

**Rotation:
Critical Care Medicine**

Goal:

To provide medical residents with the broad knowledge base and the necessary practical experience that they need in order to successfully evaluate and treat common acute and chronic medical problems (conditions) that require admission to a critical care unit.

Objectives:

By the end of the Critical Care Medicine rotation, all residents are expected to expand and cultivate skills and knowledge learned during previous training and to achieve the following objectives based on the six general competencies. The resident should exhibit an increasing level of responsibility and independency as he or she progresses throughout the year.

Competency	Required Skill(s)	Teaching Method(s)	Formative Evaluation Method(s)	Frequency of Evaluation
Patient Care	SPECIALTY SPECIFIC OBJECTIVES			
	Provide complete, organized medical record documentation including content (Diagnosis specific, Organ specific problem list, Diagnosis and Organ specific plan of care)	Direct patient care Didactic session Conferences Role Modeling	Direct questioning of resident after initial patient interview Web-based faculty global assessment Mini CEX	
	Implement medically effective, evidence-based patient management plans based on sound clinical decision-making.	Direct patient care Didactic session Conferences Role Modeling	Direct questioning of resident after initial patient interview Web-based faculty global assessment Mini CEX	
	Choose appropriate diagnostic tests based on best medical evidence and cost-effectiveness	Direct patient care Didactic session Conferences Role Modeling	Direct questioning of resident after initial patient interview Web-based faculty global assessment Mini CEX	
	Select appropriate medications and monitoring devices for various forms of hemodynamic derangements.	Direct patient care Didactic session Conferences Role Modeling	Direct questioning of resident after initial patient interview Web-based faculty global assessment Mini CEX	
	Appropriately evaluate (data acquisition, diagnosis) and manage acute medical emergencies that require admission	Direct patient care Didactic session	Direct questioning of resident after initial	

	<p>to a critical care unit including but not limited to the following:</p> <ul style="list-style-type: none"> • Acute ischemic syndromes (cardiac, neurologic, other) • Cardiac arrhythmia's • Cardiopulmonary arrest • Cardiac tamponade • Congestive heart failure • Coagulopathies • Drug overdose/toxicology emergencies • Upper or lower gastrointestinal bleeding • Hemodynamic instability • Hypertension • Hypothermia • Hyperthermia • Infectious diseases • Acute and chronic liver failure • Acid-base and metabolic emergencies • Pregnancy • Renal failure • Respiratory or ventilatory failure (ARDS, Asthma, COPD, Empyema, Interstitial Lung Disease, Pneumonia, Pulmonary vasculitis, Pulmonary alveolar hemorrhage syndromes) • Pulmonary embolism • Sepsis • Stroke • Problems in solid organ transplant recipient 	<p>Conferences Role Modeling</p>	<p>patient interview Web-based faculty global assessment Mini CEX</p>	
	<p>Under direct supervision perform the following procedures (The number in parenthesis (n = XX) is the number of procedures that should be successfully performed over a 36 month residency period in order to demonstrate competence to perform the procedure):</p> <ul style="list-style-type: none"> • Central line placement (femoral (n = 5)) • Internal jugular (n = 5) • Subclavian (n = 5)) • Pulmonary artery catheter placement and interpretation of pulmonary artery catheter data (n= 10) • Arterial line placement (radial (n = 5)) • Femoral (n = 5)) • ABG collection and interpretation (n = 5) • Intubation and mechanical ventilation (n = 8) 	<p>Direct patient care Didactic session Conferences Role Modeling</p>	<p>Direct questioning of resident after initial patient interview Web-based faculty global assessment Mini CEX</p>	

	<ul style="list-style-type: none"> • Nasogastric and oral-gastric intubation (n = 3) • Lumbar puncture (n = 5) • Thoracentesis (n = 5) • Paracentesis (n = 6) • Chest tube thoracotomy (optional (n = 5)) 			
	Perform critical care medicine consultation in subspecialty critical care units such as CICU, SICU, Neurosurgical ICU, Burn ICU, Trauma ICU, and High Risk Obstetrics ICU	Direct patient care Didactic session Conferences Role Modeling	Direct questioning of resident after initial patient interview Web-based faculty global assessment Mini CEX	
	Obtain histories and perform physical examinations on their patients and present them daily on attending rounds	Direct patient care Didactic session Conferences Role Modeling	Direct questioning of resident after initial patient interview Web-based faculty global assessment Mini CEX	
	Formulate an appropriate diagnosis and treatment plan based upon medical history, physical examination, and diagnostic studies.	Direct patient care Didactic session Conferences Role Modeling	Direct questioning of resident after initial patient interview Web-based faculty global assessment Mini CEX	
	Interpret radiological exams including CXR, CT scans	Direct patient care Didactic session Conferences Role Modeling	Direct questioning of resident after initial patient interview Web-based faculty global assessment Mini CEX	
	Review autopsy material to understand illness and the care of critically ill patients	Direct patient care Didactic session Conferences Role Modeling	Direct questioning of resident after initial patient interview Web-based faculty global assessment Mini CEX	
	Utilize alternate care venues, i.e., step-down units, ventilator units, SNF unit's, etc, appropriately	Direct patient care Didactic session Conferences Role Modeling	Direct questioning of resident after initial patient interview Web-based faculty global assessment Mini CEX	

Medical Knowledge	SPECIALTY SPECIFIC OBJECTIVES			
	Develop a detailed knowledge base in critical care pharmacology and in the pathophysiology of critical illness	Direct patient care Didactic sessions Conferences Journal Club Board Review	Direct questioning of resident after initial patient interview Web-based faculty global assessment ACP-ASIM in service examination	
	Demonstrate a knowledge of a wide variety of medical and surgical disease processes including respiratory failure, pulmonary disease, neurologic diseases, skin and soft tissue disorders, cardiac diseases, gastrointestinal diseases, endocrine disorders, renal/electrolytes, hematologic and coagulation, obstetric/gynecologic, toxicology, infectious disease, and transplant medicine	Direct patient care Didactic sessions Conferences Journal Club Board Review	Direct questioning of resident after initial patient interview Web-based faculty global assessment ACP-ASIM in service examination	
Practice Based Learning and Improvement	SPECIALTY SPECIFIC OBJECTIVES			
	See General Internal Medicine Objectives for a comprehensive list.			
	Use interaction with nursing staff and other professionals as two-way educational opportunities			
Interpersonal and Communication Skills	SPECIALTY SPECIFIC OBJECTIVES			
	See General Internal Medicine Objectives for a comprehensive list.			
	Effectively communicate with patients, families, and other health care personnel, especially when addressing end-of-life decisions.			
Professionalism	SPECIALTY SPECIFIC OBJECTIVES			
	See General Internal Medicine Objectives for a comprehensive list.			
Systems-Based Practice	SPECIALTY SPECIFIC OBJECTIVES			
	See General Internal Medicine Objectives for a comprehensive list.			
	Differentiate care delivered in the unit from other venues such as medical ward, step-down, ventilator unit.			

Learning Venues:

1. The Medical intensive care units at The Regional Medical Center at Memphis, Kindred/Vencor Pulmonary Unit, the Veterans Affairs Medical Center (VAMC Critical Care Rotation) and the Methodist University Hospital (MUH Critical Care Rotation) will form the core of the rotation. In general these units operate under a closed unit model. The Critical Care Team provides medical care. Critical Care Patient Protocols are used to manage many common problems. Residents obtain histories and perform physical examinations on their patients and present them daily on attending rounds. Residents will round at least daily and often twice daily with the Critical Care Team that includes an attending intensivist who is board certified in Pulmonary & Critical Care Medicine, a Pulmonary and Critical Care Medicine Resident (Fellow: R4 through R7 level) as well as other ancillary personnel (pharmacist, social worker, nurse, nutritionist, respiratory therapy). Learning will be primarily case-based and patient-centered.
2. Daily patient examinations, progress notes and discharge summaries will be reviewed by the attending physician and feedback provided to residents.
3. The attending physician will review radiological exams (CXR, CT scans) with residents daily.
4. Current articles from the literature will be provided throughout the rotation. Review Articles on common critical care problems are available on each unit and on the web-site (www.utm.edu/pulmonary)
5. The rotation includes didactic sessions on pathophysiology and on common medical problems encountered in the critical care unit. Didactic teaching sessions will be used to supplement the case-based and patient-centered educational experience. These didactic sessions include critical care resident conferences, monthly journal club, monthly clinical trials and bio-statistic conference, monthly research conference, a weekly multi-disciplinary Thoracic and Critical Care Conference, Medicine Housestaff Noon Conference Series, daily afternoon report and weekly Medicine Grand Rounds.
6. Hands-on demonstration projects are available for ventilator management in selected critical care units.
7. Our web site (www.utm.edu/pulmonary) contains the curriculum; syllabus, other educational resources, flow sheets and patient care protocols.
8. An easy to read and practical rotation textbook is required reading for all residents (The ICU Book; Second Edition by Paul L. Marino; Lea & Febiger) and is available at the UTHSC Bookstore.
9. Multi-disciplinary Patient Care Conferences occur weekly in some units.
10. Residents are also encouraged to observe bronchoscopy (endoscopic) so that they appreciate the advantages and disadvantages, risks and benefits of bronchoscopy. For residents interested in learning how to perform bronchoscopy, limited hands-on training maybe provided at the discretion of the Pulmonary & Critical Care attending physician and Pulmonary & Critical Care Fellow. Residents will not be certified to perform bronchoscopy (no letter certifying competence will be issued) regardless of the number of procedures performed during a rotation.
11. Web-based learning: "Up-to-Date" is available in several of our units.

Competency Evaluation:

- 1) The ABIM global assessment form will be completed by attending physicians with a satisfactory to superior rating expected both in the six competencies and on the chart audit. The six competencies include patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice (details on how to evaluate Practice-based learning and improvement and systems-based practice are included in item #3 and item #4 below).
- 2) An end-of-rotation written examination will be given to assess patient care and medical knowledge with a score of 80%+ expected.
- 3) Procedures log either in written form or on-line must be kept by each resident.
- 4) Evaluation of Practice-Based learning and Improvement in the Critical Care Unit:
 - 4a. Does the resident appropriately differentiate care delivered in the unit from other venues (medical ward, step-down, ventilator unit)?
 - 4b. Does the resident quickly access appropriate reference material for current patients?
 - 4c. Does the resident use interaction with nursing staff and other professionals as two-way educational opportunities?
 - 4d. Does the resident participate actively in quality improvement practices pertaining to patient care (e.g., morbidity and mortality conferences)?

- 4e. Does the resident's response to critical problems reflect more than rote learning and protocol management? Does the resident suggest data-driven modification of protocols?
 - 4f. Does the resident review autopsy material to understand illness and the care of critically ill patients?
 - 4g. Does the resident voluntarily plan instructional experiences in procedures not yet mastered?
- 5) Evaluation of Systems-Based Practice in the Critical Care Unit:
- 5a. Does the resident work effectively with nursing staff and ancillary health care personnel?
 - 5b. Is the resident aware of resource utilization in critically ill patients?
 - 5c. Does the resident use alternate care venues (step-down units, ventilator units, SNF unit's etc.) appropriately?

Outcome Assessment:

1. On the in-service examination, the critical care subsection score should be at or above the 50th percentile for all residents who have had the rotation.
2. On the ABIM certifying examination, the pulmonary and critical care subsection scores should be at or above the 50th percentile.
3. On the annual evaluation form completed by the residents, the Critical Care Medicine rotations should be rated at or above the 50th percentile for the program.

Reading Materials

Required Rotation Textbook

The ICU Book; Second Edition by Paul L. Marino; Lea & Febiger

Supplemental Rotation Textbook

Critical Care. Civetta JM, Taylor RW, Kirby RR (eds). Third edition. Philadelphia: Lipincot-Raven Second edition,

Helpful Pulmonary & Critical Care Journals

Critical Care Clinics

Clinics in Chest Medicine

Critical Care Medicine (Journal)

The Journal of Critical Illness

American Journal of Respiratory and Critical Care Medicine (Journal)

Chest (Journal)

Other Helpful Reading Materials

New England Journal of Medicine (Journal), Journal of the American Medical Association (Journal), The American Journal of Medicine (Journal), Archives of Internal Medicine (Journal), Annals of Internal Medicine (Journal), Harrison's Principles of Internal Medicine, 12 th edition (Textbook), Cecil's Textbook of Internal Medicine (Textbook), Diagnosis of Diseases of the Chest, Fraser and Pare, W.B. Saunders and company (Textbook) Educational Content of UTHSC Critical Care Medicine Rotations:

Our Critical Care Medicine Rotations

(1. The Med Vencor/Kindred, 2. VAMC and 3 MUC) are designed to give residents exposure to a wide variety of medical and surgical diseases. As part of these three rotations, in addition to general MICU responsibilities, you will perform critical care medicine consultation in subspecialty critical care units such as CICU, SICU, Neurosurgical ICU, Burn ICU, Trauma ICU, and High Risk Obstetrics ICU.

Disease processes encountered in our Critical Care Units

RESPIRATORY FAILURE due to a variety of causes: AIDS, Alveolar hemorrhage syndromes Amniotic fluid embolism, Arrhythmia, Aspiration, Asthma, ARDS, Air embolism, Bronchiectasis, Cancer, Congestive heart failure, COPD, Collagen vascular disease, CVA, Drug Overdose, Drug induced lung Disease, Fat embolism, Hemoptysis, Hypersensitivity pneumonitis, Interstitial lung disease, Obstructive sleep apnea, Pickwickian syndrome, Pneumonia (bacterial, fungal, mycobacterial, protozoan), Pulmonary embolism, Sepsis, Spinal cord injury. Management of Respiratory Failure with invasive (ETT or tracheotomy) and noninvasive (FaceMask) mechanical ventilation.

PULMONARY DISEASE: Asthma, Acute and chronic aspiration, Alveolar hemorrhage syndromes, Atelectasis, Bechets disease, Bronchiectasis, COPD, Collagen vascular disease, Empyema, Hemoptysis, Interstitial Lung Diseases (UIP, NIP, DIP, BOOP, LIP, Obliterative bronchiolitis, Hypersensitivity pneumonitis, Drug induced lung disease, Sarcoidosis), Lung Cancer, Cancer metastatic to Lung, Pneumonia, Pleural effusions due to a variety of causes, Pulmonary abscess, Pulmonary embolism, Pulmonary gangrene, Pulmonary hypertension due to a variety of causes, Upper airway obstruction due to a variety of causes, Indications, placement, and management of tracheostomies.

NEUROLOGIC:

- (1) traumatic and non-traumatic CVA (in-situ and embolic thrombosis, intra cranial hemorrhage)
- (2) Seizure disorders and Status epilepticus
- (3) Bacterial, fungal, viral and mycobacterial meningitis
- (4) Encephalitis/Encephalopathy (infectious, metabolic, traumatic)
- (5) Neuromuscular disease: Guillian-Barre, Muscular sclerosis, Myasthenia gravis, critical illness polyneuropathy, Paraneoplastic syndromes
- (6) Traumatic closed head injury
- (7) Spinal cord injury (The Med & VAMC Spinal Cord Injury Unit)

SKIN and SOFT TISSUE: cellulitis, burn injuries and infections, decubitus and other types of ulcers (diabetic, venous stasis, vascular insufficiency), embolic phenomenon involving skin, myonecrosis, necrotizing fasciitis, pulmonary and enteric cutaneous fistula's, rashes, vasculitis, wound infections

CARDIAC

- CAD; Acute Left and Right sided AMI
- Postpartum and viral myocarditis and cardiomyopathy
- Cardiogenic Pulmonary edema
- Cor Pulmonale
- Arrhythmia's
- Valvular Heart Disease
- Endocarditis (bacterial and fungal)
- Hypertension (urgency, emergency and malignant)
- Pericarditis, Pericardial effusions from a variety of causes
- Aortic aneurysm and dissection
- Peripheral vascular disease and acute peripheral arterial occlusion

GASTROINTESTINAL: Upper and Lower GI bleeding from a variety of causes, Hepatitis (Viral, Toxin, and autoimmune), cirrhosis, acute and chronic liver failure; acetaminophen overdose, diarrhea, Crohns disease, Ulcerative colitis, C. difficile colitis, Pancreatitis, Cholecystitis (calculus and acalculus); appendicitis, adynamic ileus, small bowel obstruction, bowel infarction

ENDOCRINE: Diabetic ketoacidosis, Hyperosmolar nonketotic coma, thyrotoxicosis, myxedema coma, hypothyroidism, addisonian crisis, diabetes insipidus, SIADH

RENAL/Electrolytes - Acute and chronic renal failure, ATN, glomerulonephritis, interstitial nephritis, obstructive nephropathy, RTA's, Pulmonary-Renal Syndromes, MODS; Anion and Non- anion gap metabolic acidosis, disorders of sodium, potassium, magnesium, calcium, and phosphorous. Hemodialysis, ultrafiltration, CAVH and CAVH-D

HEMATOLOGIC AND COAGULATION: Anemia from a variety of causes, Hemolytic anemia, DIC, Hemophilia, Hypercoaguable states, sickle cell disease, thrombocytopenia from a variety of causes, Thrombotic thrombocytopenic purpura, Immune thrombocytopenia purpura, Leukopenia from a variety of causes, Lymphoma (Hodgkin's and non Hodgkin's)

OBSTETRIC/GYNECOLOGIC - ARDS from a variety of causes, Pelvic inflammatory disease; endometritis and endometrial abscess; cervical, endometrial, and ovarian cancer; pulmonary embolus; amniotic fluid embolus; retained products of conception; HELP Syndrome, Mitral Valve Stenosis

Toxicology: Overdose due to: Acetaminophen, Aspirin, Tricyclic antidepressants, opiates, barbiturates, benzodiazepines, ethanol, methanol, ethylene glycol, INH, theophyllines, B-Blockers, Calcium Channel Antagonist and other substances.

INFECTIOUS DISEASE: Pulmonary and extra-pulmonary infections in the critically ill, endocarditis, rickettsial diseases, HIV and associated infections, infections in the immunocompromised and transplant host, West Nile Encephalitis

Transplant Medicine: Solid organ transplant patients (Renal, Liver, Pancreas) Some limited exposure to lung transplants.