**goals and objectives for intensive care Unit rotation**

**PGY - 2**

**Core Competencies & Learning Objectives**

Residents are expected to demonstrate the skills, knowledge, and attitudes needed to meet the requirements of the core competencies listed below.  Residents are educated on the core competencies through exposure at daily Surgical Intensive Care Unit (SICU) attending rounds, didactic lectures, and X-ray rounds.

Residents are expected to attend the ICU Rounds every Tuesday afternoon at 4pm. Residents are also expected to attend Morbidity & Mortality Conference and Grand Rounds.

Suggested Texts:

Rippe “ Intensive Care”

Marino “ICU”

Rippe “Techniques book

The SICU Core Competencies:

* [Patient Care](http://anesthesia.ucsd.edu/education/residency-program/curriculum/critical-care-anesthesia-curriculum/core-competencies/patient-care)
* [Medical Knowledge](http://anesthesia.ucsd.edu/education/residency-program/curriculum/critical-care-anesthesia-curriculum/core-competencies/Pages/medical-knowledge.aspx)
* [Practice Based Knowledge and Improvement](http://anesthesia.ucsd.edu/education/residency-program/curriculum/critical-care-anesthesia-curriculum/core-competencies/Pages/practice-based-knowledge.aspx)
* [Interpersonal and Communication Skills](http://anesthesia.ucsd.edu/education/residency-program/curriculum/critical-care-anesthesia-curriculum/core-competencies/Pages/communication-skills.aspx)
* [Professionalism](http://anesthesia.ucsd.edu/education/residency-program/curriculum/critical-care-anesthesia-curriculum/core-competencies/Pages/professionalism.aspx)
* [Systems Based Practice](http://anesthesia.ucsd.edu/education/residency-program/curriculum/critical-care-anesthesia-curriculum/core-competencies/Pages/systems-based-practice.aspx)

**Patient Care**

The patient care section of our core competencies includes the following:

* [General Expectations](http://anesthesia.ucsd.edu/education/residency-program/curriculum/critical-care-anesthesia-curriculum/core-competencies/patient-care/Pages/general-expectations.aspx)
* [Organ Systems Approach](http://anesthesia.ucsd.edu/education/residency-program/curriculum/critical-care-anesthesia-curriculum/core-competencies/patient-care/Pages/organ-systems.aspx)
* [Specific Skills for CCM Rotation](http://anesthesia.ucsd.edu/education/residency-program/curriculum/critical-care-anesthesia-curriculum/core-competencies/patient-care/Pages/cppm-rotation-skills.aspx)

**General Expectations**

* Residents to participate in all aspects of management of the critically ill SICU patients
* Clinical experience to focus around our open combined SICU, which includes trauma patients, neurosurgical patients, general surgery/transplant patients, and orthopedic patients, ENT, urology, and OB/Gyn patients
* Residents on the Surgical Critical Care Medicine (SCCM) Rotation are expected to perform detailed evaluations of the critically ill patients under their care
* When patients are first admitted to the unit, residents must formulate initial plans that center on airway, breathing, circulation, and neurological function
* Once life sustaining support is achieved, residents are expected to formulate more global management plans based upon a complete review of their patient's current status and overall needs from an organ system perspective
* All plans are to be reviewed directly with the attending on service
* The resident on call has additional responsibilities in the Trauma Resuscitation Suite, and also covers emergency intubations in all SICU patients, except for the operating room and the emergency department
* Emergency airway management for critically injured trauma patients, and other critically ill patients throughout the hospital, constitutes an important element of their training and maturity toward becoming competent in surgical critical care
* At the completion of the SCCM Rotation, the residents should achieve proficiency in the recognition and management of commonly encountered problems experienced by critically ill patients
* For less commonly encountered problems, the residents should gain an adequate knowledge base to formulate a complete differential diagnosis, institute appropriate initial supportive care, and request subsequent consultations as appropriate

# Organ Systems Approach to Critical Care

Residents will develop an understanding of the organ systems approach to critical care, and will obtain, organize, and present data on rounds and in their daily progress notes, according to this system.

The major organ systems to be evaluated on a daily basis include:

* Neurological
* Cardiovascular
* Pulmonary
* Gastrointestinal
* Genitourinary
* Infectious Disease
* Immunological
* Hematological
* Endocrinological
* Integumentary (e.g. burns/rash)
* Orthopedic (e.g. fracture care)

The following represents the minimum information the residents are responsible for monitoring on each of their patients.

## Neurological

The neurological system reflects abnormalities in almost every other system and is critically evaluated in every patient throughout the day.  Residents are expected to perform a daily evaluation of the neurological status, including a pupil exam and Glasgow Coma Scale on neurologically injured patients. Sedation, analgesia and delirium scores will be evaluated in each patient.

1. The pathophysiology of increased intracranial pressure; spinal cord injury and brain death evaluation.
2. The effect of acid-base changes on ICP.
3. The concept of Cerebral Perfusion Pressure.
4. The use of agents such as diuretics; loop and osmotic; the use of blood pressure and temperature control.
5. Principles of sedation, analgesia, neuromuscular blockade.

## Cardiovascular

Cardiovascular evaluation includes vital signs, invasive measures of intravascular volume (CVP, Swan-Ganz catheters, TEE), and cardiac output and derived indices, along with inotropic and vasodilator drugs being infused.

1. Basic physiology including concepts of preload, afterload, contractility, ventricular compliance, etc.
2. Definition of shock and the classification into hypovolemic, cardiogenic, neurogenic, septic, etc.
3. Appropriate therapy for each type of poor perfusion based on hemodynamic principles. This includes monitoring of perfusion via oxygen delivery or intracellular pH.
4. Management of cardiac arrhythmias.
5. Recognition and management of cardiac ischemia.

## Pulmonary

Pulmonary evaluation support and monitoring includes a report of the patient’s airway status and ventilatory support (FIO2, ventilation mode, respiratory rate, tidal volume and arterial blood gas, pulse oximetry results, their work of breathing, and ability to do that work (i.e. spontaneous breathing trials, weaning parameters, etc).

1. Basic pulmonary pathophysiology including an understanding of shunt, dead space ventilation, minute ventilation and cardiac effects on oxygenation.
2. Pulmonary vascular response to hyposix, hypercarbia.
3. The oxyhemoglobin dissociation curve.
4. Understanding and use of the concepts of oxygen delivery and oxygen consumption to regulate ventilator use.
5. Be familiar with the diagnosis, management and pathophysiology of atelectasis, ARDS, pneumonia, embolus and increased intraabdominal pressure.
6. Arterial blood gas analysis, acid base abnormalities and management.

## Gastrointestinal

Gastrointestinal evaluation includes the method of prophylaxis against stress ulcers, as well as the ability of the patient to tolerate enteral nutrition vs. needs for parenteral nutrition, general bowel function, nutritional indices, and liver function (and pancreatic function when appropriate).

1. Be familiar with common GI causes of admission to the ICU including GI bleeding, ischemic bowel, obstruction and others.
2. Be familiar with gut motility problems in the ICU including both diarrhea and ileus.
3. Understand basic techniques of enteral feeding as well as the pros and cons of enteral vs parental nutrition.
4. Understand the role of the gut in many of the infections, which arise in the ICU.

## Genitourinary

Genitourinary function status reports on the renal status, including urinary output, BUN/Cr, need for dialytic therapies, risk for renal insufficiency, etc. The electrolyte and acid/base status is partly controlled by the kidneys and reviewed with the renal system.

1. Understand the basic physiology of the renal response to stress, hypovolemia, acid-base changes, volume overload, etc.
2. The pros and cons of various renal monitoring tools’ including urine output, urine Na, FeNa, osmolality, C1
3. Be aware of the effects of renally active drugs such as lasix, mannitol, dopamine, glucose, urea on urine output and renal perfusion.
4. Principles of drug dosing in renal failure.
5. Principles of dialysis/hemofiltration.

## Infectious Disease

Infectious disease issues that must be evaluated daily include presence of fever, WBC count, gram stain, culture and sensitivity data, along with antibiotics being administered. Patients are surveyed daily in terms of common causes of fever and infections in the ICU (especially with regards to pulmonary secretions and invasive lines).

Immunocompromised patients, and those with resistant organisms, are kept in isolation from other patients, and residents are expected to use barrier precautions when examining these patients.  Universal precautions are used on all ICU patients.

1. Understand why critically ill patients are immunosuppressed
2. Learn the basics of infection control in the ICU; hand washing, mouth care, ventilator care.
3. Be familiar with the appropriate use of antibiotics, antifungals, etc. to treat infections in critically ill patients and why prophylaxis is so rarely successful.
4. Understand the concepts of superinfection and resistance and unit specific flora.

e) Understand the concepts of and indications for the use of new agents for SIRS (i.e. Xigris).

## Hematological

Hematological problems are common in the SICU, and unstable patients will have a daily evaluation of the hematocrit, platelets, coagulation system, and all patients will receive some form of prophylaxis against thromboembolic disease.

1. Acute management of bleeding patient
2. DIC
3. Use of novel agents for hemostasis, such as recombinant 7

## Endocrinological

Endocrinological issues include tight control of glucose with insulin infusions as needed. Serum cortisol, thyroid function, and other parameters are measured on an as needed basis.

Those patients with splints, traction, or external fixation devices, burns, decubitus ulcers, or wound care issues will have these sites evaluated daily by the resident, in addition to the consulting services (orthopedics, burn surgery, plastics, etc).

1. Hypoadrenal Crisis
2. Diabetes Ingipidus
3. Diabetes ketoacidosis

# Specific Skills For SCCM Rotation

## Airway Management

* Increase proficiency in bag-mask ventilation, the use of oral and nasal airway, endotracheal intubation using rigid direct laryngoscopy, the laryngeal mask airway (LMA) and esophageal-tracheal combi tube (ETC), patients may come into the hospital with these in place
* Become proficient in the management of the difficult emergency and trauma airway
* Become proficient in use of the adult and pediatric fiberoptic bronchoscope (FOB) for intubation, evaluation of airways, secretion management, and checking position of single and double lumen tubes
* Develop expertise in placement and exchange of tracheostomy tubes, as well as the use of other airway management equipment
* Become proficient in changing the ETT of patients with both difficult airways, as well as those with severe respiratory failure

## Mechanical Ventilation Technologies

* Become proficient in use of standard modes of mechanical ventilation (MV) including CMV, A/C, SIMV, Pressure support, etc.
* Become proficient in use of newer modes of MV including: TCPCIRV, APRV, HFV (several subsets), prone ventilation, permissive hypercapnea
* Develop experience using inhaled nitric oxide in selected patients with elevated PVR or severe ARDS recalcitrant to standard therapy
* Develop expertise at weaning techniques and in the application of pulmonary mechanics

## Vascular Access

* Become proficient at Placement of IV catheters, central lines, and arterial lines in critically ill patients
* Develop aseptic techniques for changing lines over a wire when needed
* Invasive Monitoring: establishment and interpretation
* Become proficient at floating a Swan-Ganz (pulmonary artery) Catheter
* Learn to trouble shoot artifact and abnormalities in the arterial pressure catheter, Swan-Ganz catheter, and other invasive devices (e.g. intra-aortic balloon counterpulsation devices
* Develop experience using the TEE on selected patients

## Pain Management & Regional Anesthesia

* Be able to program and write orders for the PCA devices
* Develop experience with placement of thoracic epidurals in patients with thoracic trauma
* Become proficient in the management of the patient with polysubstance abuse and or chronic pain in the acute pain setting (SICU)

**Medical Knowledge**

Through the use of textbooks in Critical Care Medicine, daily lectures, and rounds provided on the service, the residents are expected to develop and expand their knowledge in the following areas:

* The principles of neuro resuscitation, neuroprotection, and monitoring for patients with spinal cord injury and closed head injury
* The perioperative management of other common neurosurgical conditions, including ischemic strokes, intracerebral hemorrhage, aneurysm, a-v malformation, and brain tumor
* Principles of acute hemodynamic management for common ICU problems, including dysrhythmias, hemorrhagic shock, septic shock, myocardial ischemia, idiopathic cardiomyopathy, neurogenic shock, and hypertensive crisis
* Principles and practice of emergency airway management, including intubations using direct laryngoscopy, fiberoptic bronchoscopy (FOB), or other "awake" techniques
* The indications for and techniques of FOB for sampling bronchioalveolar lavage (BAL) and to open collapsed lung segments
* Pathophysiology and management of acute lung injury, respiratory failure, and ARDS, (including ventilator associated pneumonia, aspiration pneumonia, pulmonary contusion)
* Application of simple and advanced ventilation techniques
* Principles of early enteral feeding vs. total parenteral nutrition, as well as gut dysmotility problems, and pancreatitis
* Pathophysiology of liver failure and current and newer therapies for liver failure
* Pathophysiology of renal insufficiency and failure
* Understanding the complex dialytic strategies, including the benefits of continuous veno-veno hemodialysis (CVVHD) vs. intermittent HD
* Principles of RBC and blood factor replacement strategies
* Supplementation of erythropoietin and other tools to minimize transfusion therapy
* Pathophysiology of thrombosis and modern approach to DVT prophylaxis, early recognition, and treatment of pulmonary embolism
* Physiology of coagulation system and pathophysiology of DIC
* Principles of infectious diseases, immune system dysfunction, and antibiotic usage
* The pathophysiology of multi-system organ failure
* The mechanisms of trauma and burn injury

**Practice Based Knowledge & Improvement**

* Residents are provided with a list of recommended textbooks and a syllabus with recommended readings, containing information not normally found in the textbooks.  Most importantly, patient care plans and protocols are designed to reflect the most recent evidence based medicine recommendations and the foundation for these protocols and algorithms are reviewed in the daily didactic sessions.
* Throughout the rotation, resident performance will be evaluated by the attendings. Feedback occurs on a daily basis during clinical teaching and patient care rounds, as well as during didactic sessions, which are almost exclusively interactive and conducted in a seminar fashion. Residents receive feedback from the other members of the patient care team and from the patient and their families.
* The faculty member completes a resident performance evaluation form at the end of each month and rotation. The evaluation is based upon their experience with the resident, as well as from feedback received from other faculty members of the patient care team who worked directly with the resident during the rotation.

**Interpersonal & Communication Skills**

* Be able to appreciate the anatomical, physiological, and cognitive issues found in the SICU and communicate that to family effectively
* Be able to explain the risks and benefits of SICU procedures and care that is informative, thorough, and reassuring
* Be able to understand the frame of mind of the family when their family member is about to undergo surgery and the stresses it can place on the family unit

**Professionalism**

* All resident interactions with patients, their families, or their loved ones will be conducted with the highest level of professional and ethical standards
* All management decisions will be based upon scientific foundations of medicine. However, application of these often complex therapies will proceed in a humane and compassionate setting.
* All considerations for the initiation and cessation of invasive treatments will be with the informed consent of the patient or their surrogates to the degree possible.
* Residents will also maintain a high degree of professionalism when interacting with other members of the patient care team, including faculty, nurses, fellows, residents, and medical students
* The members of the primary team and other consulting services will be apprised of any patient care decisions that directly impact their own plans with the patient in timely and collegial way
* The residents will learn how to deal with and respect occasional dissenting opinions from these various team members, and help coordinate patient care with these individuals in a manner that places the patient first and keeps all members of the team informed and engaged in a positive way

**Systems Based Practice**

* Residents will learn the foundations of modern critical care management using evidence based data and protocols geared at decreasing complications, days on the mechanical ventilation, and total ICU length of stay
* Residents will learn the benefit of having intensivists involved in critical care management of SICU patients from both an overall patient outcome perspective. As perioperative physicians, anesthesiologists not only provide a continuum of care between the operating room and the SICU. Anesthesiologists and Surgeons engaging in critical care also possess a great deal of expertise in acute airway management, ventilation management, sedation and analgesia, monitoring modalities, and cardiovascular support techniques.
* Residents will demonstrate sensitivity and awareness of the costs of health care delivery and advocate for cost-consensus and effective patient care