

DEPARTMENT OF SURGERY
DIVISION OF ACUTE CARE SURGERY
SURGICAL CRITICAL CARE ROTATION (SCC)

University Hospital

House Officer I
House Officer II
House Officer III

Curriculum/Rotation Goals and Objectives for
Surgery Residents

Surgical Critical Care Service

House Officer I

Goal: The goal of the HO I rotation in Surgical Critical Care is to build on the resident's overall general surgical knowledge and clinical experience and provide more concentrated exposure in diseases and procedures/techniques related to management of critically ill surgical patients. Learning opportunities will include exposure to critically ill and injured patients with sepsis, severe sepsis, septic shock, other shock states (hypovolemic, distributive, cardiogenic, neurogenic), traumatic injuries, acute respiratory failure, acute kidney injury, acute respiratory distress syndrome, liver transplantation, critical endocrine disorders, fluid and electrolytes disorders, hematologic disorders (hypo- and hyper-coagulable states, DIC, HIT, anemia, transfusion of blood products) and others.

Learning Objectives:

Patient Care:

By the end of the Surgical Critical Care rotation, the HO I resident will be able to:

1. Demonstrate and apply specific medical knowledge and operations/procedures in surgical critical care using the content areas of the SCORE curriculum that maximize resident experience at this HO level

a. SCORE Category 16: Surgical Critical Care: Diseases/Conditions

BROAD

- Abdominal Compartment Syndrome
- Anaphylaxis
- ARDS and Respiratory Failure
- Cardiac Arrhythmias - Common
- Cardiac Failure
- Cardiogenic Shock
- Coagulopathy
- Derangements of Electrolytes and Acid-Base Balance
- Endocrine Dysfunction
- Gastrointestinal Failure
- Hepatic Failure and Hepatorenal Syndrome
- Hypovolemic Shock
- Neurogenic Shock
- Neurologic Dysfunction
- Pneumonia - Hospital-Acquired
- Postoperative Delirium
- Renal Failure
- Septic Shock

b. SCORE Category 16: Surgical Critical Care: Operations/Procedures

ESSENTIAL - COMMON

- Airway Management/Ventilator Management
- Arterial Catheter Placement
- Central Venous Catheter Placement
- Compartment Pressures (Abdomen, Extremity)- Measurement
- Defibrillation and Cardioversion
- Endotracheal Intubation
- Enteral Feeding Tube Placement
- Invasive Hemodynamic Monitoring

- Oxygen Administration Devices
- Paracentesis
- Pulmonary Artery Catheter Placement
- Thoracentesis
- Ultrasound Use for Intravascular Access
- Urinary Catheterization

2. Demonstrate effective non-technical skills to provide optimal care of critically ill and injured patients
3. Gather essential and accurate information about their patients in the ICU
4. Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence and clinical judgment
5. Develop and carry out patient management plans
6. Counsel and educate patients and their families
7. Effectively lead patient care issues with clear communication to team, patients, family and all medical staff and peers, including surgery attending staff
8. Synthesize complex clinical data and propose clear ICU treatment plans
9. Actively lead ICU team decision-making with supervision and support
10. Initiate appropriate treatment and diagnostic workup of the acutely decompensating ICU patient
11. Appropriately liberate patients from mechanical ventilation and explain criteria
12. Demonstrate safe and effective technical skills to perform procedures suitable to surgical critical care and trauma with attending supervision, including the following:
 - a. Placement of central venous lines (internal jugular, subclavian, femoral) including triple lumen catheters, hemodialysis catheters, and Cordis introducer catheters, using real-time ultrasound guidance, understand appropriate techniques to avoid CLABSI
 - b. Placement and interpretation of CVP and Pulmonary Artery (PA) catheters
 - c. Placement and interpretation of Esophageal Doppler monitors for cardiovascular monitoring in septic, cardiogenic and hypovolemic shock
 - d. Placement of arterial lines (radial, axillary, femoral, dorsalis pedis)
 - e. Placement of tube thoracostomy, including chest tubes and 14 French pigtail catheters
 - f. Emergent intubation and airway management
 - g. Tracheostomy, including percutaneous tracheostomy, open tracheostomy at bedside in ICU, care of complications related to airway issues
 - h. Paracentesis/Thoracentesis, diagnostic and therapeutic, using real-time ultrasound guidance
 - i. Advanced mechanical ventilation, including open lung ventilation, pressure control, inverse ratio ventilation, bilevel and airway pressure release ventilation, high frequency oscillatory ventilation, ventilator weaning, noninvasive ventilation, recruitment maneuvers
 - j. Manage modes of mechanical ventilation and understand their appropriate use
 - k. Interpret flow, pressure and volume waveforms displayed on the ventilator
 - l. ECMO support for ARDS and cardiac failure patients
 - m. Appropriately use Continuous renal replacement therapy (CVVHD), including initiation, writing orders, changing dialysate electrolyte content based on patient clinical condition and laboratory testing
 - n. Cardiac ultrasound (transthoracic echocardiography) to evaluate cardiac function
 - o. Inferior vena cava real-time ultrasound to assess intravascular volume status
 - p. Pulmonary ultrasound to assess for pneumothorax, pleural effusion, hemothorax

Medical Knowledge:

By the end of the Surgical Critical Care rotation, the HO I resident will be able to:

1. Demonstrate and apply significant knowledge (outlined in Patient Care above) in the following critical care topical areas:
 - a. Cardiothoracic-respiratory resuscitation
 - b. Physiology, pathophysiology, diagnosis, and therapy of disorders of the cardiovascular, respiratory, gastrointestinal, genitourinary, neurologic, endocrine, musculoskeletal, and immune systems as well as of infectious diseases
 - c. Metabolic, nutritional, and endocrine effects of critical illness
 - d. Hematologic and coagulation disorders
 - e. Critical obstetric and gynecologic disorders
 - f. Trauma, thermal, electrical, radiation, inhalation and immersion injuries
 - g. Monitoring and medical instrumentation
 - h. Critical surgical conditions common in surgical specialties
 - i. Pharmacokinetics and dynamics of drug metabolism and excretion in critical illness
 - j. Ethical and legal aspects of surgical critical care
 - k. Principles and techniques of administration and management
 - l. Biostatistics and experimental design
2. Demonstrate the acquisition of knowledge about evolving and established biomedical, clinical and cognate (e.g. epidemiological and social-behavioral) sciences, and apply such knowledge to patient care. The care of the critically ill patient necessitates a systematic approach to medical knowledge acquisition. Residents will be expected to understand the relevant physiology, pathophysiology, epidemiology, and where appropriate, microbiology, of the various organ systems involved in critical illness. The resident is expected to:
 - a. Demonstrate effective decision making based on adequate knowledge
 - b. Effectively correlate basic sciences knowledge with clinical scenarios
 - c. Demonstrate self-regulated learning practices for additional knowledge
 - d. Appropriately use learning resources
 - e. Explain pharmacology and physiology as it pertains to surgical critical care
 - f. Read the current literature
 - g. Demonstrate investigatory and analytical thinking approaches to clinical situations
3. Interpret laboratory tests and data (including radiologic studies) accurately and consistently
4. Explain pharmacokinetics and pharmacodynamics in the critically ill patient
5. Demonstrate acquisition and application of clinical knowledge in the essential topic areas below:
 - a. Cardiovascular System**
 - Hemodynamic parameters such as preload, afterload, and contractility, DO₂, VO₂, sVO₂, scVO₂
 - Left and right ventricular cardiac mechanics and function
 - Differential diagnosis of, diagnostic approach to, and treatment of the different shock states
 - Evaluation and management of the patient in shock
 - Mechanism of action and appropriate use of vasopressors
 - Mechanism of action and appropriate use of inotropes, and antihypertensive medications
 - Diagnosis and appropriate treatment of myocardial ischemia, especially in the perioperative patient
 - Impact of impaired cardiovascular function on other organ systems
 - Cardiovascular hemodynamics including cardiovascular support (drugs and fluids)
 - Cardiopulmonary resuscitation, treatment of acute myocardial infarction
 - Basic oxygen transport and delivery, with particular emphasis on the systemic inflammatory response syndrome and multi organ system failure
 - Management of hypovolemia and hypervolemia
 - Management of hypertension, tachycardia, including drug selection
 - Management of atrial and ventricular dysrhythmias
 - b. Respiratory System**
 - Basic pulmonary physiology including control of breathing, work of breathing, lung

volumes, compliance and resistance of the respiratory system, and the determinants of oxygenation and ventilation

- Differential diagnosis of, diagnostic approach to, and appropriate treatment of respiratory failure
- Pathophysiologic derangements seen in obstructive and restrictive respiratory disease
- Causes, diagnosis, and treatment of ARDS
- Physiologic effects of mechanical ventilation, especially on the cardiovascular system
- Epidemiology, prevention, diagnosis, and treatment of nosocomial pneumonia
- Differential diagnosis of, diagnostic approach to, and treatment of pulmonary embolism
- Respiration/ventilation including ventilator management, advanced modes of ventilation, and pulmonary function tests
- Management of Respiratory failure including severe ARDs
- Diagnosis and management of acute respiratory failure in the newborn, including respiratory distress syndrome, pulmonary hypertension, lung hypoplasia, including surfactant, NO and ECMO therapy

c. Renal, Electrolyte, and Acid-Base

- Determinants of renal blood flow, perfusion pressure, and GFR
- Differential diagnosis of, diagnostic approach to, and treatment of acute kidney injury
- Criteria for hemodialysis and renal replacement therapies (CRRT, CVVHD)
- Epidemiology of acute kidney injury in the ICU, and its effects on mortality
- Differential diagnosis of, diagnostic approach to, and treatment of acid-base disturbances
- Differential diagnosis of, diagnostic approach to, and treatment of electrolyte disorders
- Effect of renal, electrolyte, and acid-base disorders on other organ systems
- Diagnosis and management of oliguria and renal failure
- Differential diagnosis of, diagnostic approach to, and treatment of hepatorenal syndrome

d. Endocrine System

- Surgical stress response specific to the critically ill
- Differential diagnosis of, diagnostic approach to and treatment of diabetic ketoacidosis and hyperosmolar coma
- Importance of glucose control in the critically ill patient
- Relative adrenal insufficiency, and the role of steroid replacement in critically ill patients
- Common endocrine disorders in critically ill, including thyroid, adrenal, parathyroid

e. Neurologic System

- Differential diagnosis of, diagnostic approach to, and treatment of neurologic deficits in the ICU, especially acute focal neurologic deficits, seizures and status epilepticus, and the coma
- Differential diagnosis of, diagnostic approach to, and treatment of ICU delirium
- Understand the risk factors for, prevention of, and long term consequences of delirium in the ICU
- Mechanism of action, physiologic consequences, and appropriate uses of sedative and analgesic agents in the ICU
- Appropriate management of Pain, agitation and delirium in the ICU (pharmacologic and other)
- Management of increased intracranial pressure (ICP) and other neurological emergencies

f. GI, Hepatic Disease and Nutrition

- Basic hepatobiliary physiology
- Differential diagnosis of, diagnostic approach to, and treatment of acute hepatic failure
- Pathophysiology of cirrhosis, diagnosis and management of hepatorenal syndrome
- Assessment of liver function in the liver transplant patient
- Effect of hepatic disease on other organ systems
- Differential diagnosis of, diagnostic approach to, and treatment of acute and chronic pancreatitis
- Differential diagnosis of, diagnostic approach to, and treatment of abdominal compartment syndrome
- Differential diagnosis of, diagnostic approach to, and treatment of GI bleeds

- Microbiology and treatment of intra-abdominal sepsis (diverticulitis, cholangitis, perforated bowel)
- Nutrition in the critically ill patient, appropriate use of enteral and parenteral nutrition.
- Methods to determine optimal nutritional support (equations vs. indirect calorimetry)
- Acute and Chronic Hepatic failure, pre- and postoperative management of the liver transplant patient
- GI-bleeding prophylaxis and treatment
- Evaluation of Acute Abdomen

g. Hematologic System

- Differential diagnosis of, diagnostic approach to, and treatment of anemia in the ICU
- Differential diagnosis of, diagnostic approach to, and treatment of thrombocytopenia in the ICU
- Differential diagnosis of, diagnostic approach to, and treatment of coagulopathies
- Differential diagnosis of, diagnostic approach to, and treatment of hypercoagulable states
- Management of massive bleeding and transfusion, including massive transfusion protocols
- Diagnosis and management of heparin-induced thrombocytopenia in the ICU
- Differential diagnosis of, diagnostic approach to, and treatment of purpura fulminans in the ICU
- Differential diagnosis of, diagnostic approach to, and treatment of DIC in the ICU
- Diagnosis and management of bone marrow dysfunction and/or failure
- Differential diagnosis of, diagnostic approach to, and treatment of venous thromboembolism
- Optimal clinical algorithms for deep venous thrombosis prophylaxis (pharmacologic)
- Different novel oral anticoagulant agents and their appropriate use and reversal in ICU

h. Infectious Disease

- Epidemiology, pathophysiology, and treatment of sepsis, severe sepsis, septic shock
- Role of early goal directed therapy in the treatment of septic shock
- Microbiology, diagnosis, and treatment of respiratory, intra-abdominal, urologic, skin and soft tissue, cardiac and CNS infections
- Microbiology, diagnosis, and treatment of ICU-acquired infections (VAP, UTI, CLABSI)
- Mechanisms of action and side effects of commonly used antibiotics
- Infectious disease in the ICU, appropriate empiric antibiotic therapy
- Ventilator-associated pneumonia and catheter-related bacteremia definitions
- Methods to reduce nosocomial infections in the ICU
- Differences between hospital-acquired (nosocomial), healthcare-associated, and community-associated infections both in microbiology and empiric antibiotics
- Multi-drug-resistant organisms (MDROs)
- Management of Sepsis using the Surviving Sepsis Guidelines and Bundles
- Diagnosis and treatment of specialty-specific infectious diseases

i. Immunologic and inflammatory

- Systemic inflammatory response syndrome
- Manifestations of multi-organ failure syndrome
- Use and consequences of activated protein C in the treatment of severe sepsis
- Diagnosis and management of severe sepsis/septic shock, (resuscitation, vasopressors and steroid use)
- Diagnosis and management of immunologic and inflammatory disorders and complications that occur in the solid organ transplant patient (renal, pancreas, hepatic)
- Immunologic deficiencies and response to stress and sepsis in specialty patients
- Other chronic immune disorders (SLE, scleroderma, RA, IBD, other rheumatologic diseases)

Systems-Based Practice:

By the end of the Surgical Critical Care rotation, the HO I resident will be able to:

1. Explain one's position within the team, specialty, profession and society
2. Demonstrate sensitivity to and awareness of the cost of healthcare delivery, particularly in the ICU
3. Advocate for cost-conscious and effective patient care
4. Develop skills as a "team leader"
5. Develop skills (administrative and organizational) to organize and lead a busy clinical service
6. Demonstrate an awareness of and responsiveness to the larger context and system of health care
7. Effectively use system resources to provide optimal ICU patient care
8. Explain how their patient care and other professional practices affect other healthcare professionals, the healthcare organization, and the larger society and how these elements of the system affect their own practice
9. Explain how types of medical practice and delivery systems differ from one another, including methods of controlling healthcare and allocating resources
10. Practice cost-effective healthcare & resource allocation that does not compromise quality of care
11. Advocate for quality patient care and assist patients in dealing with system issues & complexities
12. Partner with healthcare managers and providers to assess, coordinate and improve healthcare to achieve optimal system performance in the ICU

Practice-Based Learning and Improvement:

By the end of the Surgical Critical Care rotation, the HO I resident will be able to:

1. Evaluate and investigate their ICU patient care practices and document the evidence base for these
2. Appraise and assimilate scientific evidence to improve their ICU patient care and practices
3. Recall evidence-based medicine applied to critical care
4. Use scientific data to help solve clinical problems
5. Actively contribute to the SICU team's education by providing recent and current data as a result of literature searches of the peer-reviewed literature and on-line educational materials
6. Apply knowledge of study designs and statistical methods to the appraisal of clinical studies
7. Use information technology to manage information, access on-line medication information and support their own education in critical care
8. Locate, appraise and assimilate evidence from scientific studies related to ICU patient problems
9. Obtain and apply knowledge of evidence on diagnostic and therapeutic effectiveness of ICU clinical care practices and procedures
10. Gain evidence-based information regarding critical care population issues
11. Facilitate the learning of students and other healthcare professionals

Professionalism:

By the end of the Surgical Critical Care rotation, the HO I resident will be able to:

1. Demonstrate compassion, respect and integrity in the work environment
2. Demonstrate the ability to flawlessly uphold the professional standards of the surgical critical care service
3. Respect differences in gender, age, culture, disability or educational levels
4. Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population
5. Contribute to all educational activities of the surgical critical care service
6. Show commitment to ethics of confidentiality and informed consent
7. Demonstrate a responsiveness to the needs of patients and society that supersedes self-interest

8. Demonstrate accountability to patients, society, and the profession
9. Demonstrate a commitment to excellence and ongoing professional development
10. Demonstrate a commitment to ethical principles pertaining to provision/withholding of ICU care

Interpersonal and Communication Skills:

By the end of the Surgical Critical Care rotation, the HO I resident will be able to:

1. Maintain professional and cordial relationships with patients, staff, co-workers and faculty
2. Listen and to accept constructive criticism
3. Communicate effectively with and demonstrate caring and respectful behaviors when interacting with ICU patients and their families
4. Communicate efficiently with the team members, attendings, referring and consulting physicians
5. Demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patients' families and professional associates
6. Use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning and writing skills
7. Efficiently and accurately present patient data on rounds
8. Create complete detailed notes in the electronic medical record that reflect clinical care provided
9. Efficiently and effectively relate information to consultants
10. Effectively relate information to patients' family in lay terms, including end-of-life discussions
11. Work effectively with others as a member and/or leader of the ICU team
12. Effectively communicate with nursing, therapists and social workers for optimal ICU patient care
13. Teach medical students and peer residents

Surgical Critical Care Service

House Officer II

Goal: The goal of the HO II rotation in Surgical Critical Care is to build on the resident's overall general surgical knowledge and clinical experience and provide more concentrated exposure in diseases and procedures/techniques related to management of critically ill and injured surgical patients. The HO II resident will focus more on independent assessment and decision-making in the management of critically ill patients and assume a large role in ICU team management. The HOII resident will serve as educator for the HO I resident, particularly with regard to teaching basic technical skills including central venous and arterial line placement. The HOII resident will acquire more in-depth knowledge of use of ultrasound for diagnostic imaging and assessment in the ICU, with transthoracic echo and inferior vena cava imaging to assess preload status in critically ill patients and to assess response to therapies.

Learning Objectives:

Patient Care:

By the end of the Surgical Critical Care rotation, the HO II resident will be able to:

1. Demonstrate and apply specific medical knowledge and operations/procedures in surgical critical care using the content areas of the SCORE curriculum that maximize resident experience at this HO level

a. SCORE Category 16: Surgical Critical Care: Diseases/Conditions

BROAD

- Abdominal Compartment Syndrome
- Anaphylaxis
- ARDS and Respiratory Failure
- Cardiac Arrhythmias - Common
- Cardiac Failure
- Cardiogenic Shock
- Coagulopathy
- Derangements of Electrolytes and Acid-Base Balance
- Endocrine Dysfunction
- Gastrointestinal Failure
- Hepatic Failure and Hepatorenal Syndrome
- Hypovolemic Shock
- Neurogenic Shock
- Neurologic Dysfunction
- Pneumonia - Hospital-Acquired
- Postoperative Delirium
- Renal Failure
- Septic Shock

b. SCORE Category 16: Surgical Critical Care: Operations/Procedures

ESSENTIAL- COMMON

- Airway Management/Ventilator Management
- Arterial Catheter Placement
- Central Venous Catheter Placement
- Compartment Pressures (Abdomen, Extremity)- Measurement
- Defibrillation and Cardioversion
- Endotracheal Intubation
- Enteral Feeding Tube Placement

- Invasive Hemodynamic Monitoring
- Oxygen Administration Devices
- Paracentesis
- Pulmonary Artery Catheter Placement
- Thoracentesis
- Ultrasound Use for Intravascular Access
- Urinary Catheterization

ESSENTIAL – UNCOMMON

- Damage Control Laparotomy and Management of the Open Abdomen

COMPLEX

- Cardiac Pacing
- Temporary Transvenous Pacemaker

2. Demonstrate effective non-technical skills to provide optimal care of critically ill and injured patients
3. Gather essential and accurate information about their patients in the ICU
4. Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence and clinical judgment
5. Develop and carry out patient management plans
6. Counsel and educate patients and their families
7. Effectively lead patient care issues with clear communication to team, patients, family and all medical staff and peers, including surgery attending staff
8. Accurately synthesize complex clinical data and propose clear ICU treatment plans
9. Actively lead ICU team decision-making
10. Initiate appropriate treatment and diagnostic workup of the acutely decompensating ICU patient
11. Appropriately liberate patients from mechanical ventilation and explain criteria
12. Demonstrate safe and effective technical skills to perform procedures suitable to surgical critical care and trauma with attending supervision, including the following:
 - a. Placement of central venous lines (internal jugular, subclavian, femoral) including triple lumen catheters, hemodialysis catheters, and Cordis introducer catheters, using real-time ultrasound guidance, understand appropriate techniques to avoid CLABSI
 - b. Placement and interpretation of CVP and Pulmonary Artery (PA) catheters
 - c. Placement and interpretation of Esophageal Doppler monitors for cardiovascular monitoring in septic, cardiogenic and hypovolemic shock
 - d. Placement of arterial lines (radial, axillary, femoral, dorsalis pedis)
 - e. Placement of tube thoracostomy, including chest tubes and 14 French pigtail catheters
 - f. Emergent intubation and airway management
 - g. Tracheostomy, including percutaneous tracheostomy, open tracheostomy at bedside in ICU, care of complications related to airway issues
 - h. Paracentesis/Thoracentesis, diagnostic and therapeutic, using real-time ultrasound guidance
 - i. Advanced mechanical ventilation, including open lung ventilation, pressure control, inverse ratio ventilation, bilevel and airway pressure release ventilation, high frequency oscillatory ventilation, ventilator weaning, noninvasive ventilation, recruitment maneuvers
 - j. Manage modes of mechanical ventilation and understand their appropriate use
 - k. Interpret flow, pressure and volume waveforms displayed on the ventilator
 - l. ECMO support for ARDS and cardiac failure patients
 - m. Appropriately use Continuous renal replacement therapy (CVVHD), including initiation, writing orders, changing dialysate electrolyte content based on patient clinical condition and laboratory testing
 - n. Cardiac ultrasound (transthoracic echocardiography) to evaluate cardiac function
 - o. Inferior vena cava real-time ultrasound to assess intravascular volume status
 - p. Pulmonary ultrasound to assess for pneumothorax, pleural effusion, hemothorax

Medical Knowledge:

By the end of the Surgical Critical Care rotation, the HO II resident will be able to:

1. Demonstrate and apply significant knowledge in the following critical care topical areas:
 - a. Cardiothoracic-respiratory resuscitation
 - b. Physiology, pathophysiology, diagnosis, and therapy of disorders of the cardiovascular, respiratory, gastrointestinal, genitourinary, neurologic, endocrine, musculoskeletal, and immune systems as well as of infectious diseases
 - c. Metabolic, nutritional, and endocrine effects of critical illness
 - d. Hematologic and coagulation disorders
 - e. Critical obstetric and gynecologic disorders
 - f. Trauma, thermal, electrical, radiation, inhalation and immersion injuries
 - g. Monitoring and medical instrumentation
 - h. Critical surgical conditions common in surgical specialties
 - i. Pharmacokinetics and dynamics of drug metabolism and excretion in critical illness
 - j. Ethical and legal aspects of surgical critical care
 - k. Principles and techniques of administration and management
 - l. Biostatistics and experimental design
2. Demonstrate the acquisition of knowledge about evolving and established biomedical, clinical and cognate (e.g. epidemiological and social-behavioral) sciences, and apply such knowledge to patient care. The care of the critically ill patient necessitates a systematic approach to medical knowledge acquisition. Residents will be expected to understand the relevant physiology, pathophysiology, epidemiology, and where appropriate, microbiology, of the various organ systems involved in critical illness. The resident is expected to:
 - a. Demonstrate effective decision making based on adequate knowledge
 - b. Effectively correlate basic sciences knowledge with clinical scenarios
 - c. Demonstrate self-regulated learning practices for additional knowledge
 - d. Appropriately use learning resources
 - e. Explain pharmacology and physiology as it pertains to surgical critical care
 - f. Read the current literature
 - g. Demonstrate investigatory and analytical thinking approaches to clinical situations
3. Interpret laboratory tests and data (including radiologic studies) accurately and consistently
4. Explain pharmacokinetics and pharmacodynamics in the critically ill patient
5. Demonstrate acquisition and application of clinical knowledge in the essential topic areas below:
 - a. Cardiovascular System**
 - Hemodynamic parameters such as preload, afterload, and contractility, DO₂, VO₂, sVO₂, scVO₂
 - Left and right ventricular cardiac mechanics and function
 - Differential diagnosis of, diagnostic approach to, and treatment of the different shock states
 - Evaluation and management of the patient in shock
 - Mechanism of action and appropriate use of vasopressors
 - Mechanism of action and appropriate use of inotropes, and antihypertensive medications
 - Diagnosis and appropriate treatment of myocardial ischemia, especially in the perioperative patient
 - Impact of impaired cardiovascular function on other organ systems
 - Cardiovascular hemodynamics including cardiovascular support (drugs and fluids)
 - Cardiopulmonary resuscitation, treatment of acute myocardial infarction
 - Basic oxygen transport and delivery, with particular emphasis on the systemic inflammatory response syndrome and multi organ system failure
 - Management of hypovolemia and hypervolemia
 - Management of hypertension, tachycardia, including drug selection
 - Management regarding atrial and ventricular dysrhythmias
 - b. Respiratory System**
 - Basic pulmonary physiology including control of breathing, work of breathing, lung volumes,

compliance and resistance of the respiratory system, and the determinants of oxygenation and ventilation

- Differential diagnosis of, diagnostic approach to, and appropriate treatment of respiratory failure
- Pathophysiologic derangements seen in obstructive and restrictive respiratory disease
- Causes, diagnosis, and treatment of ARDS
- Physiologic effects of mechanical ventilation, especially on the cardiovascular system
- Epidemiology, prevention, diagnosis, and treatment of nosocomial pneumonia
- Differential diagnosis of, diagnostic approach to, and treatment of pulmonary embolism
- Respiration/ventilation including ventilator management, advanced modes of ventilation, and pulmonary function tests
- Management of Respiratory failure including severe ARDs
- Diagnosis and management of acute respiratory failure in the newborn, including respiratory distress syndrome, pulmonary hypertension, lung hypoplasia, including surfactant, NO and ECMO therapy

c. Renal, Electrolyte, and Acid-Base

- Determinants of renal blood flow, perfusion pressure, and GFR
- Differential diagnosis of, diagnostic approach to, and treatment of acute kidney injury
- Criteria for hemodialysis and renal replacement therapies (CRRT, CVVHD)
- Epidemiology of acute kidney injury in the ICU, and its effects on mortality
- Differential diagnosis of, diagnostic approach to, and treatment of acid-base disturbances
- Differential diagnosis of, diagnostic approach to, and treatment of electrolyte disorders
- Effect of renal, electrolyte, and acid-base disorders on other organ systems
- Diagnosis and management of oliguria and renal failure
- Differential diagnosis of, diagnostic approach to, and treatment of hepatorenal syndrome

d. Endocrine System

- Surgical stress response specific to the critically ill
- Differential diagnosis of, diagnostic approach to and treatment of diabetic ketoacidosis and hyperosmolar coma
- Importance of glucose control in the critically ill patient
- Relative adrenal insufficiency, and the role of steroid replacement in critically ill patients
- Common endocrine disorders in critically ill, including thyroid, adrenal, parathyroid

e. Neurologic System

- Differential diagnosis of, diagnostic approach to, and treatment of neurologic deficits in the ICU, especially acute focal neurologic deficits, seizures and status epilepticus, and the coma
- Differential diagnosis of, diagnostic approach to, and treatment of ICU delirium
- Risk factors for, prevention of, and long term consequences of delirium in the ICU
- Mechanism of action, physiologic consequences, and appropriate uses of sedative and analgesic agents in the ICU
- Appropriate management of Pain, agitation and delirium in the ICU (pharmacologic and other)
- Management of increased intracranial pressure (ICP) and other neurological emergencies

f. GI, Hepatic Disease and Nutrition

- Basic hepatobiliary physiology
- Differential diagnosis of, diagnostic approach to, and treatment of acute hepatic failure
- Pathophysiology of cirrhosis, diagnosis and management of hepatorenal syndrome
- Assessment of liver function in the liver transplant patient
- Effect of hepatic disease on other organ systems
- Differential diagnosis of, diagnostic approach to, and treatment of acute and chronic pancreatitis
- Differential diagnosis of, diagnostic approach to, and treatment of abdominal compartment syndrome
- Differential diagnosis of, diagnostic approach to, and treatment of GI bleeds
- Microbiology and treatment of intra-abdominal sepsis (diverticulitis, cholangitis, perforated bowel)
- Nutrition in the critically ill patient, appropriate use of enteral and parenteral nutrition.

- Methods to determine optimal nutritional support (equations vs. indirect calorimetry)
- Acute and Chronic Hepatic failure, pre- and postoperative management of the liver transplant patient
- GI-bleeding prophylaxis and treatment
- Evaluation of Acute Abdomen

g. Hematologic System

- Differential diagnosis of, diagnostic approach to, and treatment of anemia in the ICU
- Differential diagnosis of, diagnostic approach to, and treatment of thrombocytopenia in the ICU
- Differential diagnosis of, diagnostic approach to, and treatment of coagulopathies
- Differential diagnosis of, diagnostic approach to, and treatment of hypercoagulable states
- Management of massive bleeding and transfusion, including massive transfusion protocols
- Diagnosis and management of heparin-induced thrombocytopenia in the ICU
- Differential diagnosis of, diagnostic approach to, and treatment of purpura fulminans in the ICU
- Differential diagnosis of, diagnostic approach to, and treatment of DIC in the ICU
- Diagnosis and management of bone marrow dysfunction and/or failure
- Differential diagnosis of, diagnostic approach to, and treatment of venous thromboembolism
- Optimal clinical algorithms for deep venous thrombosis prophylaxis (pharmacologic)
- Different novel oral anticoagulant agents and their appropriate use and reversal in ICU

h. Infectious Disease System

- Epidemiology, pathophysiology, and treatment of sepsis, severe sepsis, septic shock
- Role of early goal directed therapy in the treatment of septic shock
- Microbiology, diagnosis, and treatment of respiratory, intraabdominal, urologic, skin and soft tissue, cardiac and CNS infections
- Microbiology, diagnosis, and treatment of ICU-acquired infections (VAP, UTI, CLABSI)
- Mechanisms of action and side effects of commonly used antibiotics
- Infectious disease in the ICU, appropriate empiric antibiotic therapy
- Ventilator-associated pneumonia and catheter-related bacteremia definitions
- Methods to reduce nosocomial infections in the ICU
- Differences between hospital-acquired (nosocomial), healthcare-associated, and community-associated infections both in microbiology and empiric antibiotics
- Multi-drug-resistant organisms (MDROs)
- Management of Sepsis using the Surviving Sepsis Guidelines and Bundles
- Diagnosis and treatment of specialty-specific infectious diseases

i. Immunologic and Inflammatory System

- Systemic inflammatory response syndrome
- Manifestations of multi-organ failure syndrome
- Use and consequences of activated protein C in the treatment of severe sepsis
- Diagnosis and management of severe sepsis/septic shock, (resuscitation, vasopressors and steroid use)
- Diagnosis and management of immunologic and inflammatory disorders and complications that occur in the solid organ transplant patient (renal, pancreas, hepatic)
- Immunologic deficiencies and response to stress and sepsis in specialty patients
- Other chronic immune disorders (SLE, scleroderma, RA, IBD, other rheumatologic diseases)

Systems-Based Practice:

By the end of the Surgical Critical Care rotation, the HO II resident will be able to:

1. Explain one's position within the team, specialty, profession and society
2. Demonstrate sensitivity to and awareness of the cost of healthcare delivery, particularly in the ICU
3. Advocate for cost-conscious and effective patient care
4. Develop skills as a "team leader"
5. Develop skills (administrative and organizational) to organize and lead a busy clinical service

6. Demonstrate an awareness of and responsiveness to the larger context and system of health care
7. Effectively use system resources to provide optimal ICU patient care
8. Explain how their patient care and other professional practices affect other healthcare professionals, the healthcare organization, and the larger society and how these elements of the system affect their own practice
9. Explain how types of medical practice and delivery systems differ from one another, including methods of controlling healthcare and allocating resources
10. Practice cost-effective healthcare & resource allocation that does not compromise quality of care
11. Advocate for quality patient care and assist patients in dealing with system issues & complexities
12. Partner with healthcare managers and providers to assess, coordinate and improve healthcare to achieve optimal system performance in the ICU

Practice-Based Learning and Improvement:

By the end of the Surgical Critical Care rotation, the HO II resident will be able to:

1. Evaluate and investigate their ICU patient care practices and document the evidence base for these
2. Appraise and assimilate scientific evidence to improve their ICU patient care and practices
3. Recall evidence-based medicine applied to critical care
4. Use scientific data to help solve clinical problems
5. Actively contribute to the SICU team's education by providing recent and current data as a result of literature searches of the peer-reviewed literature and on-line educational materials
6. Apply knowledge of study designs and statistical methods to the appraisal of clinical studies
7. Use information technology to manage information, access on-line medication information and support their own education in critical care
8. Locate, appraise and assimilate evidence from scientific studies related to ICU patient problems
9. Obtain and apply knowledge of evidence on diagnostic and therapeutic effectiveness of ICU clinical care practices and procedures
10. Gain evidence-based information regarding critical care population issues
11. Facilitate the learning of students and other healthcare professionals

Professionalism:

By the end of the Surgical Critical Care rotation, the HO II resident will be able to:

1. Demonstrate compassion, respect and integrity in the work environment
2. Flawlessly uphold the professional standards of the surgical critical care service
3. Respect differences in gender, age, culture, disability or educational levels
4. Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.
5. Contribute to all educational activities of the surgical critical care service
6. Show commitment to ethics of confidentiality and informed consent
7. Demonstrate a responsiveness to the needs of patients and society that supersedes self-interest
8. Demonstrate accountability to patients, society, and the profession
9. Demonstrate a commitment to excellence and ongoing professional development
10. Demonstrate a commitment to ethical principles pertaining to provision/withholding of ICU care

Interpersonal and Communication Skills:

By the end of the Surgical Critical Care rotation, the HO II resident will be able to:

1. Maintain professional and cordial relationships with patients, staff, co-workers and faculty
2. Listen and to accept constructive criticism
3. Communicate effectively with and demonstrate caring and respectful behaviors when interacting with ICU patients and their families
4. Communicate efficiently with the team members, attendings, referring and consulting physicians
5. Demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patients' families and professional associates
6. Use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning and writing skills
7. Efficiently and accurately present patient data on rounds
8. Create complete detailed notes in the electronic medical record that reflect clinical care provided
9. Efficiently and effectively relate information to consultants
10. Effectively relate information to patients' family in lay terms, including end-of-life discussions
11. Work effectively with others as a member and/or leader of the ICU team
12. Effectively communicate with nursing, therapists and social workers for optimal ICU patient care
13. Teach medical students and more junior residents

Surgical Critical Care Service

House Officer III

Goal: The goal of the HO III rotation in Surgical Critical Care is to build on the resident's overall general surgical knowledge and clinical experience and provide more concentrated exposure in diseases and procedures/techniques related to management of critically ill and injured surgical patients. The HO III resident will serve as ICU team leader, and will gain additional autonomy (supervised by the attending intensivist) in the diagnostic evaluation and management of critically ill and injured patients. Graded progressive autonomy will be provided commensurate with the HO III resident's competency, particularly with regard to management of CRRT/CVVHD for acute kidney injury and ECMO. The HO III resident will play an increased role in patient and family discussions regarding goals of care and end-of-life issues. HO III residents will perform more advanced procedures with attending supervision.

Learning Objectives:

Patient Care:

By the end of the Surgical Critical Care rotation, the HO III resident will be able to:

1. Demonstrate and apply specific medical knowledge and operations/procedures in surgical critical care using the content areas of the SCORE curriculum that maximize resident experience at this HO level

a. SCORE Category 16: Surgical Critical Care: Diseases/Conditions

BROAD

- Abdominal Compartment Syndrome
- Anaphylaxis
- ARDS and Respiratory Failure
- Cardiac Arrhythmias - Common
- Cardiac Failure
- Cardiogenic Shock
- Coagulopathy
- Derangements of Electrolytes and Acid-Base Balance
- Endocrine Dysfunction
- Gastrointestinal Failure
- Hepatic Failure and Hepatorenal Syndrome
- Hypovolemic Shock
- Neurogenic Shock
- Neurologic Dysfunction
- Pneumonia - Hospital-Acquired
- Postoperative Delirium
- Renal Failure
- Septic Shock

b. SCORE Category 16: Surgical Critical Care: Operations/Procedures

ESSENTIAL - COMMON

- Airway Management/Ventilator Management
- Arterial Catheter Placement
- Central Venous Catheter Placement
- Compartment Pressures (Abdomen, Extremity)- Measurement
- Defibrillation and Cardioversion
- Endotracheal Intubation
- Enteral Feeding Tube Placement

- Invasive Hemodynamic Monitoring
- Oxygen Administration Devices
- Paracentesis
- Pulmonary Artery Catheter Placement
- Thoracentesis
- Ultrasound Use for Intravascular Access
- Urinary Catheterization

ESSENTIAL – UNCOMMON

- Damage Control Laparotomy and Management of the Open Abdomen

COMPLEX

- Cardiac Pacing
- Temporary Transvenous Pacemaker

- Demonstrate effective non-technical skills to provide optimal care of critically ill and injured patients.
- Gather essential and accurate information about their patients in the ICU
- Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence and clinical judgment
- Develop and carry out patient management plans
- Counsel and educate patients and their families
- Effectively lead patient care issues with clear communication to team, patients, family and all medical staff and peers, including surgery attending staff
- Accurately synthesize complex clinical data and propose clear ICU treatment plans
- Actively lead ICU team decision-making
- Initiate appropriate treatment and diagnostic workup of the acutely decompensating ICU patient
- Appropriately liberate patients from mechanical ventilation and explain criteria
- Demonstrate safe and effective technical skills to perform procedures suitable to surgical critical care and trauma with attending supervision, including the following:
 - Placement of central venous lines (internal jugular, subclavian, femoral) including triple lumen catheters, hemodialysis catheters, and Cordis introducer catheters, using real-time ultrasound guidance, understand appropriate techniques to avoid CLABSI
 - Placement and interpretation of CVP and Pulmonary Artery (PA) catheters
 - Placement and interpretation of Esophageal Doppler monitors for cardiovascular monitoring in septic, cardiogenic and hypovolemic shock
 - Placement of arterial lines (radial, axillary, femoral, dorsalis pedis)
 - Placement of tube thoracostomy, including chest tubes and 14 French pigtail catheters
 - Emergent intubation and airway management
 - Tracheostomy, including percutaneous tracheostomy, open tracheostomy at bedside in ICU, care of complications related to airway issues
 - Paracentesis/Thoracentesis, diagnostic and therapeutic, using real-time ultrasound guidance
 - Advanced mechanical ventilation, including open lung ventilation, pressure control, inverse ratio ventilation, bilevel and airway pressure release ventilation, high frequency oscillatory ventilation, ventilator weaning, noninvasive ventilation, recruitment maneuvers
 - Manage modes of mechanical ventilation and understand their appropriate use
 - Interpret flow, pressure and volume waveforms displayed on the ventilator
 - ECMO support for ARDS and cardiac failure patients
 - Appropriately use Continuous renal replacement therapy (CVVHD), including initiation, writing orders, changing dialysate electrolyte content based on patient clinical condition and laboratory testing
 - Cardiac ultrasound (transthoracic echocardiography) to evaluate cardiac function
 - Inferior vena cava real-time ultrasound to assess intravascular volume status
 - Pulmonary ultrasound to assess for pneumothorax, pleural effusion, hemothorax

Medical Knowledge:

By the end of the Surgical Critical Care rotation, the HO III resident will be able to:

1. Demonstrate and apply significant knowledge in the following critical care topical areas:
 - a. Cardiothoracic-respiratory resuscitation
 - b. Physiology, pathophysiology, diagnosis, and therapy of disorders of the cardiovascular, respiratory, gastrointestinal, genitourinary, neurologic, endocrine, musculoskeletal, and immune systems as well as of infectious diseases
 - c. Metabolic, nutritional, and endocrine effects of critical illness
 - d. Hematologic and coagulation disorders
 - e. Critical obstetric and gynecologic disorders
 - f. Trauma, thermal, electrical, radiation, inhalation and immersion injuries
 - g. Monitoring and medical instrumentation
 - h. Critical surgical conditions common in surgical specialties
 - i. Pharmacokinetics and dynamics of drug metabolism and excretion in critical illness
 - j. Ethical and legal aspects of surgical critical care
 - k. Principles and techniques of administration and management
 - l. Biostatistics and experimental design
2. Demonstrate the acquisition of knowledge about evolving and established biomedical, clinical and cognate (e.g. epidemiological and social-behavioral) sciences, and apply such knowledge to patient care. The care of the critically ill patient necessitates a systematic approach to medical knowledge acquisition. Residents will be expected to understand the relevant physiology, pathophysiology, epidemiology, and where appropriate, microbiology, of the various organ systems involved in critical illness. The resident is expected to:
 - a. Demonstrate effective decision making based on adequate knowledge
 - b. Effectively correlate basic sciences knowledge with clinical scenarios
 - c. Demonstrate self-regulated learning practices for additional knowledge
 - d. Appropriately use learning resources
 - e. Explain pharmacology and physiology as it pertains to surgical critical care
 - f. Read the current literature
 - g. Demonstrate investigatory and analytical thinking approaches to clinical situations
3. Interpret laboratory tests and data (including radiologic studies) accurately and consistently
4. Explain pharmacokinetics and pharmacodynamics in the critically ill patient
5. Demonstrate acquisition and application of clinical knowledge in the essential topic areas below:
 - a. **Cardiovascular System**
 - Hemodynamic parameters such as preload, afterload, and contractility, DO₂, VO₂, sVO₂, scVO₂
 - Left and right ventricular cardiac mechanics and function
 - Differential diagnosis of, diagnostic approach to, and treatment of the different shock states
 - Evaluation and management of the patient in shock
 - Mechanism of action and appropriate use of vasopressors
 - Mechanism of action and appropriate use of inotropes, and antihypertensive medications
 - Diagnosis and appropriate treatment of myocardial ischemia, especially in the perioperative patient
 - Impact of impaired cardiovascular function on other organ systems
 - Cardiovascular hemodynamics including cardiovascular support (drugs and fluids)
 - Cardiopulmonary resuscitation, treatment of acute myocardial infarction
 - Basic oxygen transport and delivery, with particular emphasis on the systemic inflammatory response syndrome and multi organ system failure
 - Management of hypovolemia and hypervolemia
 - Management of hypertension, tachycardia, including drug selection
 - Management regarding atrial and ventricular dysrhythmias
 - b. **Respiratory System**

- Basic pulmonary physiology including control of breathing, work of breathing, lung volumes, compliance and resistance of the respiratory system, and the determinants of oxygenation and ventilation
- Differential diagnosis of, diagnostic approach to, and appropriate treatment of respiratory failure
- Pathophysiologic derangements seen in obstructive and restrictive respiratory disease
- Causes, diagnosis, and treatment of ARDS
- Physiologic effects of mechanical ventilation, especially on the cardiovascular system
- Epidemiology, prevention, diagnosis, and treatment of nosocomial pneumonia
- Differential diagnosis of, diagnostic approach to, and treatment of pulmonary embolism
- Respiration/ventilation including ventilator management, advanced modes of ventilation, and pulmonary function tests
- Management of Respiratory failure including severe ARDs
- Diagnosis and management of acute respiratory failure in the newborn, including respiratory distress syndrome, pulmonary hypertension, lung hypoplasia, including surfactant, NO and ECMO therapy

c. Renal, Electrolyte, and Acid-Base

- Determinants of renal blood flow, perfusion pressure, and GFR.
- Differential diagnosis of, diagnostic approach to, and treatment of acute kidney injury
- Criteria for hemodialysis and renal replacement therapies (CRRT, CVVHD)
- Epidemiology of acute kidney injury in the ICU, and its effects on mortality
- Differential diagnosis of, diagnostic approach to, and treatment of acid-base disturbances
- Differential diagnosis of, diagnostic approach to, and treatment of electrolyte disorders
- Effect of renal, electrolyte, and acid-base disorders on other organ systems
- Become competent in the diagnosis and management of oliguria and renal failure
- Differential diagnosis of, diagnostic approach to, and treatment of hepatorenal syndrome

d. Endocrine System

- Surgical stress response specific to the critically ill
- Differential diagnosis of, diagnostic approach to and treatment of diabetic ketoacidosis and hyperosmolar coma
- Importance of glucose control in the critically ill patient
- Relative adrenal insufficiency, and the role of steroid replacement in critically ill patients
- Common endocrine disorders in critically ill, including thyroid, adrenal, parathyroid

e. Neurologic System

- Differential diagnosis of, diagnostic approach to, and treatment of neurologic deficits in the ICU, especially acute focal neurologic deficits, seizures and status epilepticus, and the coma
- Differential diagnosis of, diagnostic approach to, and treatment of ICU delirium
- Risk factors for, prevention of, and long term consequences of delirium in the ICU
- Mechanism of action, physiologic consequences, and appropriate uses of sedative and analgesic agents in the ICU
- Appropriate management of Pain, agitation and delirium in the ICU (pharmacologic and other)
- Management of increased intracranial pressure (ICP) and other neurological emergencies

f. GI, Hepatic Disease, and Nutrition

- Basic hepatobiliary physiology
- Differential diagnosis of, diagnostic approach to, and treatment of acute hepatic failure
- Pathophysiology of cirrhosis, diagnosis and management of hepatorenal syndrome
- Assessment of liver function in the liver transplant patient
- Effect of hepatic disease on other organ systems
- Differential diagnosis of, diagnostic approach to, and treatment of acute and chronic pancreatitis
- Differential diagnosis of, diagnostic approach to, and treatment of abdominal compartment syndrome
- Differential diagnosis of, diagnostic approach to, and treatment of GI bleeds

- Microbiology and treatment of intra-abdominal sepsis (diverticulitis, cholangitis, perforated bowel)
- Nutrition in the critically ill patient, appropriate use of enteral and parenteral nutrition.
- Methods to determine optimal nutritional support (equations vs. indirect calorimetry)
- Acute and Chronic Hepatic failure, pre- and postoperative management of the liver transplant patient
- GI-bleeding prophylaxis and treatment
- Evaluation of Acute Abdomen

g. Hematologic System

- Differential diagnosis of, diagnostic approach to, and treatment of anemia in the ICU
- Differential diagnosis of, diagnostic approach to, and treatment of thrombocytopenia in the ICU
- Differential diagnosis of, diagnostic approach to, and treatment of coagulopathies
- Differential diagnosis of, diagnostic approach to, and treatment of hypercoagulable states
- Management of massive bleeding and transfusion, including massive transfusion protocols
- Diagnosis and management of heparin-induced thrombocytopenia in the ICU
- Differential diagnosis of, diagnostic approach to, and treatment of purpura fulminans in the ICU
- Differential diagnosis of, diagnostic approach to, and treatment of DIC in the ICU
- Diagnosis and management of bone marrow dysfunction and/or failure
- Differential diagnosis of, diagnostic approach to, and treatment of venous thromboembolism
- Optimal clinical algorithms for deep venous thrombosis prophylaxis (pharmacologic)
- Different novel oral anticoagulant agents and their appropriate use and reversal in ICU

h. Infectious Disease

- Epidemiology, pathophysiology, and treatment of sepsis, severe sepsis, septic shock
- Role of early goal directed therapy in the treatment of septic shock
- Microbiology, diagnosis, and treatment of respiratory, intraabdominal, urologic, skin and soft tissue, cardiac and CNS infections
- Microbiology, diagnosis, and treatment of ICU-acquired infections (VAP, UTI, CLABSI)
- Mechanisms of action and side effects of commonly used antibiotics
- Infectious disease in the ICU, appropriate empiric antibiotic therapy
- Ventilator-associated pneumonia and catheter-related bacteremia definitions
- Methods to reduce nosocomial infections in the ICU
- Differences between hospital-acquired (nosocomial), healthcare-associated, and community-associated infections both in microbiology and empiric antibiotics
- Multi-drug-resistant organisms (MDROs)
- Management of Sepsis using the Surviving Sepsis Guidelines and Bundles
- Understand the diagnosis and treatment of specialty-specific infectious diseases

i. Immunologic and Inflammatory System

- Systemic inflammatory response syndrome
- Manifestations of multi-organ failure syndrome
- Use and consequences of activated protein C in the treatment of severe sepsis
- Diagnosis and management of severe sepsis/septic shock, (resuscitation, vasopressors and steroid use)
- Diagnosis and management of immunologic and inflammatory disorders and complications that occur in the solid organ transplant patient (renal, pancreas, hepatic)
- Immunologic deficiencies and response to stress and sepsis in specialty patients
- Other chronic immune disorders (SLE, scleroderma, RA, IBD, other rheumatologic diseases)

Systems-Based Practice:

By the end of the Surgical Critical Care rotation, the HO III resident will be able to:

1. Explain one's position within the team, specialty, profession and society
2. Demonstrate sensitivity to and awareness of the cost of healthcare delivery, particularly in the ICU
3. Advocate for cost-conscious and effective patient care
4. Develop skills as a "team leader"
5. Develop skills (administrative and organizational) to organize and lead a busy clinical service
6. Demonstrate an awareness of and responsiveness to the larger context and system of health care
7. Demonstrate the ability to effectively use system resources to provide optimal ICU patient care
8. Explain how their patient care and other professional practices affect other healthcare professionals, the healthcare organization, and the larger society and how these elements of the system affect their own practice.
9. Explain how types of medical practice and delivery systems differ from one another, including methods of controlling healthcare and allocating resources
10. Practice cost-effective healthcare & resource allocation that does not compromise quality of care
11. Advocate for quality patient care and assist patients in dealing with system issues & complexities
12. Partner with healthcare managers and providers to assess, coordinate and improve healthcare to achieve optimal system performance in the ICU

Practice-Based Learning and Improvement:

By the end of the Surgical Critical Care rotation, the HO III resident will be able to:

1. Evaluate and investigate their ICU patient care practices and document the evidence base for these
2. Appraise and assimilate scientific evidence to improve their ICU patient care and practices
3. Apply evidence-based medicine to critical care
4. Adequately use scientific data to help solve clinical problems
5. Demonstrate the ability to actively contribute to the SICU team's education by providing recent and current data as a result of literature searches of the peer-reviewed literature and on-line educational materials
6. Apply knowledge of study designs and statistical methods to the appraisal of clinical studies
7. Use information technology to manage information, access on-line medication information and support their own education in critical care
8. Locate, appraise and assimilate evidence from scientific studies related to ICU patient problems
9. Obtain and apply knowledge of evidence on diagnostic and therapeutic effectiveness of ICU clinical care practices and procedures
10. Gain evidence-based information regarding critical care population issues
11. Facilitate the learning of students and other healthcare professionals

Professionalism:

By the end of the Surgical Critical Care rotation, the HO III resident will be able to:

1. Demonstrate compassion, respect and integrity in the work environment
2. Demonstrate the ability to flawlessly uphold the professional standards of the surgical critical care service
3. Demonstrate respect differences in gender, age, culture, disability or educational levels
4. Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.
5. Contribute to all educational activities of the surgical critical care service
6. Show commitment to ethics of confidentiality and informed consent
7. Demonstrate a responsiveness to the needs of patients and society that supersedes self-interest
8. Demonstrate accountability to patients, society, and the profession

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| 9. Demonstrate a commitment to excellence and ongoing professional development |
| 10. Demonstrate a commitment to ethical principles pertaining to provision/withholding of ICU care |

Interpersonal and Communication Skills:

By the end of the Surgical Critical Care rotation, the HO III resident will be able to:

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| 1. Maintain professional and cordial relationships with patients, staff, co-workers and faculty |
| 2. Listen and to accept constructive criticism |
| 3. Communicate effectively with and demonstrate caring and respectful behaviors when interacting with ICU patients and their families |
| 4. Communicate efficiently with the team members, attendings, referring and consulting physicians |
| 5. Demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patients' families and professional associates |
| 6. Use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning and writing skills |
| 7. Efficiently and accurately present patient data on rounds |
| 8. Create complete detailed notes in the electronic medical record that reflect clinical care provided |
| 9. Efficiently and effectively relate information to consultants |
| 10. Effectively relate information to patients' family in lay terms, including end-of-life discussions |
| 11. Work effectively with others as a member and/or leader of the ICU team |
| 12. Effectively communicate with nursing, therapists and social workers for optimal ICU patient care |
| 13. Teach medical students and more junior residents |