

## **Introduction to Critical Care Overall Goals and Expectations**

### **Overall Goals and Objectives**

- Patient Care
  - Establish skills in the triage and management of critically ill medical patients through admission, daily patient care, and discharge.
  - Improve leadership and technical skills during management of crises.
  - Demonstrate appropriate use and interpretation of invasive monitors (such as arterial lines, CVP) and equipment (such as ultrasound, airway equipment).
- Medical knowledge
  - Build / strengthen knowledge around both general ICU care management principles, as well as the specific content areas of focus listed below through independent study, patient care, and formal didactics.
- Practice-based learning and improvement
  - Embrace an active role in the education of patients, families, students, co-residents, and other healthcare professionals.
- Interpersonal and Communication Skills
  - Illustrate skill in communication with patients, families, and other professionals.
  - Illustrate teamwork and leadership skills in daily patient care, crisis management, and interprofessional ICU team interactions.
- Professionalism
  - Demonstrate a high level of responsibility to patients, families, and society reflecting a sense of honesty, integrity, and ethical behavior.
  - Illustrate commitment to institution, department, and colleagues.
- Systems-based practice
  - Coordinate patient care within the medical system as a member of the interprofessional medical critical care team.
  - Demonstrate an approach to care that prioritizes patient safety and quality improvement.

### **Content Areas of Specific Focus for this Rotation**

- Diagnosis and management of respiratory failure, including respiratory physiology and principles of noninvasive and mechanical ventilation
- Management of shock and differentiation of different types of shock based on their physiology
- Management of pain, agitation, and delirium
- Management of sepsis, including early management guided by sepsis bundles, appropriate antibiotic selection and source control, assessment of fluid responsiveness, vasopressor selection and management, and appropriate use of adjunctive therapies such as corticosteroids
- Diagnosis and management of patients who have immunocompromised states
- Diagnosis and management of other single- or multiple-organ dysfunction states (ex: AKI), including supportive therapies such as renal replacement therapy

- Communication with patients and families about goals of care and End-of-Life Care

### **Our Expectations of You**

1. Arrive promptly and pre-round (seeing your patients before attending rounds) each morning, including chart review AND performing a physical exam.
2. With few exceptions, continue to follow all patients you admit throughout their ICU stay.
3. Present concise, organized rounding presentations in a systems-based format (see separate document with suggested contents) including your assessment and plan.
4. Actively participate in didactics.
5. Complete your independent reading assignment by the end of the rotation.
6. Take ownership over your own learning. Ask questions and be proactive in finding the answers!
7. Act with professionalism at all times in interactions with patients and families, nursing and ancillary staff members, and your teammates.

### **What You Can Expect from Us**

1. You will be exposed to a wide variety of patients with complex medical critical illness.
2. You will have structured didactic teaching as time permits and informal teaching during rounds and at the bedside.
3. Completion of assigned reading topics (at minimum) will help to solidify content focus areas.
4. You will have access to essential critical care literature.
5. We will do everything possible to avoid duty hour violations.
6. You will be treated with respect at all times. Please contact rotation leadership if this is not the case.
7. We will take your suggestions and feedback seriously. Please complete rotation evaluations and feel free to provide informal feedback to rotation leadership.

### **Reading List**

- Articles:
  - o ARDS
  - o Shock
  - o Sedation and Delirium
  - o End of Life Care in the ICU
  - o Maintenance IV Fluids
  - o Mechanical Ventilation
  - o Management of Acute Kidney Injury: Core Curriculum 2018. PMID 29478864
  - o Targeted Temperature Management
- Online Resources
  - o A Primer on Mechanical Ventilation  
[https://courses.washington.edu/med610/mechanicalventilation/mv\\_primer.html](https://courses.washington.edu/med610/mechanicalventilation/mv_primer.html)
  - o Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients

in the ICU

[https://journals.lww.com/ccmjournals/Fulltext/2018/09000/Clinical\\_Practice\\_Guidelines\\_for\\_the\\_Prevention.29.aspx](https://journals.lww.com/ccmjournals/Fulltext/2018/09000/Clinical_Practice_Guidelines_for_the_Prevention.29.aspx)

- Surviving Sepsis Campaign Guidelines  
[https://journals.lww.com/ccmjournals/Fulltext/2017/03000/Surviving\\_Sepsis\\_Campaign\\_International.15.aspx](https://journals.lww.com/ccmjournals/Fulltext/2017/03000/Surviving_Sepsis_Campaign_International.15.aspx)
- ATS Reading List: <https://www.thoracic.org/professionals/career-development/residents-medical-students/ats-reading-list/adult/index.php>
- For your reference (Dr. Bernstein's summaries):
  - Conventional Modes of Mechanical Ventilation
  - Highlights of the 2018 Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU
  - Hemodynamic Equations and the Swan Ganz Catheter

### **Detailed Competency-Based Goals and Objectives**

As laid out above in the Introduction to Critical Care, the ICU rotation will provide the resident with an opportunity to evaluate and manage patients with life-threatening conditions, often affecting multiple organ systems. Training should familiarize the resident both with patient management as a member of a coordinated team and with consultation for critically ill patients on other services. Residents will become skilled in the interpretation of data and performance of procedures necessary to manage these patients, as well as with the social and ethical issues pertinent to acute care and end-of-life care.

Below is a more detailed look at the competency-based learning plan for this rotation.

### **Patient Care and Procedural Skills**

- I. All residents must be able to provide compassionate, culturally-sensitive, and appropriate care for critically ill patients.
  - PGY2s should seek directed and appropriate specialty consultation when necessary to further patient care.
  - PGY3s should supervise and ensure seamless transitions of care within the hospital and at discharge from the ICU.
  
- II. Residents will demonstrate the ability to take a pertinent history and perform a focused physical exam. PGY1s should be able to differentiate ill from stable patients and appreciate and characterize the following physical findings:
  - Abnormal respiratory patterns
  - Abnormal heart and lung sounds
  - SIRS physiology and symptoms and signs of shock
  - Focal neurologic abnormalities

PGY2s should be able to access pertinent complex historical information in a timely fashion and detect more subtle physical findings.

PGY3s should be able to independently obtain a focused history and perform a targeted physical exam.

III. Residents will understand the indications, contraindications, complications, limitations, and interpretation of following procedures, and become competent in their safe and effective use:

- PGY1s: arterial blood gas and arterial line placement, BLS and ACLS protocols, central line placement, endotracheal intubation, initial ventilator management, nasogastric tube placement
- PGY2s: management of chest tube (placement skill optional), noninvasive ventilation, basic ventilator management beyond 48 hours
- PGY3s: ventilator troubleshooting

In addition, residents will demonstrate knowledge of and be able to counsel patients and/or families regarding the indications and contraindications for the following procedures:

- PGY1s: acute hemodialysis, mechanical ventilation, PEG placement, transfusion
- PGY2s: tracheostomy, withdrawal of care
- PGY3s will be able to independently counsel patients on the above issues in the setting of complex socio-medical circumstances, such as the issue of PEG placement in demented patients, or mechanical ventilation in the setting of end-stage systemic illness.

## **Medical Knowledge**

I. PGY1s will develop an understanding of the pathophysiology, clinical presentation, diagnostic studies and therapy for the following conditions:

- Acute abdominal pain
- Acute organ failure (adrenal, kidney, liver, respiratory)
- Altered mental status and coma
- ARDS
- Cardiac arrest
- Diabetic ketoacidosis
- Disseminated intravascular coagulation
- Hemoptysis
- Heparin-induced thrombocytopenia
- Hypertensive emergency
- Hypo/hyperthermia
- Marked electrolyte abnormalities
- Massive gastrointestinal bleeding
- Massive pulmonary embolus
- Meningitis and encephalitis
- Pancreatitis
- Severe intoxication/overdose and withdrawal syndromes
- Severe stroke
- Shock

- Status asthmaticus
- Status epilepticus
- Thyroid storm and myxedema coma

PGY2s will be able to assess patients and formulate a differential diagnosis and management plan in the setting of multi-organ involvement.

PGY3s will be able to independently assess patients, triage patient management tasks appropriately, and delegate to effectively manage multiple critically ill patients.

- II. Residents will become knowledgeable in the following issues pertaining to critical care:
  - PGY1s: enteral and parenteral nutrition; pharmacology of opioids, paralytic agents, sedation, and pressors; scoring systems for alcohol withdrawal, sedation, and severity of illness
  - PGY2s: diagnosis of brain death; national guidelines for prevention of catheter-associated blood stream infections, deep venous thrombosis, and ventilator-associated pneumonia
  - PGY3s: Issues important in the co-management of surgical patients, such as ICP monitoring, abdominal compartment pressure monitoring, conscious sedation, and massive transfusion protocol.
  
- III. Residents will be able to understand the indications for ordering and interpretation of results from laboratory and diagnostic studies, including:
  - PGY1s: arterial blood gas and interpretation of oxygenation and basic acid-base status; analysis of sputum, cerebrospinal, and pleural fluids; chest and abdominal radiographs; computed tomography of head, chest and abdomen; echocardiogram; NT-pro-BNP
  - PGY2s: arterial blood gas and interpretation of complex acid-base status; analysis of joint and peritoneal fluids; bronchoscopy results; magnetic resonance imaging of head, chest and abdomen; lung biopsy
  - PGY3s: interpretation of diagnostic study results in the setting of complex comorbidities.

### **Practice-Based Learning and Improvement**

- I. All residents should be able to access current critical care clinical practice guidelines from the Society of Critical Care Medicine, journals, and other sources to apply evidence-based strategies to patient care.
- II. PGY2s should develop skills in evaluating new studies in published literature, through Journal Club and independent study.
- III. All residents should learn to function as part of a team, including the critical care specialist, nurse, pharmacist, and dietician, and social worker to optimize patient care, and PGY3s should assume a leadership role.
- IV. All residents should respond with positive changes to feedback from members of the health care team.

## **Interpersonal and Communication Skills**

- I. PGY1s must demonstrate written, electronic and verbal communication skills that facilitate the timely and effective exchange of information within the system.
- II. PGY2s must also demonstrate interpersonal skills that facilitate collaboration with patients, their families, and other health professionals.
- III. PGY3s should demonstrate leadership skills to build consensus and coordinate a multidisciplinary approach to patient care.
- IV. PGY3s must become proficient in managing social dynamics, including identifying the power of attorney or surrogate decision maker, resolving conflict among family members with disparate wishes, and patient advocacy.

## **Professionalism**

- I. All residents must demonstrate strong commitment to carrying out professional responsibilities as reflected in their conduct, ethical behavior, attire, interactions with colleagues and community, and devotion to patient care.
- II. PGY1s should be able to educate patients and their families in a manner respectful of gender, age, culture, race, religion, disabilities, national origin, socioeconomic status, and sexual orientation on choices regarding their care.
- III. PGY3s should be able to provide constructive criticism and feedback to more junior members of the team.

## **Systems-Based Practice**

- I. PGY1s must have a basic understanding that their diagnostic and treatment decisions involve cost and risk and affect quality of care.
- II. PGY2s must be able to discuss alternative care strategies and the cost and risks involved and articulate current quality issues in Critical Care Medicine.
- III. PGY3s must demonstrate an awareness of and responsiveness to established quality measures, risk management strategies, and cost of care within our system.
- IV. PGY3s should work with faculty to assess patient care trends in our ICU and raise best practice issues that may merit further study.

## **Teaching Methods**

- I. Supervised patient care in the intensive care unit.
  - Residents will initially be directly observed with patients, to facilitate the acquisition of excellent history taking, physical exam, and procedural skills.
  - As residents become more proficient, they will interact independently with patients and present cases to faculty.
    - Initial emphasis will be on diagnosis and basic management.
    - When residents have mastered these skills, focus will be on medical decision-making, and residents will work with supervising physicians to finalize a care plan.

- II. Conferences
  - Specialty-specific didactics
- III. Independent study
  - See E-file articles provided by faculty and Reading List provided in the Introduction to Critical Care at the front of this document
  - Online educational resources
    - Society of Critical Care Medicine – register for LearnICU  
<http://www.learnicu.org/Pages/default.aspx>
    - Pain management and addiction:  
<https://www.hhs.gov/opioids/treatment/overdose-response/index.html>
    - American Thoracic Society – ATS reading List
    - *MKSAP*
    - Up to Date
    - Clinical Key

### **Evaluation**

- I. Case and procedure logs
- II. Mini-CEX bedside evaluation tool
- III. Verbal mid-rotation individual feedback
- IV. 360 Evaluation
- V. Attending written evaluation of resident at the end of the month based on rotation observations and chart review

### **Rotation Structure**

- I. Residents should contact the lead intensivist the day prior to determine start time and location. Residents should notify the attending physician promptly if they cannot be available at their assigned time.
- II. Residents should spend the majority of their time in the critical care unit, with the exception of required conferences or patient-related time elsewhere in the hospital.
  - Residents will be involved in discussion of patient presentation, generation of a differential diagnosis, development of a treatment plan, and daily patient followup.
  - Case-based learning is most effective. Nightly reading/study should be based on patients seen during the day.
  - When doing consults, the resident should understand the question asked and provide a concise answer.
- III. Residents may be asked to do focused literature searches or presentations during the course of the rotation.
- IV. Call and weekend responsibilities TBD by the attending physician.
  - Hours worked must be consistent with ACGME requirements and are subject to approval by the Program Director.
- V. Residents have specialty-specific didactics and should be excused in a timely fashion to attend.

## **Rounding Guidelines**

ICU Attendings have a formal order in which they expect to hear the ICU presentation. **Rigorous adherence** to this order (especially the order of vitals, exam findings, data, and assessment) will greatly improve rounding efficiency and afford more time for learning and patient care. Be sure to give your co-residents your full attention when they are presenting their patients; in this way, you will learn more and contribute more to patient care. Interruptions on rounds should be limited to essential urgent/emergent patient care issues only. Non emergent nursing issues, progress notes, and text messages should be attended to after rounds.

## **Resident**

### One Liner

--- Single succinct sentence that summarizes the reason for admission, major events and trajectory. (ie. “This is a 43 yo woman with ILD who was admitted to the ICU for hypoxemic respiratory failure likely due to pneumonia; she was originally intubated and required pressors, but is now extubated and nearing discharge from ICU”).

## **ICU Nursing Staff**

### Nursing Script:

- Major events in last 24 hours (Studies/consultant visits/problems)
- Current infusions with rates and trajectory (going up/down)
  - Pressor doses, sedative infusions and IVF are especially important
- Vascular access, Skin Integrity
- Pain scores (NRS, CPOT or verbal pain descriptor), sedation level (RASS) and comparison to target RASS, delirium screen (CAM-ICU or ICDSC)
- Spontaneous awakening trial (SAT) and spontaneous breathing trial (SBT) status
- Activity level/tolerance in the last 24 hours
- Patient/family concerns, goals, and needs
- Plans from other teams (e.g., nutritionist, speech therapy, PT).

## **Resident/Med Student**

1. Patient history and 24 Hour Events: in addition to and distinct from those reported by the nurse above.
2. Physical examination **always** starting with general appearance, VSs, and I/Os followed by organ systems in the following sequence (Note-we expect you to perform a thorough exam but only report either normal and/or positive findings (e.g., “normal abdominal exam;” “pulsatile enlarged liver palpable 5 cm below the right costal margin”):

**Skin:**

- Skin integrity, breakdown, rash

**HEENT:**

- Scleral icterus, conjunctival injection
- ETT/NG/Trach tubes
- Oral/labial/dental abnormalities

**Heme:**

- Lymphadenopathy, ecchymoses
- Anticoagulant infusions- type and rate
- 24 hour transfusion data

**Pulm:** Intubation Day #\_\_

- Lung exam including respiratory effort and secretion quantity and quality
- Vent Settings: Mode/TV/RR (set and measured)/FiO<sub>2</sub>/PEEP
- If relevant, you must present and understand: ml/kg TV PBW, peak pressure, plateau pressure, compliance (ask the RTs for help, if needed)
- SBT results if relevant (why did they fail? RR, tachycardia? Current RSBI)

**CV:** On vasoactive drugs x,y,z and which vasopressors were discontinued in past 24 hours.

- Cardiac exam especially the rhythm and abnormal findings
- Devices (e.g., Aline, Swan, Impella)
- Hemodynamics (e.g., cardiac output)

**GI/Nutrition:**

- Abdominal exam (Soft or firm? Bowel sounds?)
- Stools?
- Current feeds with rate and goal
- Bladder pressures if relevant

**Musculoskeletal:**

- Swelling of extremities
- Joint swelling, tenderness, effusion
- Mobility (are PT/OT orders in? Activity in the last 24 hours?)

**Neuro:**

- LOC, pupils, moving all extremities and strength, delirium
- Pain scores (NRS, CPOT, or verbal pain descriptors) and current pain meds (if different from infusions: "Patient required x mgs of fentanyl PRN in the past 24 hours in which the majority was administered overnight because...")
- Sedation level (RASS), comparison to target RASS, and current sedatives (if different from infusions)
- Delirium screen (CAM-ICU or ICDSC) and current antipsychotics

\*\* Ask the bedside nurse if (s)he would like to add any other exam findings.

3. Data: CXR and new or updated imaging studies, EKGs; CBC, coags, chemistries, ABGs, serologies; point of care glucose levels; microbiology updates

**Assessment and Plan**: Provide a summary statement, stated briefly, similar to the One Liner above but focusing on data synthesis and more immediate treatment needs, followed by **either** a problem by problem assessment/plan **or** a body system by system assessment/plan—the choice is yours, **starting** with the respiratory problem/system. Do **not** include chronic medical conditions that are not relevant to the patient’s current illness (e.g., stable hypertension, hypothyroidism, or controlled GERD). With either method, conclude with a review of general ICU considerations, goals of care, and ICU needs:

General ICU:

- Prophylaxis: Are DVT or GI prophylaxis indicated? If so, is it currently adequate
- Lines: Do we need to make any changes to the lines? Always ask yourself if there are lines that can be removed.
- Medications: Always ask yourself if there are meds that can be safely discontinued.
- Mobility: This is essential, if they are not getting it, what are the barriers?  
Are PT/OT orders in (should be ordered on EVERY patient, unless specifically contraindicated; intubation is NOT a contraindication)? How should we mobilize the patient today?

Goals of Care/Social: Code status, family dynamics, social situation ICU

NEEDS:

What are the physiologic, treatment or nursing needs that are keeping the patient in the ICU? How can we improve these?

**Glossary**:

**NRS**: Numeric rating scale, pain scale used preferentially in an alert and cooperative patient, pain rated by patient on a 0-10 scale; 0 = no pain, 1-3 = mild pain, 4-6 = moderate pain, 7-10 = severe pain

**CPOT**: Critical care pain observation tool, used when a patient cannot report pain; patient is given a score of 0-2 for facial expression, body movements, muscle tension, compliance with ventilator (intubated) or vocalization (extubated), minimum score = 0 (no pain), maximum score = 8 (most pain)

**Verbal pain descriptor**: Pain rated by patient as mild, moderate, or severe; used when patient unable to cooperate with NRS

**RASS**: Richmond Agitation Sedation Scale, scale used to measure agitation or sedation

level of patient; -5 = unarousable, 0 = alert and calm; +4 = combative; in most patients target is 0 to -1

**CAM-ICU:** Confusion Assessment Model for the ICU; delirium screen performed by nursing staff every shift; patient assessed for 1. acute onset or fluctuating status, 2. inattention, 3. altered level of consciousness, 4. disorganized thinking; scored as positive (delirium present, 1 AND 2 AND 3 or 4) or negative (delirium absent)

**ICDSC:** Intensive Care Delirium Screening Checklist; delirium screen performed by nursing staff every shift; patient assessed in eight domains. Delirium is present if at least 4 are present

**SAT:** Spontaneous awakening trial = all sedating medications are stopped, only amount needed are restarted with analgesia targeted first; performed daily on all intubated patients in coordination with SBT unless contraindication present as outlined in CMHS' SAT Checklist document

**SBT:** Spontaneous breathing trial = trial on a spontaneous breathing mode (usually PSV); performed daily per ICU protocol on all intubated patients in coordination with SAT unless contraindication present as outlined in CMHS' SBT Checklist document; daily SBT increases ventilator-free days, decreases ICU and hospital