
20. Utilize validated instruments effectively in the assessment of functioning and quality of life to monitor response to therapy
21. Establish the roles of the patients and all team members for follow-up investigations of treatment response and consultations and ensure that the agreed upon follow-up takes place; this is especially necessary after a change of service such as on-call or transfer of the patient within the hospital or to an outside facility
22. Recognize when care should be transferred to other physicians or healthcare providers

Communicator

1. Communicate effectively using a patient-centered approach and demonstrate empathy and respect in all patient encounters
2. Optimize the physical environment for patient comfort, privacy, dignity, and safety
3. Communicate effectively with patients, families, and admitting services about patients' daily progress
4. Communicate effectively with an ICU team (nurses, residents, and/or attending staff) about patient care issues
5. Engage patients in a way that is respectful and non-judgmental regarding their religious values, cultural values, and biases
6. Recognize and respond appropriately to patients' non-verbal communication
7. Demonstrate counseling skills and decision-making aids to help patients or patients' decision-makers make informed choices and/or provide informed consent
8. Demonstrate effective skills in listening and speaking with patients, families, and other healthcare team members
9. Reliably and accurately communicate patients' and their families' views and concerns to the attending physician
10. Demonstrate competency in documentation including histories and physical, progress, and discharge notes
11. Disclose adverse events and procedural complications to patients and their families accurately and appropriately
12. Document clinical encounters accurately and promptly in compliance with legal and regulatory requirements
13. Share information with patients and appropriate others in a manner that respects patients' privacy and confidentiality
14. Use counseling skills to effectively communicate end-of-life care issues to patients and/or patients' families
15. Participate in end-of-life discussions with the ICU team and family members

Collaborator

1. Participate in effective teamwork and demonstrate a respectful attitude toward other colleagues and inter- and intra-professional team members
2. Demonstrate teamwork to prevent conflict and identify and negotiate overlapping and shared responsibilities

3. Recognize their own differences, misunderstandings, and limitations regarding others' opinions
4. Discuss how the healthcare system affects the management of inpatient ICU care
5. Demonstrate effective collaboration with other healthcare providers
6. Demonstrate awareness of the impact of diagnostic and therapeutic recommendations on the healthcare system
7. Demonstrate effective and safe handover during sign out or transition of care responsibilities, either within the institution or to a different setting or stage of care

Leader

1. Promote a culture of teamwork that recognizes, supports, and responds effectively to colleagues in need during patient care
2. Efficiently perform patient care tasks allocated during ward rounds
3. Recognize personal limitations and seek help when appropriate
4. Recognize and professionally respond to unprofessional and unethical behaviors in other staff members
5. Utilize resources effectively to balance patient care, continuing education, and personal activities
6. Understand and judiciously allocate healthcare resources
7. Work efficiently and effectively within a healthcare system
8. Utilize information technology for optimal patient care and personal scholarship
9. Use information technology appropriately
10. Demonstrate knowledge of the physical requirements of the design of an ICU

Health advocate

1. Identify the important determinants of health that affect patients
2. Contribute effectively to improving the health of patients and communities
3. Recognize and respond to issues where health advocacy is appropriate
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, etc.)
5. Respect and empower patient autonomy
6. Promote fair healthcare
7. Apply the principles of quality improvement and quality assurance
7. Appreciate the existence of global health advocacy and initiatives for the elimination of diseases (e.g., tuberculosis (TB), malaria, and human immunodeficiency virus (HIV)) and the roles of advocacy groups and funding agencies

Scholar

1. Develop, monitor, and revise a personal learning plan by utilizing meaningful feedback and evaluations to promote goal-directed learning
2. Set, assess, and prioritize individualized learning goals
3. Use assessment tools and practices in a given learning context
4. Recognize their own knowledge gaps in clinical and other professional encounters
5. Integrate evidence into decision making

6. Promote patient safety and a safe learning environment
7. Effectively use technology to manage information, support patient care decisions, and enhance both patient and physician education
8. Demonstrate an attitude that is supportive of teamwork and promotes collaborative learning
9. Integrate and apply knowledge obtained from multiple study sources to the care of critically ill patients
10. Analyze their own clinical experience and employ a systematic methodology for improvement
11. Develop and maintain a willingness to learn from errors and use errors to improve the system and/or processes of care
12. Pose medically and scientifically relevant questions that are amenable to scholarly investigation and address the critique of a given scholarly question

Professional

1. Exhibit a professional commitment to rounds
2. Demonstrate a commitment to maintaining and enhancing competence, quality improvement, and patient safety
3. Recognize the importance of patient primacy, privacy, and autonomy; informed consent; and equitable respect and care to all
4. Respect patients, patients' families, staff, and colleagues
5. 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
6. Demonstrate integrity, honesty, and openness in discussion of therapeutic options with patients and respect for patients' preferences and cultural differences
7. Respond to phone calls, pages, and messages promptly
8. Recognize and professionally respond to unprofessional and unethical behaviors in other staff members
9. Promote a teamwork culture that recognizes, supports, and responds effectively to colleagues in need during patient care
10. Demonstrate commitment to the disclosure of errors and or adverse events and their impact
11. Demonstrate self-responsibility, including personal care, to best serve others

Anesthesia rotation

This rotation will be mandatory for fellows without an anesthesia background (medicine and surgery) and elective for those who have completed an anesthesia residency/fellowship. During this rotation, fellows will be assigned to theater lists in the fields of general surgery, orthopedics; gynecology; urology; ear, nose, and throat; dental; vascular surgery; cardiac surgery; neurosurgery; plastic surgery; ophthalmology; off-site anesthesia (e.g., radiology); and accidents and emergency anesthesia.

Medical expert

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

1. Explain the adult anatomy and physiology of the following systems and the pathophysiology of the disease states that affect them including
   a. Cardiovascular
   b. Upper airway and respiratory
   c. Central and peripheral nervous system
   d. Hepatic
   e. Renal
   f. Endocrine
   g. Hematologic
2. Perform basic and advanced airway management including
   a. Bag mask ventilation
   b. Direct laryngoscopy
   c. Use of different intubation techniques in cases of difficult intubation (e.g., laryngeal mask airway or Glide Scope)
3. Perform awake fiberoptic intubation
4. Appropriately select and 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
5. Appropriately select and administer 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
6. 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 for all patients within the scope of practice defined above
7. Identify and manage complications as they occur in the perioperative period
8. Identify risk factors for postoperative complications and modify anesthetic plans to minimize those complications
9. Assess suitability for patient discharge to ICU, intermediate care, ward, and home settings
10. Predict, identify, and contribute to the alleviation of impediments to recovery in the perioperative period such as postoperative nausea/vomiting, pain, and functional impairment
11. Explain the principles of the function of all anesthetic equipment, including the anesthetic machine, mechanical ventilator, safe delivery of anesthetic gases, and monitoring equipment
12. Select, apply, and interpret information from appropriate monitors, including invasive and noninvasive blood pressure amplifiers, 5-lead electrocardiograms (ECGs), neuromuscular monitors, oximeters, end-tidal gas monitors, temperature, urine output, and invasive monitors of cardiac output and filling
13. Identify and correct sources of error in the above monitoring equipment
14. Select and administer appropriate fluids and blood products, considering the indications, contraindications, and correct procedures in the use of said products
15. Identify and manage complications of fluid and blood product administration throughout the entire perioperative period

16. Appropriately assess patients and their risks and then formulate and implement an appropriate individualized plan for perioperative management, that considers the implications of patients' underlying problems; surgical procedure; and coexisting patient factors such as other medical problems, anxiety, discomfort, culture, language, ethnicity, age, and sex
17. Manage adult patients in a variety of settings, including
    a. Elective, urgent, and emergency/trauma procedures
    b. Sites distant from the operating room (OR)
    c. Unforeseen emergencies (e.g., malignant hyperthermia, anaphylaxis, etc.)
18. Perform all technical skills (initially under supervision and then independently) necessary to manage adult patients in the perioperative period, including
    a. Routine and difficult airway management
    b. General anesthesia techniques including those related to induction, maintenance, and emergence
    c. Peripheral and central venous access invasive monitoring
    d. Resuscitation of critically ill adult patients (with reference to advance cardiac life support (ACLS) and advanced trauma life support (ATLS) procedures and protocols)

Communicator

1. Establish a therapeutic relationship with patients and family members as appropriate, including
    a. Encouraging patient participation in decision making in consultative, elective, and emergency situations and more challenging situations such as when patients are angry or confused, language or ethno-cultural differences, or age extremes
    b. Listening to patients, answering their questions, and attempting to alleviate their anxiety
    c. Demonstrating respect and empathy in relationships with patients
2. Gather sufficient information from patients, family members, and medical personnel to identify all issues that will have implications for perioperative management including
    a. Patients' medical and surgical status
    b. Patient expectations, beliefs, and concerns (in addition to medical problem information), while also considering the influence of age, sex, and background (ethno-cultural, spiritual, and socio-economic) on patients' medical problems
3. Impart sufficient information to patients and appropriate family members or delegates to allow a complete understanding of the implications of the planned procedure, alternatives, risks, and benefits
4. Obtain complete informed consent for anesthetic care
5. Tactfully present bad news to patients and family members

Collaborator

By the end of this rotation, fellows should be able to do the following:
1. Function well in the clinical environment using the full abilities of all team members
2. Coordinate care of adult patients with other OR team members, post anesthesia care unit, ICU staff, and other physicians
3. Manage urgent and crisis situations such as cardiac arrest, trauma, anaphylaxis, and malignant hyperthermia as a team member or team leader
4. Resolve conflicts or provide feedback where appropriate
5. Consult other physicians and allied health professionals to provide optimal perioperative care
6. Communicate effectively with other team members.

Leader

By the end of this rotation, fellows should be able to do the following:

1. Demonstrate knowledge of the management of ORs
2. Demonstrate knowledge of the contributors to anesthetic expenditures
3. Demonstrate knowledge of the national guidelines concerning anesthetic practice and equipment
4. Record appropriate information for the anesthetics and consultations provided
5. Demonstrate knowledge of the principles of quality assurance and conduct morbidity and mortality reviews
6. Utilize personal and outside resources effectively to balance patient care, continuing education, practice, and personal activities
7. Manage assigned room/slot in terms of maintaining the schedule or changing the schedule in response to emergencies, delays, additional cases, etc.
8. Manage after-hours scheduling of cases including prioritization and adaptation to changes
9. Schedule other residents to various assignments when senior resident is also covering the service
10. Use limited health resources appropriately, including
    a. Time for patient assessment, OR equipment preparation, anesthesia induction and emergence, and OR change over
    b. Expenses of anesthesia resources including cost-effective choices of drugs, techniques, equipment, and invasive monitoring
11. Participate in the assessment of patient care outcomes and practice including quality assurance. This will include
    a. Maintaining a personal record of experience and outcomes
    b. Participating in any appropriate case reviews
12. Explain how an anesthetic department is structured and managed.

Health advocate

By the end of this rotation, fellows should be able to do the following:

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

Scholar

By the end of this rotation, fellows should be able to do the following:
1. Develop and maintain a personal learning strategy that will be continued after acquiring certification
2. Seek out and critically appraise literature to support clinical care decisions and apply new evidence-based knowledge
3. Contribute to the appropriate application, dissemination, and development of new knowledge
4. Teach medical students, other residents, faculty members, other health professionals, and patients using the learned principles and methods

Professional

By the end of this rotation, fellows should be able to do the following:
1. Deliver the highest quality patient care with integrity, honesty, and compassion
2. Fulfill the ethical and legal aspects of patient care
3. Maintain patient confidentiality
4. Demonstrate appropriate interpersonal and professional behavior
5. Recognize personal limitations through appropriate consultation (with staff supervisors, other physicians, and other health professionals) and show appropriate respect for those consulted
6. Recognize conflict in patient care situations, professional relationships, and value systems, and demonstrate the ability to discuss and resolve differences of opinion
7. Accept constructive feedback and criticism and implement appropriate advice
8. Continually review their own personal and professional abilities and demonstrate continuing development of skills and knowledge through education
9. Identify problems of physical and mental health in oneself and others including chemical dependence, stress, depression, and ways to deal with these problems.

Coronary care unit rotation

The objective is to develop knowledge and experience in each of the following domains:

Medical expert

1. Assessment and management of a wide variety of acute cardiac problems encountered in the CCU including acute coronary syndrome, arrhythmias, syncope, cardiogenic shock, and congestive heart failure
2. Address the hemodynamic complications of acute valvular (native and prosthetic) disease
3. Basic principles of applying an intra-aortic balloon pump and its indication and contraindication
4. Describe the common pathophysiology and management of patients admitted to a cardiac critical care setting, including
    a. Coronary artery disease, acute myocardial ischemia and infarction, and complications of myocardial infarction and thrombolytic therapy
    b. Valvular heart disease with familiarity of the pathophysiological alterations induced by chronic valvular disease in critically ill patients
    c. Shock and the use of volume resuscitation, venodilators/constrictors, inotropes, and lusitropes

   d. Cardiac tamponade or constrictive pericarditis
   e. Dilated, restrictive, and obstructive cardiomyopathy; congestive heart failure; and diastolic dysfunction
   f. Aberrant conduction, dysrhythmia, and sudden acute and subacute ventricular and supraventricular arrhythmia
   g. Aortic dissection, thoracic and thoracoabdominal aortic aneurysm, and pulmonary edema
   h. Pacemakers and the indications for and applications of the various modes of temporary pacing
5. Commonly used cardiac drugs, heparin, thrombolytics, and antiplatelet agents and their appropriate dosages
6. Anti-fibrinolytic agents and their mechanisms of action
7. Commonly used vasodilators, vasoconstrictors, and inotropic and lusitropic agents and their dosages and effects
8. Commonly used anti-arrhythmic agents
9. Interpret ECGs for ischemia, infarction, arrhythmias, and paced rhythms; fellows should know the relevance of special leads placement and recognize the limitations, sensitivity, and specificity of ECGs for monitoring ischemia
10. Gain procedural skills for complicated procedures such as pacemaker insertion, invasive and noninvasive hemodynamic and cardiac output monitoring, cardioversion, arterial line insertion, and pericardiocentesis under cardiologists' supervision
11. Describe current indications and recommendations for subacute bacterial endocarditis prophylaxis

Communicator

1. Can do the following when a patient presents with a cardiac problem:
   a. Obtain a complete and thorough patient history with emphasis on the present problem
   b. Perform a general physical examination including a detailed examination of the cardiovascular system
   c. Identify and interpret the significance of any abnormal physical findings related to diseases of the cardiovascular system
2. Document the basic essential components of all clinical encounters clearly utilizing progress, procedural, and consultation notes. The synthesis and management plans should be recorded at a level that corresponds with their training
3. Be aware of the importance of clear and effective communication with patients, involved family members, and other healthcare team members
4. Refer problem issues or problem cases appropriately

Collaborator

1. Recognize and integrate the roles of other healthcare providers into patient management
2. Effectively consult with other physicians and healthcare 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 healthcare workers and referring physicians in patient care

Leader

By the end of this rotation, fellows should be able to do the following:

1. Describe the duties of an intensive care specialist and CCU director
2. Utilize resources to effectively balance patient care and healthcare economics
3. Work to develop effective and efficient patient management strategies by
   a. Avoiding duplication of services
   b. Involving other caregivers
   c. Using information technology appropriately
   d. Knowing the physical requirements of a CCU design
   e. Contributing to unit activities and encouraging others to do so by instilling enthusiasm among workplace colleagues
   f. Obtaining in-depth experience in acute cardiac care by being responsible for the management of patients in the CCU

Health advocate

1. Recognize the role played by physicians in the care of patients with cardiac disease in the healthcare 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

1. Accumulate the necessary knowledge to be a competent CCM physician
2. Learn how to apply basic and clinical science to patient care
3. Develop an appreciation of the role of critical appraisal in the assessment of current scientific developments
4. Develop an understanding of evidence-based medicine and incorporate the appropriate references to the literature in complex cases
5. Recognize the ongoing need for self-assessment and the role of self-directed learning

Professional

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

Cardiac surgery ICU rotation

Fellows should achieve competency in the management of routine postoperative cardiac surgery patients

Medical expert

By the end of the rotation, CCM fellows should achieve competency in the following:

1. Management of 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
2. Recognizing postoperative complications, generating a differential diagnosis, and planning appropriate investigations and management
3. Basic use of intra-aortic balloon pumps and extracorporeal membrane oxygenation
4. Knowledge of the basic sciences as applied to the critical postoperative period after coronary artery bypass grafting, valve replacement or repair, and major vascular surgery

Physiology and anatomy
Fellows are expected to

1. Describe coronary anatomy and physiology in detail and their relevance to ischemia
2. Describe 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
3. Describe normal and abnormal conduction pathways and their clinical significance

Pharmacology
Fellows should understand

1. Commonly used cardiac drugs including heparin, thrombolytics, and antiplatelet agents, and their dosages
2. The use of blood products (e.g., packed red blood cells, fresh frozen plasma, platelets, and cryoprecipitate), blood alternatives (e.g., albumin and synthetic starches), transfusion reactions, and complications
3. Currently available coagulation drugs (e.g., Desmopressin, activated factor VII, and protamine) and their indications, contraindications, and complications
4. Commonly used vasodilators, vasoconstrictors, and inotropic and lusitropic agents and their dosages and effects
5. Commonly used anti-arrhythmic agents (e.g., procainamide, amiodarone, sotalol) for prophylaxis and treatment of postoperative atrial fibrillation, supraventricular tachycardia, and ventricular arrhythmias
6. Neurological sequelae after cardiac surgery
7. Gastrointestinal (GI) complications following major vascular surgery

Monitoring
Fellows should be able to

1. Acquire skills in performing arterial and central venous cannulation, peripheral venous cannulation, and pulmonary artery catheterization; interpret central venous pressure and data from pulmonary artery catheter (pulmonary artery pressure, pulmonary capillary wedge pressure, and cardiac output); and know the indications, complications, and management of these procedures

2. Describe the basics of introductory transesophageal echocardiography (TEE) and its application to critical care patients
3. Perform laboratory monitoring of the coagulation system in postoperative cardiac or vascular patients
4. Recognize the parameters used for assessing postoperative blood loss
5. Describe the significance of body temperatures postoperatively in cardiac and vascular patients

Communicator

Fellows should be able to do the following:
1. Obtain an accurate and relevant history and perform a detailed physical examination using effective listening skills
2. Explain critical care patients' status and expected progress to their families
3. Communicate patient information to and outline a management plan for the attending physician in a professional and intelligent manner
4. Communicate a management plan effectively in routine and emergency situations
5. Discuss the clinical parameters of possible surgical re-exploration in a calm and intelligent manner

Collaborator

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

Leader

Fellows should be able to do the following:
1. Understand the duties of the cardiac surgery intensive care specialist and unit director
2. Utilize resources to effectively balance patient care and healthcare economics
3. Work to develop effective and efficient patient management strategies through
    a. Collaborative care plans that utilize resource optimization
    b. Appropriate time management in coordinating discharge with scheduled surgical admissions and the impact of surgery cancellations owing to limited resources on patients and families, use of the waiting list, and effective human resource allocations
    c. Arranging the discharge of postoperative cardiac patients per their needs (e.g., step-down, telemetry floors, etc.)

Health advocate

Fellows should be able to do the following:
1. Recognize the impact of a collaborative care plan to facilitate patient care
2. Recognize the importance of pain management, arrhythmia prophylaxis, etc. on impacting the hospital length of stay

Scholar

Fellows should be able to do the following:
1. Identify important determinants of health and success of cardiac patients during cardiac surgery ICU admission
2. Identify areas of controversy in the management of CCM patients using clinical observations and literature reviews and seek to practice evidence-based medicine
3. Contribute to the medical education of other health professionals (clerks, novice nurses, and respiratory therapists, etc.)
4. Learn how to apply basic and clinical science to patient care
5. Recognize the ongoing need for self-assessment and the role of self-directed learning

Professional

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

Emergency medicine rotation

During this rotation, fellows are expected to gain experience in the initial assessment and management of common medical and surgical emergencies.

Medical expert

Fellows should be able to do the following:
1. Obtain a concise and accurate history from and perform a physical examination on patients with undifferentiated acute emergencies
2. Formulate appropriate plans of management for patients presenting with acute emergencies
3. Develop an organized approach to resuscitation, ensuring maintenance of airways, breathing, and circulation
4. Perform initial management of compromised airways, including intubation of the trachea and the use of various airway adjuncts
5. Perform initial management of patients with cardiac arrhythmias and acute coronary syndrome

6. Perform initial assessment and management of patients with shock
7. Develop approaches to assessing patients with toxin exposure, substance abuse, and drug overdose
8. Develop skills for assessing and managing a wide variety of acute medical conditions including
    a. Environmental exposure (heat stroke, hypothermia, carbon monoxide poisoning, burn, and drowning or near drowning)
    b. Central nervous system (CNS) disorders (acute stroke, seizure disorders, meningitis, and coma)
    c. Cardiovascular diseases (hypertensive emergencies/urgencies, pulmonary edema, dissecting aortic aneurysm, and acute ischemic syndrome)
    d. Respiratory disease (acute asthma exacerbation, chronic obstructive pulmonary disease exacerbation, pneumonia, acute respiratory distress, and acute thromboembolic disorders)
    e. GI disorder (upper GI hemorrhage, hepatic encephalopathy, and acute liver failure)
9. Develop the ability to assess and initially manage acute abdomen, trauma, fractures, and interpret related radiological imaging

Communicator

Fellows should be able do the following:
1. Obtain a focused medical history from patients or their families
2. Discuss a wide variety of medical conditions and their treatments with patients and their families in a language that they can understand
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
4. Accurately describe patients' clinical condition to consultants using appropriate medical terminology
5. Initiate appropriate telephone consultations with other specialists at local and remote locations
6. Keep thorough and accurate written medical records

Collaborator

Fellows should be able to do the following:
1. Work collaboratively with allied healthcare professionals in the ER
2. Develop a care plan for a patient they have assessed, including investigation, treatment, and continuing care, in collaboration with interdisciplinary team members
3. Consult judiciously and effectively
4. Collaborate with other healthcare professionals to ensure smooth transition of patient care within or outside the hospital

Leader

Fellows should be able to do the following:
1. Effectively manage the care of multiple patients while working in the ER
2. Effectively triage patients and manage ER flow
3. Improve their ability to obtain a focused history and perform a physical examination in the time-limited ER environment

4. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
5. Work effectively as a member of a team
6. Understand the principles of managing the critical care situations during disaster

Health advocate

Fellows should be able to do the following:
1. Identify and engage in opportunities for patient counseling and education regarding patients' diseases
2. Ensure timely access to relevant consultation and investigation
3. Expedite patient transfer from the ER
4. Ensure follow-up of care and enhance care continuity

Scholar

Fellows should be able to do the following:
1. Identify their own learning needs and make use of available learning resources
2. Demonstrate critical thinking and integrate critical appraisal of the literature into the bedside approach
3. Apply appropriate clinical evidence to patient care

Professional

Fellows are expected to
1. Treat all patients with dignity and respect
2. Be punctual for shifts, meetings, and educational events
3. Follow through on assigned tasks
4. Demonstrate integrity in all interactions with colleagues
5. Be respectful, honest, and compassionate when dealing with patients, families, and other professionals

Trauma rotation

By the end of this rotation, fellow should have competency and confidence in dealing with trauma patients.

Medical expert

Fellows should be able to do the following:
1. Demonstrate knowledge and skill in the initial assessment and management of patients with multiple traumas
2. Demonstrate proficiency in trauma resuscitation and wound care
3. Demonstrate understanding of injury mechanisms and their possible impact on patient presentation
4. Perform primary and secondary surveys of trauma victims under the principles of focused assessment with sonography for trauma (FAST) and the indications of peritoneal lavage
5. Demonstrate knowledge of airway management in patients with multiple traumas
6. Demonstrate knowledge of appropriate blood and blood products transfusion in trauma patients

Communicator

Fellows should be able to do the following:
1. Demonstrate the ability to counsel patients and families in the setting of acute trauma
2. Ensure appropriate patient disposition, referral, and follow-up
3. Demonstrate knowledge of and appropriate conduct in dealing with issues of patient confidentiality and informed consent
4. Communicate effectively with a multidisciplinary team involved in patient care
5. Keep thorough and accurate written medical records

Collaborator

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

Leader

Fellows should be able to do the following:
1. Utilize resources effectively to balance patient care and personal learning needs
2. Multitask appropriately and effectively, prioritize tasks appropriately, and understand the principles of effective delegation
3. Delegate responsibilities or accept delegated tasks appropriately
4. Develop team leadership skills
5. Improve the ability to obtain a focused history and perform a physical examination
6. Work effectively as a member of a team
7. Understand the principles of disasters management

Health advocate

Fellows should be able to do the following:
1. Ensure timely access to relevant consultations and investigation
2. Understand when and how to appropriately advocate on behalf of patients
3. Demonstrate an understanding of injury prevention
4. Promote and participate in patient safety

Scholar

Fellows should be able to do the following:
1. Critically appraise trauma-related literature and apply knowledge obtained from the current literature to daily practice
2. Demonstrate the ability to engage in continual self-directed learning
3. Integrate critical appraisal conclusions into clinical care
4. Attend and participate in divisional academic activities

Professional

Fellows should be able to do the following:
1. Deliver the highest quality care with integrity, honesty, and compassion
2. Exhibit appropriate personal and interpersonal professional behaviors
3. Demonstrate sensitivity to age, sex, culture, and ethnicity in dealing with patients and their families
4. Display teamwork and respect for all healthcare team members
5. Maintain patient privacy and dignity and act with personal integrity

Research rotation

Medical expert

Fellows should demonstrate an awareness of the basic principles of clinical and laboratory research and incorporate research into improving care of critically ill patients. The fellow, after this rotation, should be able to do the following:
1. Understand the principles and processes for development and implementation of clinical trials
2. Understand common statistical principles and tests and their usefulness
3. Understand the importance of good record keeping in research
4. Understand the ethical considerations of research involving human and animal subjects
5. Demonstrate knowledge of how to prepare protocols involved in hypothesis and observational research
6. Understand the process of organizing a laboratory research project
7. Understand the principles of evidence-based medicine techniques
8. Prepare and refine a workable research protocol, including a proposal for ethics committee review
9. Prepare, organize, and analyze a database
10. Prepare a draft manuscript and abstract

Communicator

Fellows should be able to do the following:
1. Recognize the need for effective communication with patients and their families as it pertains to research
2. Recognize the need for effective communication with medical and non-medical colleagues
3. Coordinate research with colleagues from different disciplines

Collaborator

Fellows should be able to do the following:
1. Effectively consult with other physicians and healthcare professionals
2. Work effectively as part of multidisciplinary team
3. Act as a leader of a multidisciplinary team

Leader

Fellows should be able to do the following:
1. Create a stimulating research environment
2. Delegate responsibilities in a fair and non-threatening manner
3. Instill enthusiasm among colleagues in the workplace
4. Utilize resources to effectively balance patient care and healthcare economics

Health advocate

Fellows should be able to do the following:
1. Recognize the risk factors for a variety of common critical illnesses and counsel families and colleagues in such a way as to minimize said risks
2. Understand that patients' welfare always takes precedence in the event of medical or ethical conflicts
3. Appreciate the difficult and stressful situations associated with the environment of CCM and how that relates to research

Scholar

Fellows should be able to
1. Demonstrate knowledge of how to be a competent critical care physician
2. Apply basic and clinical science to patient care
3. Establish comprehensive, self-directed learning and educational strategies
4. Impart a similar enthusiasm to their colleagues
5. Develop an appreciation of the role of critical analysis in the assessment of current scientific developments
6. Participate in the processes of clinical audit and quality improvement activities

Professional

Fellows should be able to do the following:
1. Develop an ethical framework for delivery of the highest quality care
2. Understand professional obligations to patients and colleagues
3. Exhibit appropriate personal and interpersonal professional behaviors
4. Act with integrity, honesty, and compassion in the delivery of the highest quality healthcare

Critical care radiology rotation

The purpose of this rotation is to familiarize fellows with applications, indications, and interpretation of various radiological examinations required in the management of critically ill patients.

Medical expert

1. Fellows are required to develop the skills to interpret chest X-rays and CT scans of the thorax, with an emphasis on
   a. Interstitial vs. air space disease
   b. Congestive heart failure
   c. Pleural effusion

   d. Lobar collapse
   e. Barotraumas
2. Understand the indications for and reading of abdominal X-rays and CT scans of the abdomen, with emphases on
   a. Small bowel obstruction
   b. Large bowel obstruction
   c. Bowel edema/inflammation
   d. Liver masses/cysts
   e. Renal masses/cysts
3. Recognize the indications for and interpret CT scans of the head, with emphasis on:
   a. Masses/cysts
   b. Hemorrhage
   c. Ischemic infarcts
   d. Brain edema
   e. Hydrocephalus
4. Recognize the indications for and uses of ultrasound of the abdomen and chest to determine the presence of significant pleural effusion or ascites
5. Understand the indications for
   a. Magnetic resonance imaging
   b. Angiograms/interventional radiology procedures
   c. Bone/gallium scans
   d. Other nuclear medicine scans

Focused learning objectives

1. Demonstrate knowledge of the causes of and ultrasound findings in respiratory failure owing to various causes including
   a. Pleural effusion
   b. Pneumothorax
   c. Alveolar-interstitial syndrome (e.g., congestive heart failure, acute respiratory distress syndrome)
   d. Normal aeration pattern (e.g., pulmonary embolism, obstructive lung disease, etc.)
   e. Lobar collapse
2. Generate general critical care ultrasound images in the assessment of pneumothorax, pleural effusion, and ascites
3. Demonstrate ability to perform ultrasound-guided procedures (e.g., pleurocentesis, paracentesis)
4. Demonstrate ability to perform the FAST exam, which is a limited ultrasound examination directed solely at identifying the presence of free intraperitoneal, pericardial fluid, and hemothorax in trauma patients

Communicator

Fellows should be able to do the following:

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

Collaborator

Fellows should be able to do the following:
1. Identify the necessities and benefits of consulting other physicians and healthcare professionals
2. Collaborate with healthcare providers to address patient needs and provide the most suitable radiological study
3. Collaborate with radiology premedical staff to identify the optimal radiological study

Leader

Fellows should be able to do the following:
1. Use technology to optimize patient care
2. Use healthcare resources effectively
3. Work effectively and efficiently
4. Understand the dynamics and workflow of the radiology department

Health advocate

Fellows should be able to do the following:
1. Educate and counsel patients and their families regarding the factors that influence their health
2. Provide timely access for emergency cases
3. Promote and understand radiation safety

Scholar

Fellows should be able to do the following:
1. Critically appraise sources of medical information
2. Engage in evidence-based clinical practice
3. Understand the specificity, sensitivity, and limitations of each radiological study

Professional

Fellows should be able to do the following:
1. Deliver the highest quality care with integrity, honesty, and compassion
2. Exhibit appropriate personal and interpersonal professional behaviors
3. Maintain patient privacy and dignity and act with personal integrity
4. Recognize and resolve ethical issues as they arise in clinical practice
5. Recognize and address unprofessional behavior in clinical practice

Critical care echocardiography rotation

The echocardiography rotation is required to help fellows in the assessment of critically ill patients by identifying and treating the underlying causes of hemodynamic instability promptly, thereby preventing or decreasing mortality and morbidity. Fellows are expected to become competent in the assessment of critically ill patients using focused and goal-directed cardiac examinations via appropriate transthoracic echocardiography (TTE). This is not intended to replace a detailed TTE by a cardiologist.

Medical expert

By the end of rotation, fellows should be able to do the following:

1. Understand the basic thoracic anatomy
2. Understand the importance of proper positioning of the patient for optimal cardiac examination
3. Understand the basic principles of cardiac transducer orientation and positioning
4. Understand the anatomy and orientation of basic echocardiographic views
5. Obtain a safe and optimal echocardiographic examination via the transthoracic approach in acutely ill patients
6. Learn how to perform and interpret a focused and goal-directed echocardiographic examination
7. Demonstrate an ability to answer focus questions through a focused or goal-directed examination, which are usually related to
    a. Left ventricular size and function
    b. Right ventricular size and function
    c. Pericardial space for fluid and tamponade
    d. Fluid status and responsiveness
8. Demonstrate ability to identify the causes of hemodynamic instability including
    a. Cardiogenic
    b. Distributive
    c. Hypovolemic

Communicator

Fellows should be able to do the following:

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

Collaborator

Fellows should be able to do the following:

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

Leader

Fellows should be able to do the following:

1. Triage multiple requests for echocardiographic studies
2. Disinfect echocardiography equipment and demonstrate knowledge of the proper care/handling of this equipment
3. Demonstrate knowledge of different equipment models, specifications, and their use.

Health advocate

Fellows should be able to do the following:
1. Recognize the risk factors for a variety of common cardiac critical illnesses and counsel families and colleagues in such a way as to minimize said risks
2. Understand that patients' welfare always takes precedence in the event of medical, political, or ethical conflicts
3. Learn to identify and minimize the stresses placed upon patients, their relatives, and hospital staff

Scholar

Fellows should be able to do the following:
1. Apply basic and clinical science to patient care
2. Establish a comprehensive self-directed learning and educational strategy
3. Appreciate the role of critical appraisal in the assessment of current scientific developments
4. Commit to forever pushing the boundaries of excellence in caring for critically ill patients

Professional

Fellows should be able to develop an ethical framework for the delivery of the highest quality care, including
1. Understanding professional obligations to patients and colleagues
2. Exhibiting appropriate personal and interpersonal professional behaviors
3. Acting with integrity, honesty, fairness, and compassion in delivery of the highest quality healthcare

Infectious disease rotation

The goal of this rotation is for fellows to gain experience in the evaluation and management of inpatients with a broad spectrum of infectious diseases

Medical expert

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
3. Summarize approaches to the evaluation of common presentations of infectious diseases (e.g., AIDS, pneumonia, urinary tract infections, and sepsis)
4. Interpret diagnostic tests used in the evaluation of inpatients with suspected infectious diseases
5. To understand the risks, mechanisms, treatment, and prevention of antimicrobial resistance
6. Demonstrate an ability to critically appraise and cite literature pertinent to the evaluation of inpatients with infectious diseases

Patient care competencies

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

Communicator

Approach patients with an empathetic and understanding manner

1. Demonstrate effective skills in listening and speaking with patients, families, and other healthcare team members
2. Reliably and accurately communicate patients' and their families' views and concerns to the attending physician
3. Compose clear consultation reports and interval notes/letters promptly, including a precise diagnosis whenever possible and a differential diagnosis when appropriate, and recommended follow-ups or additional studies
4. Counsel patients, families, and colleagues regarding side effects and appropriate use of specific medications, providing written documentation when appropriate
5. Exercise empathy in all patient encounters
6. Demonstrate competency in documentation including histories and physical, progress, and discharge notes

Collaborator

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

Leader

Efficiently perform patient care tasks allocated during ward rounds

1. Recognize personal limitations and seek help when appropriate
2. Utilize personal resources effectively to balance patient care, continuing education, and personal activities
3. Understand and judiciously allocate healthcare resources
4. Work efficiently and effectively within a healthcare system
5. Utilize information technology for optimal patient care and personal scholarship

Health advocate

1. Identify the important determinants of health that affect patients
2. Contribute effectively to improving the health of patients and communities
3. Recognize and respond to those issues where advocacy is appropriate
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, etc.)
5. Respect and empower patient autonomy
6. Promote fair healthcare
7. Apply the principles of quality improvement and quality assurance
8. Appreciate the existence of global health advocacy and initiatives for the elimination of disease (e.g., TB, malaria, and HIV) and the roles of advocacy groups and funding agencies

Scholar

Effectively use technology to manage information, support patient care decisions, and enhance both patient and physician education
Integrate and apply knowledge obtained from multiple sources for inpatient care
Demonstrate an ability to critically assess the scientific literature
Set and assess individualized learning goals
Analyze clinical experience and employ a systematic methodology for improvement
Develop and maintain a willingness to learn from errors and use errors to improve the system or processes of care

Professional

1. Exhibit punctuality in all assigned duties
2. Incorporate the principles of patient primacy, privacy, and autonomy; informed consent; and equitable respect in the care of patients
3. Demonstrate respect for patients, their families, staff, and colleagues
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
5. Demonstrate integrity, honesty, and openness in discussion of therapeutic options with patients and respect for patients' preferences and cultural differences
6. Respond to phone calls, pages, and messages promptly

Pulmonary medicine rotation

The objective of this rotation is for fellows to gain experience in the evaluation and management of inpatients with a broad spectrum of pulmonary diseases.

Medical expert

1. Describe the epidemiology, genetics, natural history, and clinical expression of pulmonary disorders encountered in the inpatient, outpatient settings, and critical care settings
2. Demonstrate competence in performing common procedures used in a general medicine service, including bronchoscopy and thoracentesis

3. Summarize approaches to the evaluation of common pulmonary disease presentations generally and in critically ill patients with obstructive airway diseases, pulmonary hypertension, or pneumonia
4. Evaluate and manage perioperative ICU patients undergoing thoracic procedures (lobectomy/pneumonectomy)
5. Interpret diagnostic tests used in the evaluation of inpatients with suspected pulmonary disease e.g., pulmonary function test, CT scan, ventilation–perfusion scan, etc.
6. Demonstrate the ability to critically appraise and cite literature pertinent to the evaluation of inpatients (or outpatients during the clinical rotation) with pulmonary diseases

Patient care competencies

1. Effectively obtain a comprehensive history and perform a complete physical examination of patients with respiratory symptoms or known pulmonary disease
2. Appropriately select and 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

Communicator

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

Collaborator

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

Leader

1. Learn to efficiently perform patient care tasks allocated during ward rounds
2. Recognize personal limitations and seek help when appropriate
3. Utilize personal resources effectively to balance patient care, continuing education, and personal activities

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

Health advocate

1. Identify the important determinants of health that affect patients
2. Contribute effectively to improving the health of patients and communities
3. Recognize and respond to issues where advocacy is appropriate
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)
5. Respect and empower patient autonomy
6. Promote fair healthcare
7. Apply the principles of quality improvement and quality assurance
8. Appreciate the existence of global health advocacy and initiatives for the elimination of disease (e.g., TB, malaria, and HIV) and the roles of advocacy groups and funding agencies.

Scholar

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

Professional

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

Nephrology rotation

The objective of this rotation is for fellows to gain experience in the inpatient evaluation and management of patients with a broad spectrum of renal disorders.

Medical expert

1. Describe the epidemiology, genetics, natural history, and clinical expression of renal disorders encountered in inpatient settings
2. Describe the structure and function of the kidneys
3. Summarize approaches to evaluation of the common presentations of renal disorders
4. Interpret diagnostic tests used in the evaluation of inpatients with suspected renal disorders
5. Demonstrate the ability to critically appraise and cite literature pertinent to the evaluation of in patients with renal disorders

Patient care competencies

1. Effectively obtain a 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. Appropriately select and interpret laboratory, imaging, and pathologic studies used in the evaluation of renal disorders
4. Construct a comprehensive treatment plan and assess patient response to therapy
5. Counsel patients concerning their diagnosis, planned diagnostic testing, and recommended therapies

Communicator

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

Collaborator

1. Discuss how the healthcare system affects the management of outpatients with renal disorders
2. Demonstrate effective collaboration with other healthcare providers, including nurses
3. Determine cost-effectiveness of alternative proposed interventions
4. Design cost-effective plans based on knowledge of best practices
5. Demonstrate an awareness of the impact of diagnostic and therapeutic recommendations on the healthcare system, procedure costs, insurance coverage, and resources utilized

Leader

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

4. Understand and judiciously allocate healthcare resources
5. Work efficiently and effectively within the healthcare system
6. Utilize information technology for optimal patient care and personal scholarship

Health advocate

1. Identify the important determinants of health that affect patients
2. Contribute effectively to improving the health of patients and communities
3. Recognize and respond to those issues where advocacy is appropriate
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, etc.)
5. Respect and empower patient autonomy
6. Promote fair healthcare
7. Apply the principles of quality improvement and quality assurance
7. Appreciate the existence of global health advocacy and initiatives for the elimination of disease (TB, malaria, and HIV) and the role of advocacy groups and funding agencies

Scholar

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

Professional

1. Be prompt and prepared for rounds and/or clinic
2. Recognize the importance of patient primacy, privacy, and autonomy; informed consent; and equitable respect and care to all
3. Respect patients, patients' families, staff, and colleagues
4. Model ethical behavior by reporting back 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
5. Demonstrate integrity, honesty, and openness in discussion of therapeutic options with patients and respect for patients' preferences and cultural differences
6. Respond to phone calls, pages, and messages promptly

Neurocritical care rotation

Medical expert

1. During this rotation, basic skills in the diagnosis, evaluation, and management of critically ill neurology patients in neurocritical care are developed. This will supplement knowledge gained on the inpatient ward, ER, and ICU:
   a. Provide basic neurocritical care to patients with an acute brain/spinal cord injury

   b. Understand the signs, symptoms, monitoring, and management of intracranial hypertension
   c. Employ a sound knowledge base for the recognition and treatment of acute stroke syndromes
   d. Delineate the recognition and management of acute intracerebral and subarachnoid hemorrhages
   e. Identify and provide care for critically ill patient admitted with neuromuscular/neurodegenerative and movement disorders
   f. Manage and monitor patients with refractory status epilepticus
   g. Interpret the neuroimaging of acutely brain injured patients
   h. Recognize the importance of prognostication in neurocritical care
   i. Receive instruction in various aspects of end-of-life palliative care, including pain relief and support for patients and family members
   j. Be exposed to various aspects of bioethics
   k. Participate in the evaluation of and decision making for patients with disorders of the nervous system requiring surgical management
2. Display and apply the following medical knowledge:
   a. Basic knowledge regarding neurocritical care and acute stroke management through background reading and bedside teaching
   b. Knowledge from evidence-based medicine to patient care
   c. Knowledge is also gained through didactic teaching
3. Practice-based learning and improvement
   a. Fellows will develop the ability to investigate and evaluate their care of patients, to appraise scientific evidence, and to improve patient care based on constant self-evaluation and life-long learning
   b. The supervising attending physician will ensure that fellows identify strengths and deficiencies in their knowledge and implements changes leading to improvement
   c. Fellows will locate and use evidence from scientific studies in patient care
   d. Fellows will educate the patient and their family about patients' condition

Communicator

1. Fellows will succinctly and completely present patients to the supervising attending physician and will maintain comprehensive, timely, and legible medical records
2. Fellows will communicate effectively with patients, families, and other health professionals and will confer with consultants, as necessary. Owing to the critical nature of neuro-ICU patients, effective communication skills are necessary to interact with families and participate in family conferences as necessary

Professional

1. Fellows will always behave in a professional manner. The highest standards of professionalism must be maintained, especially in interactions with patients/other physicians
2. Fellows will participate in family meetings where important decisions are made pertaining to neuro-ICU patients
3. Fellows are responsible for tracking duty hours and reporting them to the Education Administrator and Program Director
4. Fellows should accomplish all assigned tasks related to clinical patient care

ACADEMIC ACTIVITIES

To achieve the required competencies, fellows should be exposed to a wide range of topics forming the major subjects in the curriculum. Different educational activities will be used to 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 the topics. These include each of the following areas:

1) Formal teaching and learning activities
   - Universal topics (10%)
   - Core specialty topics (70%)
   - Fellows' 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

1. Formal learning and teaching

1.1 Universal topics

The SCFHS developed an e-learning platform to deliver high value, interdisciplinary topics of the utmost importance to fellows to ensure that all fellows receive high-quality teaching and develop essential core knowledge. These topics are common to all specialties and are delivered in a modular fashion. At the end of each learning unit, there is an online formative assessment. Upon completion of all topics, fellows 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 following seven modules is mandatory.

Module 1: Introduction

1. Safe drug prescribing
2. Hospital acquired infections (HAIs)
3. Sepsis, systemic inflammatory response syndrome (SIRS), and disseminated intravascular coagulation (DIC)
4. Antibiotic stewardship
5. Blood transfusion

Safe drug prescribing

At the end of the learning unit, fellows should be able to do the following:

1. Recognize importance of safe drug prescribing in the healthcare
2. Describe the various adverse drug reactions with examples of commonly prescribed drugs that can cause such reactions

3. Apply principles of drug-drug interactions, drug-disease interactions, and drug-food interactions in common situations
4. Apply principles of prescribing drugs in special situations such as renal failure and liver failure
5. Apply principles of prescribing drugs in elderly, pediatric, and pregnant and/or lactating patients
6. Promote evidence-based, cost-effective prescribing
7. Discuss the ethical and legal framework governing safe drug prescribing in Saudi Arabia

HAIs

At the end of the learning unit, fellows should be able to do the following:
1. Discuss the epidemiology of HAI with special reference to HAI in Saudi Arabia
2. Recognize HAI as one of the major emerging threats in healthcare
3. Identify the common sources and set-ups of HAI
4. Describe the risk factors of common HAIs such as ventilator associated pneumonia, methicillin-resistant Staphylococcus aureus, central line-associated bloodstream infection, and vancomycin resistant enterococcus
5. Identify the role of healthcare workers in the prevention of HAI
6. Determine appropriate pharmacological (e.g., selected antibiotics) and non-pharmacological (e.g., removal of an indwelling catheter) measures in the treatment of HAI
7. Propose a plan to prevent HAI in the workplace

Sepsis, SIRS, and DIC

At the end of the learning unit, fellows should be able to do the following:
1. Explain the pathogenesis of sepsis, SIRS, and DIC
2. Identify patient related and non-patient related predisposing factors of sepsis, SIRS, and DIC
3. Recognize a patient at risk of developing sepsis, SIRS, and/or DIC
4. Describe the complications of sepsis, SIRS, and DIC
5. Apply the principles of management of patients with sepsis, SIRS, and/or DIC
6. Describe the prognosis of patients with sepsis, SIRS, and/or DIC

Antibiotic stewardship

At the end of the learning unit, fellows should be able to do the following:
1. Recognize antibiotic resistance as one of the most pressing global public health threats
2. Describe the mechanisms of antibiotic resistance
3. Determine the appropriate and inappropriate use of antibiotics
4. Develop a plan for safe and proper antibiotic usage plan including correct indications, duration, types of antibiotic, and discontinuation
5. Be appraised of the local guidelines for the prevention of antibiotic resistance

Blood transfusion

At the end of the learning unit, fellows should be able to do the following:
1. Review the different components of blood products available for transfusion
2. Recognize the indications and contraindications for blood product transfusion
3. Discuss the benefits, risks, and alternative to transfusion

4. Undertake consent for specific blood product transfusion
5. Perform steps necessary for safe transfusion
6. Develop understanding of special precautions and procedures necessary during massive transfusions
7. Recognize transfusion associated reactions and provide immediate management

Module 2: Cancer

1. Principles of cancer management
2. Side effects of chemotherapy and radiation therapy
3. Oncologic emergencies
4. Cancer prevention
5. Surveillance and follow-up of cancer patients

Principles of cancer management

At the end of the learning unit, fellows should be able to do the following:
1. Discuss the basic principles of staging and grading of cancers
2. Enumerate these basic principles (e.g., indications, mechanism, types):
   a. Cancer surgery
   b. Chemotherapy
   c. Radiotherapy
   d. Immunotherapy
   e. Hormone therapy

Side effects of chemotherapy and radiation therapy

At the end of the learning unit, fellows should be able to do the following:
1. Describe important side effects (e.g., frequent, life-threatening, or organ threatening side effects of common chemotherapy drugs)
2. Explain the principles of monitoring of side effects in a patient undergoing chemotherapy
3. Describe measures (pharmacological and non-pharmacological) available to ameliorate side effects of commonly prescribed chemotherapy drugs
4. Describe important common and life-threatening side effects of radiation therapy
5. Describe measures (pharmacological and non-pharmacological) available to ameliorate side effects of radiotherapy

Oncological emergencies

At the end of the learning unit, fellows should be able to do the following:
1. Enumerate important oncologic emergencies encountered both in hospital and ambulatory settings
2. Discuss the pathogenesis of important oncologic emergencies
3. Recognize the oncologic emergencies
4. Institute immediate measures when treating a patient with an oncologic emergency
5. Counsel patients in an anticipatory manner to recognize and prevent oncologic emergencies

Cancer prevention

At the end of the learning unit, fellows should be able to do the following:
1. Conclude that many major cancers are preventable
2. Identify smoking prevention and lifestyle modifications as major preventable measures
3. Recognize cancers that are preventable
4. Discuss the major cancer prevention strategies at the individual and national levels
5. Counsel patients and families in proactive manner regarding cancer prevention, including screening

Surveillance and follow-up of cancer patients

At the end of the learning unit, fellows should be able to do the following:
1. Describe the principles of surveillance and follow-up of patients with cancer
2. Enumerate the surveillance and follow-up plan for common forms of cancer
3. Describe the role of primary care physicians, family physicians, and similar others in the surveillance and follow-up of cancer patients
4. Liaise with oncologists to provide surveillance and follow-up for patients with cancer

Module 3: Diabetes and metabolic disorders

1. Recognition and management of diabetic emergencies
2. Management of diabetic complications
3. Comorbidities of obesity
4. Abnormal ECG

Recognition and management of diabetic emergencies

At the end of the learning unit, fellows should be able to do the following:
1. Describe the pathogenesis of common diabetic emergencies including their complications
2. Identify risk factors for and groups of patients vulnerable to such emergencies
3. Recognize a patient presenting with a diabetic emergency
4. Institute immediate management
5. Refer the patient to the appropriate next level of care
6. Counsel patient and families to prevent such emergencies

Management of diabetic complications

At the end of the learning unit, fellows should be able to do the following:
1. Describe the pathogenesis of important complications of Type 2 diabetes mellitus
2. Screen patients for such complications
3. Provide preventive measures for such complications
4. Treat such complications and
5. Counsel patients and families with special emphasis on prevention

Obesity comorbidities

At the end of the learning unit, fellows should be able to do the following:
1. Screen patients for presence of common and important comorbidities of obesity
2. Manage obesity-related comorbidities
3. Provide dietary and lifestyle advice for prevention and management of obesity

Abnormal ECG

At the end of the learning unit, fellows should be able to do the following:
1. Recognize common and important ECG abnormalities
2. Institute immediate management, if necessary

Module 4: Medical and surgical emergencies

1. Management of acute chest pain
2. Management of acute breathlessness
3. Management of altered sensorium
4. Management of hypotension and hypertension
5. Management of upper GI bleeding
6. Management of lower GI bleeding

For all the above, the following learning outcomes apply. At the end of the learning unit, fellows should be able to do the following:
1. Triage and categorize patients
2. Identify patients who need prompt medical and/or surgical attention
3. Generate preliminary diagnoses based on patient medical history and physical examination
4. Order and interpret urgent investigations
5. Provide appropriate immediate management to patients
6. Refer patients to the next level of care, if needed

Module 5: Acute care

1. Preoperative assessment
2. Postoperative care
3. Acute pain management
4. Chronic pain management
5. Management of fluid in the hospitalized patient
6. Management of acid-base/electrolyte imbalances

Preoperative assessment

At the end of the learning unit, fellows should be able to do the following:
1. Describe the basic principles of preoperative assessment
2. Perform preoperative assessment in an uncomplicated patient with special emphasis on the following:
   a. General health assessment
   b. Cardiorespiratory assessment
   c. Medications and medical device assessment

   d. Drug allergies
   e. Pain relief needs
3. Categorize patients per risks

Postoperative care

At the end of the learning unit, fellows should be able to do the following:
1. Devise a postoperative care plan including monitoring of vitals, pain management, fluid management, medications, and laboratory investigations
2. Handover patients properly to the appropriate facilities
3. Describe the process of postoperative recovery in a patient
4. Identify common postoperative complications
5. Monitor patients for possible postoperative complications
6. Institute immediate management for postoperative complications

Acute pain management

At the end of the learning unit, fellows should be able to do the following:
1. Review the physiological basis of pain perception
2. Proactively identify patients who might be in acute pain
3. Assess a patient with acute pain
4. Apply various pharmacological and non-pharmacological modalities available for acute pain management
5. Provide adequate pain relief for uncomplicated patients with acute pain
6. Identify and refer patients with acute pain who can be benefited from specialized pain services

Chronic pain management

At the end of the learning unit, fellows should be able to do the following:
1. Review the bio-psychosocial and physiological bases of chronic pain perception
2. Discuss various pharmacological and non-pharmacological options available for chronic pain management
3. Provide adequate pain relief for uncomplicated patients with chronic pain
4. Identify and refer patients with chronic pain who can be benefited from specialized pain services

Management of fluid in the hospitalized patient

At the end of the learning unit, fellows should be able to do the following:
1. Review physiological basis of water balance in the body
2. Assess a patient for their hydration status
3. Recognize a patient with over or under hydration
4. Order fluid therapy (oral and intravenous) for a hospitalized patient
5. Monitor fluid status and response to therapy through history, physical examination, and selected laboratory investigations

Management of acid-base electrolyte imbalances

At the end of the learning unit, fellows should be able to do the following:
1. Review physiological bases of electrolyte and acid-base balance in the body
2. Identify diseases and conditions that are likely to cause or be associated with acid-base and electrolyte imbalances
3. Correct electrolyte and acid-base imbalances
4. Perform careful calculations, checks, and other safety measures while correcting acid-base and electrolyte imbalances
5. Monitor response to therapy through history, physical examination, and selected laboratory investigations

Module 6: Frail elderly

1. Assessment of frail elderly
2. Mini-mental state examination (Mini-MSE)
3. Prescribing drugs for the elderly
4. Care of the elderly

Assessment of frail elderly

At the end of the learning unit, fellows should be able to do the following:
1. Enumerate the differences and similarities between comprehensive assessment of elderly patients and assessment of other patients
2. Perform comprehensive assessment of a frail elderly patient in conjunction with other members of healthcare team, with special emphasis on social factors, functional status, quality of life, diet and nutrition, and medication history
3. Develop a problem list based on the assessment of elderly patients

Mini-MSE

At the end of the learning unit, fellows should be able to do the following:
1. Review the appropriate usages, advantages, and potential pitfalls of the Mini-MSE
2. Identify patients suitable for the Mini-MSE
3. Screen patients for cognitive impairment through the Mini-MSE

Prescribing drugs for the elderly

At the end of the learning unit, fellows should be able to do the following:
1. Discuss the principles of prescribing for elderly patients
2. Recognize polypharmacy, prescribing cascade, inappropriate dosages, inappropriate drugs, and deliberate drug exclusion as major causes of morbidity in the elderly
3. Describe the physiological and functional declines in the elderly that contribute to increased drug related adverse events
4. Discuss drug-drug interactions and drug-disease interactions among the elderly
5. Demonstrate familiarity with the Beers criteria
6. Develop rational prescribing habits for elderly patients
7. Counsel elderly patients and their families on safe medication usage

Care of the elderly

At the end of the learning unit, fellows should be able to do the following:
1. Describe the factors that need to be considered while planning care for elderly patients
2. Recognize the needs and well-being of caregivers
3. Identify the local and community resources available in the care of the elderly
4. Develop, with input from other healthcare professionals, an individualized care plan for elderly patients

Module 7: Ethics and healthcare

1. Occupational hazards of healthcare workers
2. Evidence-based approach to smoking cessation
3. Patient advocacy
4. Ethical issues: transplantation/organ harvesting and withdrawal of care
5. Ethical issues: treatment refusal and patient autonomy
6. The role of doctors in death and dying

Occupation hazards of healthcare workers

At the end of the learning unit, fellows should be able to do the following:
1. Recognize common sources and risk factors of occupational hazards among healthcare workers
2. Describe common occupational hazards in the workplace
3. Develop familiarity with the legal and regulatory frameworks governing occupational hazards among healthcare workers
4. Develop a proactive attitude to promote workplace safety
5. Protect themselves and colleagues against potential occupational hazards in the workplace

Evidence-based approach to smoking cessation

At the end of the learning unit, fellows should be able to do the following:
1. Describe the epidemiology of smoking and tobacco usage in Saudi Arabia
2. Review the effects of smoking on the smoker and family members
3. Effectively use pharmacologic and non-pharmacologic measures to treat tobacco usage and dependence
4. Effectively use pharmacologic and non-pharmacologic measures to treat tobacco usage and dependence among special population groups such as pregnant women, adolescents, and patients with psychiatric disorders

Patient advocacy

At the end of the learning unit, fellows should be able to do the following:
1. Define patient advocacy
2. Recognize patient advocacy as a core value governing medical practice
3. Describe the role of patient advocates in the care of patients
4. Develop a positive attitude toward patient advocacy
5. Be a patient advocate in conflicting situations
6. Be familiar with local and national patient advocacy groups

Ethical issues: transplantation/organ harvesting and withdrawal of care

At the end of the learning unit, fellows should be able to do the following:
1. Apply key ethical and religious principles governing organ transplantation and withdrawal of care
2. Be familiar with the legal and regulatory guidelines regarding organ transplantation and withdrawal of care
3. Counsel patients and families in light of applicable ethical and religious principles
4. Guide patients and families to make informed decisions

Ethical issues: treatment refusal and patient autonomy

At the end of the learning unit, fellows should be able to do the following:
1. Predict situations where a patient or family is likely to decline prescribed treatment
2. Describe the concept of the "rational adult" in the context of patient autonomy and treatment refusal
3. Analyze key ethical, moral, and regulatory dilemmas in treatment refusal
4. Recognize the importance of patient autonomy in the decision-making process
5. Counsel patients and families declining medical treatment in light of the best interest of patients

The role of doctors in death and dying

At the end of the learning unit, fellows should be able to do the following:
1. Recognize the important role a doctor can play during the dying process
2. Provide emotional and physical care to a dying patient and family
3. Provide appropriate pain management in a dying patient
4. Identify suitable patients and refer to patient to palliative care services

1.2. Core specialty topics

Knowledge

Adult CCM competencies

At the completion of training, fellows must acquire the competencies listed below.
1. Establish and maintain clinical knowledge and skill
   a. Demonstrate knowledge of applied clinical physiology and homeostasis
   b. Demonstrate an understanding of physiology, pathophysiology, and pharmacology in critical ill patient
2. Demonstrate knowledge of the following bodily systems and areas of CCM
   a. Respiratory system
      - Anatomy of the respiratory system
      - Physiology of airway, gas exchange unit, lung, and chest wall mechanics
      - Respiratory monitoring
      - Diagnostic imaging of respiratory system
      - Pathophysiology and treatment of different lung diseases
      - Principles of mechanical ventilation and other methods of respiratory support
      - Weaning and extubation from mechanical ventilation

b. Cardiovascular system
   - Anatomy of the cardiovascular system
   - Physiology of heart and circulation, including heart lung interactions
   - Invasive and noninvasive hemodynamic monitoring
   - Diagnostic imaging of the cardiovascular system
   - Pathophysiology and treatment of different heart disease like coronary artery disease, heart failure, and arrhythmia
   - Principles of basic and ACLS

c. CNS
   - Normal anatomy of the CNS
   - Physiology of the central and peripheral nervous system
   - Invasive and noninvasive neurological monitoring
   - Diagnostic imaging of neurological systems
   - Pathophysiology and treatment of toxic, metabolic, structural, vascular, and infectious causes of altered consciousness as wells as stroke, traumatic brain injuries, seizure disorder, delirium, substance intoxication, and withdrawal
   - Neuromuscular system disease including spinal cord syndrome, motor disease, myopathy, and polyneuropathy of critical ill patients
   - Determination of brain death

d. Renal system
   - Anatomy of the genitourinary system
   - Physiology of the genitourinary system
   - Renal function monitoring
   - Diagnostic imaging of the genitourinary system
   - Pathophysiology, prevention, and management of acute kidney injury, including renal replacement therapy

e. GI and hepatobiliary system
   - Anatomy of the GI and hepatobiliary system
   - Physiology of GI and hepatobiliary and hepatobiliary
   - Diagnostic imaging of the GI and hepatobiliary system
   - Diagnostic imaging of the GI and hepatobiliary system
   - Pathophysiology and treatment of upper and lower GI (GI) bleeding, acute abdomen, bowel ischemia, severe acute pancreatitis, acute hepatobiliary dysfunction, hepatic failure, and acute abdominal compartment syndrome

f. Hematological system
   - Coagulation and fibrinolytic pathways
   - Pathophysiology and treatment of red cell, WBC, platelets
   - Pathophysiology and treatment of coagulation disorder
   - Blood product transfusion and massive transfusion

g. Oncologic disorders
   - Superior vena cava syndrome, hypercalcemia, and tumor lysis syndrome

h. Metabolic and endocrine system
   - Physiology of the metabolic and endocrine system, fluids, and electrolytes
   - Pathophysiology and treatment of fluid and electrolyte disturbance, acid-base disturbance, and endocrine emergency

i. Shock
   - Physiology of the hormones and regulatory inflammatory mediators
   - Invasive and noninvasive monitoring of shock
   - Diagnostic imaging for the patient with shock
   - Pathophysiology and treatment of shock, hypovolemic, cardiogenic, and obstructive shock

j. Septic illness
   - Pathogenesis and diagnostic criteria of sepsis, septic shock, SIRS, and multiple organ dysfunction syndrome
   - Diagnostic tests for sepsis
   - Pathophysiology and treatment of septic shock, including appropriate use of antibiotics, source control, and other therapies
   - Preventive infection control techniques for patients and healthcare workers

k. Intoxication
   - Pharmacology of common intoxicants and poisons
   - Pathophysiology and treatment of different toxin and poisons and related treatment and supportive care
   - Specific antidotes

l. Trauma and environmental hazards
   - Assessment and management of the traumatic patient, including ATLS
   - Diagnostic imaging of the injured patient
   - Pathophysiology and treatment of blunt and penetrating trauma; thermal, chemical, electrical, and radiation injury; and near drowning and drowning

m. Nutritional support
   - Identification of current deficiencies, ongoing losses, and monitoring of nutritional status and patients' response to therapy
   - Caloric, protein, vitamin, and micronutrient requirements in the critically ill patient
   - Indications and complications of enteral and parenteral nutrition therapy

n. Pharmacotherapy
   - Principles of pharmacokinetics and pharmacodynamics
   - Indications, routes of delivery, risks, and drug interactions
   - Indications for using vasoactive agents
   - Management of sedation, analgesia, and neuromuscular blockers
   - Mechanisms of antibiotic resistance

o. Transplantation
   - Principles of immunosuppression medication
   - Identification of opportunistic and nosocomial infections
   - Pathophysiology and treatment of solid organ transplantation and bone marrow transplant related complications

p. Critical illness in pregnancy
- Physiology of pregnancy
- Pathophysiology and treatment of critical illness due to pregnancy and birth complications
- Pathophysiology and treatment of critical illness in pregnant patients

q. Preoperative and postoperative care
- Patient assessment and optimization and minimization of perioperative risk
- Pathophysiology and treatment of critical illness in the perioperative period
- Pathophysiology and treatment of critical illness during the postoperative period

r. Critical care illness
- Pathophysiology of chronic critical illness
- Management of the chronic ventilated patient
- Critical care acquired weaknesses
- Post-traumatic stress disorders

s. End-of-life issues
- Ethical principles
- Withholding and/or withdrawing life sustaining therapy
- Organ and tissue donation including medical and ethical issues associated with brain death
- Optimal management of the organ donor

Skills

1. Demonstrate procedure skills
   Demonstrate appropriate and timely performance of diagnostic and therapeutic procedures relevant to adult critical care
   a. Airway
      - Assessment of the airway
      - Performance of endotracheal intubation
      - Management of the difficult airway
      - Performance of tracheostomy and replacement of an existing tracheostomy tube
      - Performance of bronchoscopy and obtaining bronchoalveolar lavage samples

   b. Breathing
      - Performance of ventilation by bag and mask
      - Performance of thoracentesis
      - Performance of fiberoptic bronchoscopy in the intubated patient

   c. Circulation
      - Insertion of central line
      - Insertion of arterial line
      - Performance of ultrasound assessment for vascular access
      - Performance of ultrasound assessment of patient with shock
      - Intraosseous vascular access
      - Performance of emergency pericardiocentesis
      - Performance of defibrillation/cardioversion

- Insertion and management of invasive and noninvasive cardiac output monitors
- Insertion of pulmonary artery catheter
- Insertion of intravenous pacemaker
- Application of transcutaneous pacemaker

d. Renal
   - Insertion of temporary hemodialysis catheter

e. GI
   - Performance of paracentesis

f. CNS
   - Performance of lumbar puncture
   - Follow-up and management of intracranial pressure monitors

2. Perform a complete and appropriate assessment of the critically ill patient
   a. Take a relevant history for the purposes of diagnosis, management, and disease prevention
   b. Perform a physical examination that is relevant and accurate for the purposes of diagnosis, management, and disease prevention
   c. Utilize appropriate investigation and diagnostic methods
   d. Demonstrate effective clinical problem-solving and judgment regarding patient problems, including interpretation of available data and integration of information to generate differential diagnosis and a management plan
   e. Recognize, resuscitate, stabilize, and sustain patients who are at risk of cardiopulmonary arrest or other life-threatening condition
   f. Provide consultation to other services that may help the patient

Attitude

At the completion of training, fellows must acquire the competencies listed below:

1. Aware of professional capabilities, values, feelings, and ethics
2. Awareness of their own capabilities and values
3. Identification of the ethical aspects of clinical practice (prevention, diagnostics, therapy, and factors that influence lifestyles)
4. Awareness of self: to understand that their own attitudes and feelings and their impact on practice
5. Awareness of personal and professional ethics and patient rights
6. Awareness of the interaction of work and personal life, and the need for a good balance between them

Activities related to core specialty topics

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

Cardiovascular section

Topics	Learning objectives
Approach patients with hypotension and hemodynamic instability	• Perform proper assessment and evaluation of patients with hemodynamic instability, initiate proper management, and identify possible causes with differential diagnosis to start proper management
Hemodynamic monitoring	• Recognize variable tools of hemodynamic monitoring, understand their basic science of and build the experience to start, calibrate, and interpret the result in the context of patients' clinical condition • Recognize indications, limitations, and pitfalls • Master principles of invasive pressure measurement and waveform recognition, interpretation, and troubleshooting
Types of shock and assessment of the cardiac function	• Recognize circulatory shock and its different types and possible causes, utilizing clinical data and available laboratory and monitoring variables • Build experience to promptly manage all shock types and supporting organ functions • Gain the skills of assessing cardiac function utilizing different assessment methods
Management of advanced heart failure, valvular heart disease, and pericardial disease	• Manage advanced heart failure using pharmacological support and to recognize different modalities of mechanical support • Recognize severe valvular heart disorder, manage acute presentation, and plan further interventions • Recognize pericardial disease and identify emergency situations requiring immediate intervention
Acute aortic syndromes and evaluation	• Recognize acute coronary syndrome (ACS) and initiate its management • Master thrombolytic therapy, indications, contraindications and the need for immediate cardiac intervention • Recognize complication of ACS and manage them including arrhythmias, cardiac dysfunction, and mechanical complication
Arrhythmia recognition and management	• Diagnose and manage different type of arrhythmias and recognize different precipitating factors and basic physiology of cardiac rhythm and dysrhythmias • Understand the basics of cardiac pacemakers and the method and use of transvenous and percutaneous pacing and defibrillators
Management of hypertension in the ICU	• Monitor and manage hypertensive emergencies and urgencies and build the knowledge of and experience in using different classes of antihypertensive medications and their side effects
Extracorporeal cardiac support	• Gain the knowledge of different cardiac extracorporeal support and gain the skills for extracorporeal membrane oxygenation (ECMO) utilization in intensive care settings

Cardiovascular pharmacology	• Gain advanced knowledge about the basic principles and use of various vasopressors and inotropes • Develop knowledge and experience regarding other cardiovascular related medications
Cardiorespiratory resuscitation	• Master basic and advanced cardiac life support and maintain required training and certifications, following international guidelines • Build necessary competency to manage the post arrest patient
Diastolic heart failure	• Recognize the pathophysiology, evaluation, and management of diastolic heart failure and manage the patient with chronic and acute right-sided heart failure

Pulmonary section

Topic	Learning objectives
Assessment of respiratory failure	• Understand the basic principles of pulmonary function, gas exchange, and pathophysiology of respiratory failure • Recognize various types of respiratory failure and their causes and management
Blood gas analysis and acid-base	• Understand the principles of blood gas analysis • Master reading and interpretation of blood gas values and various acid-base abnormalities as single or combined disorders, using the conventional method and the strong ion difference method
Oxygen therapy	• Understand physiology and the application of various oxygen therapy tools
Acute respiratory distress syndrome (ARDS)	• Understand the basic science, pathophysiology, and clinical presentation of ARDS and master its recognition, management principles, and options
Bronchial asthma and chronic obstructive airway disease	• Understand the basic science, pathology, evaluation of severity, and management in critical care for acute exacerbation • Master ventilatory support of obstructive airway disease
Extrapulmonary causes of respiratory failure	• Recognize, evaluate, and manage the patient with respiratory failure secondary to extrapulmonary causes and evaluate severity and the need for mechanical support
Pulmonary hypertension in the ICU and right ventricular failure	• Understand basic principles, physiology, and pathophysiological causes, evaluation, and management of acute or acute on top of chronic pulmonary hypertension and right-sided heart failure

Mechanical ventilation	• Master the basic principles of mechanical ventilation, including basic science related to physics, dynamic, machines, operation, maintenance, and troubleshooting • Understand mechanical ventilation modes, settings, delivery, phases, waveform analysis, pitfalls, and troubleshooting • Master the best methods to ventilate the patient with normal lungs, or restrictive lung disease, ARDS, or obstructive airway disease • Gain knowledge of rescue therapy and non-conventional mechanical ventilation • Master the weaning of the patient from mechanical ventilation and care of patients with difficult weaning • Understand complications of mechanical ventilation and master their management
Noninvasive mechanical ventilation	• Understand and master noninvasive ventilation, principles, types, interface, indications, contraindications, monitoring, and titration • Initiate and adjust noninvasive ventilation

Renal section

Topic	Learning objectives
Acute kidney injury	• Recognize the basic principles of kidney function, and understand pathophysiology of acute kidney injury and its causes, presentation, complications, diagnosis, prevention, and management
Renal replacement therapy (RRT)	• Understand basic principles of RRT, types, indications, advantages, disadvantages, and management
Severe electrolytes disorders	• Recognize presentation and master management of severe electrolytes disorders including disorders of sodium, potassium, calcium, phosphate, and magnesium
Chronic and acute on top of chronic kidney disorder	• Recognize clinical manifestation of chronic kidney disorder, its complications, evaluation, and management of severe complications
Kidney transplant	• Manage patients post-kidney transplant and recognize complications related to the transplant and immune suppression

Infectious disease section

Topic	Learning objectives
Approaches to fever in the ICU	• Define fever in the ICU, recognize presentation of infectious disease, and initiate appropriate work up and therapy for various life-threatening infections
Antibiotic therapy in critical care	• Understand the principles of antimicrobial therapy including classes, pharmacodynamics, pharmacokinetics, spectrum, dosing, and dosing adjustment

Infections in the immune competent ICU patient	• Recognize pathogenesis, clinical presentation, and diagnostic methods for treatment of common infections and related microbiological principles, including community and hospital acquired CNS infection, respiratory infection, intra-abdominal infection, urinary tract infection, skin and soft tissue infections, infective endocarditis, and prosthetic valve, intra-cardiac devices, intravascular, and other device-related infections
Infection in the immune compromised patient	• Recognize the pathogenesis, clinical presentations, diagnostic methods and treatment of common infections and related microbiological principles, including community and hospital acquired CNS infection, respiratory infection, intra-abdominal infection, urinary tract infection, skin and soft tissue infections, infections in the transplant recipient, and acquired and congenital immune deficiencies
Prevention and control of HAIs	• Understand the principles of infection control, types of isolation, the use of protective tools, and management of exposure to infectious hazards • Understand the principles of prevention of device-related infection
Antimicrobial resistance	• Understand the risks, mechanisms, treatment, and prevention of antimicrobial resistance

GI section

Topic	Learning objectives
Upper and lower GI bleeding	• Understand pathogenesis, causes of GI bleeding, master resuscitation, initiate pharmacological therapy, and plan mechanical and interventional therapy
Acute liver or acute on top of chronic liver failure	• Master recognition of acute, fulminant liver failure, possible etiology, and management • Recognize the scoring system and guidelines used to initiate a transplant process
Acute abdomen	• Understand surgical and non-surgical acute abdominal emergencies, including bowel ischemia, perforation, obstruction, pancreatitis, cholangitis, and abdominal infections
Stress ulceration	• Master assessing the risk, prevention, and treatment of stress ulceration

Endocrine function section

Topic	Learning objectives
Blood sugar related disorders	• Understand and master recognition of hyperglycemic disorder (diabetic ketoacidosis, and hyperosmolar nonketotic state), hypoglycemia, and management of blood sugar in the ICU
Endocrine emergencies	• Understand the thyroid storm, adrenal insufficiency, myxedema coma, pheochromocytoma acute, and perioperative management

Neurology section

Topic	Learning objectives
CNS infection	• Identify clinical presentations, pathophysiology, microbiology, diagnosis, therapy and complications of meningitis, encephalitis, and brain bacterial, viral, and fungal infection
Cerebrovascular accident	• Recognize risk factors, clinical presentations, diagnostic modalities, and management of ischemic and hemorrhagic stroke and subarachnoid, subdural, and epidural hemorrhage
Status epilepticus	• Understand the principles of seizure disorder and clinical presentation of refractory seizure and status epilepticus • Master therapeutic modalities, monitoring options, and possible complications
Decompensating neuromuscular disorder	• Understand the basics of neuromuscular disorders, assessment of exacerbation presentation • Develop the ability to assess severe cases requiring life support measures
Traumatic brain injuries	• Understand mechanisms and pathophysiology of brain injury • Master therapeutic and monitoring options
Traumatic spine injury	• Recognize clinical presentation, appropriate diagnostic methods, and emergent therapeutic options for spine injury
Brain death	• Understand the principles of brain death pathophysiology, diagnosis, and maintenance of the potential organ donor
Altered mental status	• Approach and generate a differential diagnosis list and properly investigate and manage variable causes
Metabolic encephalopathy	• Understand common metabolic encephalopathy and manage it
CNS pharmacology	• Comprehend the principles of sedative agents, antiepileptics, thrombolytic, antithrombotic agents, neuromuscular blockades, neuroleptic agents and their therapeutic use and complications

Hematology and oncology section

Topic	Learning objectives
Transfusion medicine	• Understand the basics of transfusion medicine, different types and properties of various blood product components, indications for use, and side effects
Benign hematology	• Recognize the presentation of complicated hematological disorders including sickle cell disease and other congenital hemoglobinopathies, coagulation disorders, and platelet disorders
Malignant hematology	• Understand the variable hematological malignancies and related emergencies including tumor lysis syndrome and leukostasis
Venous thromboembolism	• Recognize risk factors, diagnostic methods and management of severe and life-threatening forms of venous thromboembolism and methods of prophylaxis
Bone marrow transplant	• Understand the basics of bone marrow transplant and post-transplant complication related to immune changes, and effects on different organ systems such as respiratory complications, graft-versus-host disease), and diffuse alveolar hemorrhage
Oncology	• Recognize common oncological complications related to direct tumor effects, metastatic complications, and metabolic and paraneoplastic complications

Trauma and burn section

Topic	Learning objectives
Initial assessment and resuscitation of trauma	• Develop proficiency in initial evaluation and management of multi-trauma patients • Master management of organ specific injury such as cardiac, thoracic, abdominal and orthopedic injuries • Understand the trauma system and organization
Thermal and environmental injuries	• Recognize different types and degree of burns and related complications, electrical injuries, chemical burns and injuries, hyperthermia, and hypothermia

Perioperative medicine section

Topic	Learning objectives
Perioperative physiology and monitoring	• Evaluate surgical patients' perioperative risks • Understand perioperative physiological changes, complications, and required monitoring
Post-cardiac surgery	• Understand postoperative changes and properly manage complications
Non-cardiac surgery in cardiac patients	• Assess and manage surgical patients with cardiac disorders
Surgical emergencies	• Recognize surgical emergencies including bowel and esophageal perforation, intestinal obstruction, pancreatitis, bowel ischemia, abdominal sepsis, compartment syndrome, limb ischemia, and necrotizing soft tissue infection
Post-transplant patients	• Understand the principles of the care of patients post solid organ transplant, including kidney, liver, and lung transplant

Toxicology section

Topic	Learning objectives
Toxicology	• Understand common toxidromes, initial evaluation, monitoring, management, and available antidotes
Drug overdose	• Recognize common drug overdoses, their presentation, and management

1.3. Fellows' selected topics

1. Fellows will be given the opportunity to develop a list of topics on their own
2. They can choose any topics relevant to their needs
3. All these topics must be planned and cannot be random
4. All the topics need to be approved by the local education committee
5. The institution might work with fellows to determine the topics as well

2. Practice-based learning

Regular educational activities

A. Morning report

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

a patient management plan. The performance of fellows should be supervised by a senior member of the team to guide them through proper evaluation and management. Different formats of clinical materials can be presented during the morning report including case presentation, 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 around 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.

B. Case presentation

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

C. Journal club

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

D. Ground round

The ground round is usually presented by a senior staff member, reviewing a topic with literature review. For fellowship training, it provides a chance for fellows to prepare a ground round, enhance presentation skills, and build experience in the field necessary to develop expertise. In addition to the clinical knowledge gained by presenting a ground round, this practice also develops the personality of fellows to become a scholar in their field.

E. Mortality and morbidity reviews and meeting

The objective of fellows 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 to determine system-related issues and errors, recognize complications and methods of prevention, and plan for monitoring parameters and performance improvement.

F. Academic half-day activity

The academic half-day activity is a weekly protected time for fellows to attend a presentation on one of the core curriculum topics. The local training committee is responsible for arrangement of this activity to ensure exposure of fellows to required topics in the curriculum and stimulate

them to read and expand their knowledge and skills regarding the topic. In each training region the participating training center should organize the activity and decide upon the venue and time.

G. Sign in/sign out meeting

In the sign in/sign out meeting fellows should be given the chance to handover patients under their care to the receiving team after they concisely highlight the important clinical data, plan of care, and goal of therapy. Fellows are also required to receive handover from the team caring for the patient, which should be a routine daily activity.

3. Work-based learning

A. Daily round-based learning

With daily round-based learning, fellows present a focused history and physical examination findings to the rounding team; document historical and physical examination findings per the accepted formats, 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, fellows will elicit a comprehensive patient history and perform a complete physical examination on admission, clearly write patients' assessment and differential diagnosis of medical problems, and initiate the plan of management and discuss it. This includes investigations of the treatment plan with the seniors, communication of the plan to the nurse charged with patients' care, performance of basic procedures necessary for diagnosis and management, and attending to consultations within and outside the department, including emergency consultations and consultations with other specialties.

C. Workshops and courses

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

A. Required at entry level

- Basic life support
- ACLS

B. Mandatory

- ATLS
- Fundamental critical care support
- Mechanical ventilation
- Difficult airway management
- Critical care ultrasound
  - E-FAST workshop
  - Ultrasound-guided central venous catheter insertion
  - Echocardiogram and TEE principles workshop

- CRRT
- ECMO
- Crisis resource management/rapid response team

C. Recommended

- Emergency neurological life support
- Evidence-based medicine
- Research methodology and statistics
- Communication skills workshop
- Professionalism and ethics
- Examination preparation

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

5. Administrative topics

- Recognition and management of staff stress in the ICU
- Quality monitoring and quality indicators
- Interprofessional collaboration among critical care team members and communication
- ICU organization and management
- Defining and measuring patient safety in the critical care unit
- 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

LEARNING PORTFOLIO (APPENDIX 8)

Logbook/DOPS

Fellows are expected to document all cases and procedures completed in a logbook to be presented at the end of each academic year

- The recommended minimum number of logged cases and procedures that should be registered during the two-year training program is required to achieve skills development (Appendix 3)
- Feedback by the Program Director will be given to the fellows at the end of each academic year, and instructions will be given to fulfill deficient procedures

Research/quality projects

Fellows must complete a project at the end of training, which can be any of the following:

- A critical care-related evidence-based policy and procedures
- Local guidelines for critical care
- A case report
- A qualitative or quantitative research project

Scholarly activity

- Fellows are expected to present grand rounds at least once every academic year in their department
- Fellows are expected to present at the journal club at least twice every academic year in their regions
- Fellows are expected to participate in teaching for residents and medical students
- Fellows are highly encouraged to participate in national/international meetings to present research projects or other topics of individual interest

ASSESSMENT

Fellows' evaluation and assessment throughout the program is undertaken per the Saudi Commission's training and examination rules and regulations. The assessment includes the following areas that are later described in greater detail:

A. Annual assessment

1. Formative continuous assessment
2. Summative continuous assessment
3. End-of-year examination

B. FITER/comprehensive competency report

C. Summative CCM fellowship examination

1. Written examination
2. Clinical examination

Procedural assessment

1. DOPS
2. Logbook

The purpose of the assessment system is to

- Enhance learning by providing formative assessment, enabling fellows to receive immediate feedback, measure their own performance, and identify areas for development
- Drive learning and enhance the training process by clarifying what is required of fellows and motivating them to ensure that they receive suitable training and experience
- Provide robust, summative evidence that fellows are meeting curriculum standards during the training program
- Ensure fellows are acquiring competencies within the domains of good medical practice
- Assess fellows' actual performance in the workplace
- Ensure that fellows possess the essential underlying knowledge, skills, and attitude required for the CCM specialty
- Identify fellows who should be advised to consider a career change
- Evaluation of the quality of the training program

Assessment methods

The following assessment methods are used in the integrated assessment system:

A. Annual assessment

1. Continuous appraisal
   Formative Continuous Evaluation
   - 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, fellows' performance will be evaluated jointly by relevant staff for the following competencies:
  - Performance of fellows during daily work
  - Performance and participation in academic activities
  - Performance of diagnostic and therapeutic procedural skills by fellows
  - Performance in a 10- to 20-minute direct observation assessment of fellow-patient interactions. Trainers are encouraged to perform at least two assessments per clinical rotation, preferably near the end of the rotation. Trainers should provide timely and specific feedback to fellows after each assessment of a fellow-patient encounter (Mini-CEX and CBD; Appendices 4 and 5).
- The CanMEDS-based competencies end-of-rotation evaluation form must be completed within two weeks following the end of each rotation (preferably in an electronic format). The Program Director will discuss the evaluation with fellows, 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%.
- Evaluation report prepared for each fellow at the end of each academic year, which may also involve clinical, oral examination, objective structured practical examinations, and objective structured clinical examination (OSCE).

2. **End-of-year examination:** The end-of-year examination will be limited to the fellows at the end of 1st year of training(F1). The number of exam items, eligibility, and passing score will be per the Commission's training and examination rules and regulations. Examination details and blueprints are published on the Commission website: www.scfhs.org.sa

   The components of promotion requirements
   - The total score of promotion for the first-year fellowship will be distributed as follows {promotion from 1st year of training to the 2nd year (F1 to F2)}:
     - Knowledge: written promotion exam
     - Skills:
       - Workplace assessment (Mini-CEX/CBD; two a rotation)
       - Logbook and DOPS (Appendix 3)
     - Attitude: rotation evaluations through ITERs

   - The total score of promotion for second-year fellowship will be distributed as follows (eligibility for final examination):
     - Knowledge: participation in academic activities (at least 1–2 journal clubs/year, juniors teaching, presentation at grand round and morbidity and mortality round)
     - Skills:
       - Workplace assessment (Mini-CEX/CBD; two a rotation)
       - Logbook and DOPS (Appendix 3)
       - Research/quality project (Appendix 6)
     - Attitude: rotation evaluations (ITERs)

Note: Promotion criteria can be changed per the scientific council recommendation and it will be sent to the candidates and published on the Commission website: www.scfhs.org.sa

B. Principles of promotion examination

This written MCQ examination is held once a year. The number of exam items, eligibility, and passing score will be per the Commission's training and examination rules and regulations. Examination details and blueprints are published on the Commission website: www.scfhs.org.sa

Format: The Saudi subspecialty fellowship final written examination shall consist of one paper with 80–120 MCQs (single best answer out of four options).

End-of-year promotion exam blueprint

No.	Section	Percentage
1	Renal, endocrine, and metabolic disorders	12%
2	Cardiovascular disorders and hemodynamics	15%
3	Pulmonary disease and mechanical ventilation	15%
4	Infectious disease	10%
5	Neurologic disorders	10%
6	GI disorders	7%
7	Hematologic and oncologic disorders	5%
8	Surgery, trauma, burn, obstetrics, and transplantation	10%
9	Pharmacology and toxicology	4%
10	Critical care radiology	2%
11	Research, ethics and professionalism, and patient safety	10%
Total		**100%**

Note: Blueprint distributions of the examination may differ up to +/-3 % in each category.

Summative assessment

C. FITER/comprehensive competency report

In addition to the approval of completion of the clinical requirements (fellows' logbook) by the local supervising committee, the FITER is also prepared by the Program's Directors for each fellow at the end of their final year (Appendix 1). This may also involve clinical, oral exams, and completing other academic assignment(s).

D. Final fellowship examination

The final examination comprised two parts:

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

2. **Clinical examination:** This examination assesses a broad range of high-level clinical skills, including data gathering, patient management, communication, and counseling skills. The examination is held at least once a year, preferably in an OSCE format in the form of patient management problems, a structured oral examination (SOE), and/or simulation-based exam. The clinical exam will be held at the end of the second academic year. The final clinical exam is restricted to second-year fellows after they have passed the final written exam. The exam passing score will be per the Commission's training and examination rules and regulations. Examination details and blueprints are published on the Commission website: www.scfhs.org.sa.

Final written exam blueprint

No.	Section	Percentage
1	Renal, endocrine, and metabolic disorders	12%
2	Cardiovascular disorders and hemodynamics	15%
3	Pulmonary disease and mechanical ventilation	15%
4	Infectious disease	10%
5	Neurologic disorders	7%
6	GI disorders	10%
7	Hematologic and oncologic disorders	5%
8	Surgery, trauma, burn, obstetrics, and transplantation	10%
9	Pharmacology and toxicology	4%
10	Critical care radiology	2%
11	Research, ethics and professionalism, and patient safety	10%
Total		**100%**

Note: Blueprint distributions of the examination may differ up to +/-3 % in each category.

Final clinical exam format

a. The adult critical care final clinical examination shall comprise eight graded stations each with 10-minute encounters
b. The eight stations consist of five OSCE stations with one examiner each and three SOE stations with two examiners each
c. All stations shall be designed to assess integrated clinical encounters
d. SOE stations are designed with preset questions and ideal answers
e. Each OSCE station is assessed with 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 for integrated clinical encounter	Patient care	2	1	1	1	5
	Patient safety and procedural skills				1	1
	Communication and interpersonal skills	1				1
	Professional behaviors		1			1
	Total stations	3	2	1	2	8

Final clinical exam blueprint

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

Definitions

Care dimensions	Focus of care for the patient, family, community, and/or population
Approach and assessment	How to approach patients from history tracking to examination and investigations to reach diagnosis
Diagnosis	How to set the most appropriate diagnosis and excluding the other possible different diagnosis
Investigations and data interpretations	How to interpret the available investigations and radiological investigations to reach the diagnosis and set the management plan
Prevention and management	How to treat patients based on the diagnosis and change to prevent further deterioration or transmission to other patients

Domain	Reflects the scope of practice and behaviors of a practicing clinician
Patient care	Exploration of illness and disease through gathering, interpreting, and synthesizing relevant information that includes, but is not limited to, history taking, physical examination, and investigation. Management is a process that includes, but is not limited to, generating, planning, and organizing care in collaboration with patients, families, communities, populations, and healthcare professionals (e.g., finding common ground, agreeing on problems and goals of care, time and resource management, and arriving at mutual decisions for treatment)

Patient safety and procedural skills	Patient safety emphasizes the reporting, analysis, and prevention of medical errors that often lead to adverse healthcare events. Procedural skills encompass the areas of clinical care that require physical and practical skills of the clinician integrated with other clinical competencies to accomplish a specific and well-characterized technical task or procedure
Communication and interpersonal skills	Interactions with patients, families, caregivers, other professionals, communities, and populations. Elements include, but are not limited to, active listening, relationship development, education, verbal, non-verbal and written communication (e.g., patient-centered interview, disclosure of error, and informed consent)
Professional behaviors	Attitudes, knowledge, and skills based on clinical and/or medical administrative competence, ethics, societal, and legal duties resulting in the wise application of behaviors that demonstrate a commitment to excellence, respect, integrity, accountability, and altruism (e.g., self-awareness, reflection, life-long learning, scholarly habits, and physician health for sustainable practice)

Research

- All fellows are required to conduct at least one research project during training
- In each academic year, one research day is held where the research project for each fellow is evaluated
- The components and scores are determined per the SCFHS Critical Care Fellowship Research Manual (Appendix 6)

Procedural assessment

DOPS

- This assessment is conducted at the beginning of fellowship training
- The procedures form should be completed during each rotation (Appendix 2)
- Fellows will perform procedures under the supervision of the attending consultant and receive immediate feedback
- Successful completion of the DOPS form is mandatory for all fellows and it can be part of the logbook
- Each fellow shall complete required procedures that can be assessed by DOPS, as defined by the critical care curriculum assessment blueprint (Refer to table 1)
- 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 fellows are required to keep a logbook during training (electronic records are highly recommended)

- The purposes of the logbook are to monitor fellows' performance on a continual basis, maintain a record of procedures and technical interventions performed, enable fellows and supervisor to determine learning gaps, and provide feedback to fellows
- For the first-year fellowship, fellows are required to complete a minimum of 50% of the required procedures; for the second-year fellowship, fellows 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 first- and second-year fellows

Certification

Candidates passing final written and clinical examinations are awarded the "Saudi Fellowship of Adult Critical Care Medicine" certificate.

Holidays, vacations, and interruption of training

Holidays, vacations, and interruption of training are designated per the SCFHS postgraduate rules and regulations (www.scfhs.org.sa).

Mentorship during fellowship training

Fellows entering the program will be asked to select a faculty mentor who will be available to them while they are in the program. Fellows without a mentor six months after starting the program will be assigned a mentor by a Program Director.

The following is a summary of the mentors' role, and principles outlining the way the mentorship system should operate.

Mentors' role

1. Mentors' main responsibility will be to assist fellows in making decisions regarding training issues and career choices. The mentor should be supportive to fellows and advocate for the fellow
2. While the frequency of meetings between fellows and mentors may vary, mentors should meet with mentees a minimum of four times per academic year (30–60 minutes each meeting)
3. Mentors should review rotation evaluations regularly and discuss pertinent weaknesses/strengths with mentees to improve academic standing, which also applies to in-training exam performance
4. Mentors are encouraged to review mentees' rotations/electives annually to ensure that mentees meet their educational/research objectives and that exposure to a broad range of CCM is achieved by program completion

Selection process

Fellows have the opportunity to choose their own mentor. It is recognized that many fellows entering the fellowship training program will have little knowledge of faculty members initially. However, after a period of six months, fellows should be in a position to approach and choose a mentor. Fellows will be reminded after six months to do so. If they have not selected a mentor by this time, a mentor will be selected for them by the Program Director. If fellows require help approaching a mentor or feel that they need to change mentors, they should contact the Program Director.

Stress during fellowship training

Recognizing that fellowship training can be a period that creates physical, mental, and emotional stress, the Program Director provides continuous support for fellows. In some instances, fellows' personal concerns will be reviewed at the Scientific Committee Meeting.

Stress counseling

Some fellows may experience stress during their training owing to multiple factors.

- Any fellow experiencing such issues can meet with the Program Director to seek advice
- The Scientific Committee will be asked to help with such issues if the Program Director cannot do so
- The Scientific Committee will generate a report with recommendations
- The committee may request additional members to join the committee and help with resolution of the matter as needed

Suggested learning resources

Textbooks

Recommended

- Vincent, J. L., Abraham, E., Kochanek, P., Moore, F. A., & Fink, M. P. (2011). *Textbook of Critical Care E-Book*. Elsevier Health Sciences.
- Irwin, R. S., Lilly, C. M., Mayo, P. H., & Rippe, J. R. (2017). *Irwin and Rippe's Intensive Care Medicine*. Eighth edition. Wolters Kluwer.
- Gabrielli, A., Layon, A. J., & Yu, M. (2011). *Civetta, Taylor, and Kirby's Manual of Critical Care*. Lippincott Williams & Wilkins.
- Irwin, R. S., & Rippe, J. M. (Eds.). (2008). *Procedures, techniques, and minimally invasive monitoring in intensive care medicine.* Lippincott Williams & Wilkins.

Others

- Kluwer, W. W. (2014). *Marino's the ICU Book, Paul L. Marino, 2014: Marino's the ICU Book* (Vol. 1). Bukupedia.
- Society of Critical Care Medicine. (2001*). Fundamental critical care support. Fundamental Critical Care Support. Second Edition. Zimmerman JL (Ed). Des Plaines, IL, Society of Critical Care Medicine*, 1-5.

- Zanotti-Cavazzoni, S. L., & Pino, R. M. (2016). Self-assessment in adult multiprofessional critical care. Eighth edition. *Society of Critical Care Medicine*.
- Hess, D. R., & Kacmarek, R. M. (2018). *Essentials of mechanical ventilation*. McGraw Hill Professional.
- Webb, A., & Gattinoni, L. (Eds.). (2016). *Oxford textbook of critical care*. Oxford University Press.

Recommended journals

- Critical *Care Medicine*
- *Critical Care*
- *Critical Care Clinics*
- *Intensive Care Medicine*
- *Anesthesia and Analgesia*
- *New England Journal of Medicine*
- *Resuscitation*
- *Journal of Trauma*

References

1. Vincent, J. L., Abraham, E., Kochanek, P., Moore, F. A., & Fink, M. P. (2017). *Textbook of Critical Care*. 7th edition. Amsterdam: Elsevier Saunders.
2. Irwin, R. S., Lilly, C. M., Mayo, P. H., & Rippe, J. R. (2017). *Irwin and Rippe's Intensive Care Medicine*. Eighth edition. Wolters Kluwer.
3. Frank, J. R., Snell, L., & Sherbino, J. (2015). *CanMEDS 2015 Physician Competency Framework*. Ottawa: Royal College of Physicians and Surgeons of Canada.
4. The fellowship of intensive care medicine.ac.uk.
5. Family medicine curriculum, SCFHS.

APPENDICES

Appendix 1: Final in-training evaluation report (FITER)

1. The FITER is a summative evaluation prepared at the end of the Fellowship Program, which grants fellows with the full range of competencies (knowledge, skills, and attitudes) required of an intensivist and provides readiness to sit for the Saudi fellowship examinations
2. The FITER provides information that will be considered by the Saudi Examination Board during the deliberation of a candidate whose performance at the Saudi certification examination falls into the borderline category
3. The FITER is requested by the Saudi Board at the end of fellowship training
4. The FITER is completed by the fellowship training Program Director
5. The FITER is not a composite of the regular in-training evaluations; rather, it is a testimony of the evaluation of competencies at the end of a fellowship education program
6. The FITER will be completed as late as possible in fellows' training but no later than two months before the final exam
7. 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 Program Director at all times

Saudi Adult Critical Care Medicine Fellowship Program

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

Fellow name:
Fellow SCFHS number:
Evaluation covering the last year as a fellow:

In the view of the Fellowship Program Committee, the fellow 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, Mini-CEX) 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 Fellow
SCFHS number:
Date: Signature:

Fellow'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

FITER: (medical expert competency)
Fellow name:
Fellow SCFHS number:

	Expectations					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	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						
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%**

FITER: (procedures and clinical skills competencies)
Fellow name:
Fellow SCFHS number:

	Expectations					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	Not applicable
Procedures and clinical skills						
Demonstrates the ability to perform diagnostic and therapeutic procedures/skills described in the Critical Care Medicine Fellowship 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						
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%**

FITER: (communicator competency)
Fellow name:
Fellow SCFHS number:

	Expectations					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	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						
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%**

FITER: (collaborator competency)
Fellow name:
Fellow SCFHS number:

	Expectations					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	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%**

FITER: (manager competency)
Fellow name:
Fellow SCFHS number:

	Expectations					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	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						
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%**

FITER: (health advocate competency)
Fellow name:
Fellow SCFHS number:

	Expectations					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	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%**

FITER: (scholar competency)
Fellow name:
Fellow SCFHS number:

	Expectations					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	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						
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%**

FITER: (professional competency)
Fellow name:
Fellow SCFHS number:

	Expectations					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	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 2: 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

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*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

Page 2

Appendix 3: Procedures Logbook

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

Required procedures in logbook and DOPS

The following illustrate the procedures, categories, number of required procedures, sites, and number of DOPS over 2 years of training **(fellows are supposed to complete 50% during F1 and 50% during F2)**

Procedure	Required number	Site and type	Required DOPS
Performs central venous catheterization	40	IJV, SCV, femoral	1 for each site
Performs arterial catheterization	30	Radial, femoral	1 for each
Performs pulmonary artery catherization	1	IJV, SCV, femoral	1 (if possible)
Performs emergency airway management	2	Cricothyroidectomy	1 (If possible)
Performs difficult and failed airway management per local protocols	4	Not applicable	2
Directs laryngoscopy and Intubation	50	Not applicable	4
Pleural tap	10	Not applicable	2
Ascitic Tap	10	Not applicable	2
Performs lumbar puncture	5	Not applicable	1
Bronchoscopy (intubated patient)	10	Not applicable	2
Chest tube insertion	10	Not applicable	2
Percutaneous tracheostomy	20	Not applicable	4
ABG sampling	10	Radial and femoral	1
US chest	50	Lung and pleural cavity	4
US abdomen	50	Ascites and E-FAST	4
US cardiac	50	Assess contractility, effusion, and chambers	4
US guided vascular access	40	IJV, SCV, femoral V	4

US for inferior vena cava assessment	50	For fluid status assessment	4
Performs transthoracic cardiac pacing, transvenous, and percutaneous pacemakers	2	Not applicable	1
Sengstaken tube placement	1	---	1 (if possible)
Cardiac output monitors (e.g., PICO, LIDCO, NICO)	20	---	2

Appendix 4: 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:

Page 1

*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 5: 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:**

Page 1

- ○ 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 6: Research Manual

Definition of research

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

Types of research

- Basic medical research: Areas tackled in the most fundamental parts of medical research include cellular and molecular biology, medical genetics, immunology, neuroscience, and psychology.
- Preclinical research: Preclinical research prepares the groundwork for clinical research with 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 it 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 is a way of combining data from many different research studies. A meta-analysis is a statistical process that combines the findings from individual studies.
- Systematic review: This is a summary of the clinical literature. A systematic review is a critical assessment and evaluation of all research studies that address a particular clinical issue. The researchers use an organized method of locating, assembling, and evaluating a body of literature on a particular topic using a set of specific criteria. A systematic review typically includes a description of the findings from 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 to randomize study participants to their 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 what different experiences they had. They compare the odds of having an experience with a specific outcome to 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 interval. 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, opinions: These are put forth by experts in the field bioethical training and certification.

Each fellow 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 each of the following steps: 1) selection of research, 2) creation of a research team, 3) approval of 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 fellows' two years of training, two months is allocated for the completion of the individual fellow research project. The two months are distributed as follows:

- One month in the first year
- One month in the second year

During the first year, the candidate should select the research project, write the proposal, and apply for IRB approval. Fellows should be able to do the following present their work at the end of first-year research day. During the second year, the candidate should complete the analysis and writing of the final research manuscript. Fellows 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 Fellowship Scientific Council members. The entire research work for the first and second years should be scored from 0% to 100% per mark distribution. The final score for the first and second years will be calculated as 10% of the total promotion mark for the year. The completion of the end of training research is evaluated with 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 fellow should be ready to present the required component of their research work on these research days.

Journal selection: Either a local or international indexed journal is acceptable. Fellows should be encouraged to publish in international journals.

Appendix 6: Research Evaluation Sheet

Saudi Adult Critical Care Medicine Fellowship Program

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		
	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 7: Presentation Evaluation form

Saudi Adult Critical Care Medicine Fellowship Program

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					
- 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 8: Portfolio Assessment

Saudi Adult Critical Care Medicine Fellowship Program

Portfolio assessment

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

Fellow 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 fellows 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	
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/fellow file**
- **Copy for the fellow**

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					

F. Health advocate					
22. Can identify the psychosocial, economic, environmental, and biological factors that influence the health of patients and society					
23. Offers advocacy on behalf of patients at practice and general population levels					
G. Professional					
24. Delivers the highest quality care with integrity, honesty, and compassion, and recognizes limitations and seeks advice and consultation when necessary					
25. Reflects the highest standards of excellence in clinical care and ethical conduct					
Total score					

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

Comments:

_____

_____

_____

_____

Fellow name: _____ Signature: _____ Date:_____

Program Director: _____ Signature: _____ Date: _____

Director—Academic Affairs: _____Signature: _____ Date: _____