

5 Linsky/Pulmonary/RSDU/Medical ICU Curriculum

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Faculty: Samuel Acquah, MD, Daniel I. Steinberg, MD

Residents: Pending

Description of Rotation and Educational Experience

The pulmonary/RSDU/critical care/MICU rotation exposes residents to patients with a broad variety of pulmonary disease, and to patients with unstable, life-threatening medical illnesses. Residents will learn the basic tenets of diagnosis and treatment of common pulmonary diseases, and will learn stabilization of critically ill patients. Residents will develop the skills needed for the assessment, evaluation, and management of such patients. They will function within multidisciplinary teams to provide care that is timely, appropriate, and takes into account patient or family preferences.

The MICU at Beth Israel medical Center is a 16 bed ICU. The team is headed by a board certified critical Care Medicine Attending and a Critical Care fellow. There are usually 4 residents and 6 interns assigned to the ICU. In addition to the physician staff, there are nursing staff, social workers, chaplains, care coordinators and pharmacists who function as an integral part of the team. There are about 1000 admissions to the ICU teams yearly. The wide variety of clinical conditions cared for in the ICU include respiratory failure, DKA, GI bleeding, pneumonia, status asthmaticus, severe COPD exacerbation, sepsis, shock, liver failure, and hypertensive crisis. Admissions arrive from the emergency department, as transfers from inpatient ward services, and as transfers from outside hospital ICUs.

The Respiratory Step Down Unit functions as an intermediate care unit for seriously ill patients, or for patients on ventilatory support awaiting transfer to long term care facilities.

The 5L pulmonary ward predominantly cares for patients with pulmonary diseases, including those needing respiratory isolation.

Supervision of Residents in the 5L/RSDU/MICU Rotations

At all times, residents will function under the direct or indirect supervision of a clearly identifiable, appropriately privileged attending physician with training in pulmonary/critical care medicine. This attending shall be the teaching attending assigned to (or covering) the MICU or the RSDU. On the 5L floor, the attending serves a didactic role, rather than a clinical care delivery role, but is available to provide direct supervision of care as needed. In the RSDU and MICU, direct or indirect supervision may occur under a fellow, but indirect supervision with direct supervision available by an attending physician will always be available. Overnight, an attending physician is present to perform direct supervision as needed, and to support both residents' and fellows' decision making and delivery of care.

In accordance with the IM Program's goal of providing residents with graded and progressive responsibility, PGY-2 and PGY-3 residents will perform assessments of patients and evaluate them for admission to the ICU under the indirect supervision of a fellow, with direct supervision available by both the fellow and an attending physician.

Goals and Objectives by ACMGE Core Competency by PGY level

At the end of the rotation, residents will be able to:

- **Patient Care:**
 - **Intern** – Under the supervision of a senior resident, fellow and attending
 - Admit and manage the hospital course of a wide variety of ICU patients under the direction of the senior resident, fellow and attending.
 - Perform appropriately detailed initial evaluation – including complete H&P, thorough PE, obtain and interpret initial labs, perform any urgent procedures, develop an initial DDx, and initiate a management plan.
 - Acquire experience to become credentialed in the following procedures: thoracentesis, paracentesis, lumbar puncture, central line placement, ABG. This includes the demonstration of knowledge of procedural indications, contraindications, necessary equipment, specimen handling, patient after-care, and risk and discomfort minimization.
 - **Resident 2/3** – As above – in addition –
 - Independently assess the severity of, and manage the spectrum of patients admitted to the ICU, under the direct or indirect supervision of the attending physician and fellow
 - Direct interns in delivering care on the 5L ward, RSDU and MICU
 - Develop competency in common intensivist procedures and credentialed to perform these independently in hospital setting
 - Perform efficient and focused H&Ps for common ICU presentations
 - Develop context-appropriate differential diagnoses for common ICU presentations and management plans
 - Prioritize tasks so that patient care is optimized and work is completed efficiently.
 - Identify appropriate indications for ICU admission and transfer
 - Develop team leadership skills in supervising in an RSDU/ICU setting
- **Medical Knowledge:**
 - **Intern** - Acquire basic knowledge of the etiology, pathophysiology, clinical manifestations, exam and diagnostic evaluation findings, as well as appropriate initial management for common Pulmonary and MICU conditions and topics (see below)
 - An R1 resident will demonstrate satisfactory knowledge of common pulmonary and ICU conditions sufficient to manage basic patient presentations, patient complaints and issues.

- Understand the physiology of mechanical ventilation
 - Be able to interpret arterial blood gases.
 - **Resident 2/3** – As above – plus
 - Acquire the knowledge and identify resources for acquiring knowledge necessary to manage patients with less common and more complex medical illnesses in the ICU setting.
 - Be familiar and able to cite the most recent guidelines for diagnosis and treatment of COPD, Pneumonia, Asthma, Sepsis, GI Bleeding
 - Understand basic ventilator troubleshooting and be able to formulate differential diagnosis for the most common ventilator alarms.
 - Be able to incorporate the results of an arterial blood gas into the care plan of a patient.
- **Practice-Based Learning and Improvement:**
 - **Intern** –
 - Be able to incorporate feedback into daily practice.
 - Use computer resources appropriately to gather and present information.
 - Completion of the above learning objectives and assigned readings.
 - Be able to apply evidence to the care of patients
 - **Resident 2/3** – as above, additionally
 - Consistently evaluate and target areas for self-improvement, and develop means to do so in the RSDU/ICU setting.
 - Identify effective techniques for teaching and supervising junior residents / interns / students effectively in the ICU setting
 - Analyze patient-care experiences and implement strategies to improve future quality of care.
 - Manage a team effectively, including delegation of responsibilities and giving of timely feedback, both positive and constructive, so that patient care, work, and teaching are completed effectively and efficiently.
 - Identify to the supervising fellow, the attending and the chief medical residents those members of the team who may need developmental assistance and support in functioning.
- **Interpersonal and Communication Skills:**
 - **Intern**
 - Develop and practice the ability to interact with other physicians (including consultants), nursing and clerical staff, and patients and their families in a professional, respectful, and effective manner.
 - Keep legible, complete, and timely medical records.
 - Document complex ICU patient care activities in appropriately detailed initial and daily SOAP notes.

- Verbally present this information to the attending and consultants.
 - **Resident 2/3** – as above, in addition -
 - Serve as a role model and instructor in the above outlined skills.
 - Act professionally and responsibly when performing evaluations of patients for other services (the ED, other departments, etc).
 - Demonstrate the ability to break bad news to a patient or family member.
 - Formulate and communicate clear, focused patient assessments to the fellow and/or attending physician
- **Professionalism:**
 - **Intern**
 - Attendance / Punctuality. Call the CMR on call as well as the ICU fellow ASAP to report acute illness or personal / family emergency requiring absence so that ward and clinic coverage may be found.
 - Professional behavior at all times with staff, peers, consultants, patients and families.
 - Dictation completion in a timely manner (within 24-36 hours of discharge).
 - Preparedness for rounds daily.
 - Attendance at daily radiology rounds and at the MICU core conference series.
 - Be on time for daily work rounds, arriving at work NO EARLIER THAN 6:30am (interns) and 7am (residents.)
 - Interact professionally and respectfully with all members of the ICU team.
 - Respect patient and family privacy.
 - Handoff appropriately and responsibly, including in a timely way such that fatigue and sleep deprivation do not impact the delivery of care
 - Be compliant with ACGME and NYS/IPRO duty hours regulations, and request assistance or raise awareness if duty hours violations are to occur.
 - Demonstrate respect and compassion in interactions with colleagues and patients and their families, including sensitivity and responsiveness to their race, gender, age, socioeconomic status, stress of the ICU setting, and other defining characteristics.
 - Demonstrate professionalism in interactions with patients and other house staff / services in terms of appropriateness of admissions / transfers in and out of the ICU.
 - Uphold patient confidentiality and informed consent.
 - **Resident 2/3** – additionally, serve as a role model and instructor for others in the outlined behaviors.

- Maintain an awareness of interns' level of fatigue and alertness, and alert the supervising fellow or attending physician or chief resident on call if an intern appears too fatigued to work and needs to be removed from duty.
 - Maintain this awareness in oneself, and alert supervisors as appropriate.
- **Systems-Based Practice:**
 - **Intern**
 - Become familiar with the complex and integrated practice of ICU medicine at an urban university hospital
 - Work effectively with nurses, respiratory therapists, fellows and consultants.
 - Be able to arrange for consultations by other services in the ward, RSDU and MICU settings, including helping to arrange such things as dialysis and surgery.
 - Observe others access and utilize necessary resources within the system to provide optimal patient care, including the application of EBM and cost-conscious strategies.
 - **Resident 2/3** – in addition to above
 - Use a multidisciplinary approach in ICU patient management involving other subspecialties when appropriate: PT / OT, social services, dietitians, diabetic educators, speech pathology, pharmacists, lab and radiology technicians, hospital staff, religious support, etc.
 - When deficiencies are recognized, learn to work with health team members to develop new strategies to improve systematic processes of care.
 - Be able to direct the arrangement of dialysis, endoscopy or other consultative services in the MICU setting.
 - Understand and apply the concepts of cost and resource utilization to the care of ICU patients
 - Develop proficiency in the coordination of medical care in the RSDU/ICU setting
 - Become aware of insurance issues, especially length of stay, and learn what is and is not reimbursed during a patient's hospitalization.

Specific Educational Topics in the Pulmonary/RSDU/MICU Rotation

The following is a list of topics that will be addressed during the 5L/RSDU/MICU rotations. Certain of the topics below may apply more or only to the RSDU/MICU rotations.

1. Assessment of severity of illness—understand the rationale, applications, and limitations of severity of illness scoring systems
2. Ethics—understand principles of advanced directives, terminal care and conflict resolution in the context of the ICU

3. Hemodynamic monitoring—know indications, contraindications, techniques, and potential complications for arterial catheterization, central venous catheterization, and pulmonary artery catheterization. Be able to interpret hemodynamic data and analyze waveforms.
4. Pharmacology in the ICU—understand the basic principles of pharmacokinetics and how organ dysfunction and critical illness can influence it. Understand the indications and potential complications of vasopressors, inotropes, sedatives and paralytic agents.
5. Advanced life support—know the procedures and management algorithms for basic life support, shock, myocardial infarction, and cardiac arrhythmias as outlined in the current ACLS manual
6. Airway management—know principles of airway management including the indications, contraindications, techniques, and potential complications for orotracheal and nasotracheal intubation as well as the alternatives to endotracheal intubation.
7. Mechanical ventilation including principles of positive pressure ventilation; common modes, settings, alarms and monitors; application in ARDS; mechanisms, risk factors, recognition and management of barotrauma and pneumothorax; principles of weaning; indication, contraindications, techniques and potential complications of noninvasive ventilation.
8. Arterial blood gas and pulse oximetry interpretation including techniques, limitations, and principles of acid-base physiology and interpretation.
9. Respiratory failure—causes pathophysiology, and management of various forms including hypoxemic and hypercapneic respiratory failure.
10. ARDS—defining characteristics, causes, pathophysiology, and management
11. Pneumonia—agents and antibiotics for severe community acquired pneumonia; pathophysiology, manifestations, prevention, diagnostic testing and management of ventilator-associated pneumonia
12. Tuberculosis—epidemiology, presentation, diagnosis and management, including what type of isolation is required.
13. Severe Clostridium Difficile diarrhea and Toxic Mega colon—presentation, diagnosis, management, including both antibiotic and surgical treatment options.
14. COPD—presentation, diagnosis, management, including indications for use of antibiotics and steroids, and knowledge of current guidelines.
15. Chronic Asthma—Presentation, classification, treatment options, patient education and counseling.
16. Interstitial Lung Disease—Presentation, diagnosis, prognosis and treatment options
17. Life-threatening asthma—principles of mechanical ventilation and pharmacologic management options
18. Shock—mechanisms of hypovolemic, maldistributive, cardiogenic and obstructive; principles of resuscitation and monitoring; indications and characteristics for common vasopressors and inotropic agents.
19. Myocardial infarction—diagnostic studies and basic management of cardiac ischemia and acute coronary syndromes
20. Cardiac arrhythmias—identify atrial and ventricular tachyarrhythmias, heart blocks, and ECG abnormalities associated with electrolyte disturbances and ischemia; anti-

- arrhythmic agents and basic pacing modes, including indications, contraindications, potential adverse effects.
21. Hypertensive crisis—criteria for hypertensive urgency and emergency; treatment agents including indications, contraindications and potential adverse effects.
 22. Acute renal failure—differential diagnosis, management principles, indications for dialysis
 23. Fluid and electrolyte disorders—understand pathophysiology, manifestations of disorders; advantages and disadvantages of crystalloid vs. colloid fluids
 24. Endocrine disorders in the ICU—manifestations, diagnostic tests and management of adrenal insufficiency, thyroid storm, hypothyroidism, and DKA.
 25. Principles of enteral and parental nutrition.
 26. Gastrointestinal disorders—differential diagnosis, evaluation and management of upper and lower GI bleeding, acute pancreatitis, cirrhosis and its complications, and fulminant hepatic failure.
 27. Hematology/oncology—causes and management of bleeding disorders, including proper use of blood products; management of neutropenic and immunocompromised patient; complications of bone marrow transplantation and their management.
 28. Nervous system disorders—causes, evaluation and management of coma, cerebrovascular accidents, status epilepticus, delirium and other psychiatric disorders, weakness and neuromuscular disorders. Criteria and testing for brain death.
 29. Infectious diseases in the ICU—including principles of infection control and prevention of nosocomial infection; spectrum of activity and potential adverse effects of antimicrobial agents; causes and evaluation of fever in the ICU; criteria, causes, evaluation and management of septic shock.
 30. Manifestations, evaluation and management of poisoning and drug overdose
 31. Disorders of temperature control including evaluation and management of hypo- and hyperthermia
 32. Basics of critical care in obstetrical and gynecological diseases
 33. Recognition and management of acute allergic reactions and anaphylaxis

Teaching Methods

- Direct observation of delivery of care by attending physicians and fellows.
- One-on-one interaction with ward attending during teaching and work rounds.
- Direct patient care
- Lectures, both formal (with power point slides) and informal/on rounds
- Interaction with consultants and support staff
- Participation in regularly scheduled MICU core conference
- Literature searches to answer clinical questions that arise on rounds or during patient care
- Interaction with the interdisciplinary health care team

- Participation in daily radiology rounds
- Specific readings will be assigned by supervising clinical faculty members and fellows. In addition, it is expected that house staff read articles that are relevant to the patients they see, including articles generated through literature searches and distributed at morning report or at rounds. Residents should become familiar with national and hospital guidelines for care of ICU disease states.

Methods of Evaluation of Residents

- Direct observation of resident competence by attending physicians and fellows.
- Case presentations on morning rounds.
- Summative feedback from nurses, respiratory therapists and fellows.
- Evaluation of admission history and physical notes and daily progress notes.
- Supervising attendings will evaluate house staff via New Innovations. These evaluations should be discussed in person with the house staff. There will also be a mid-rotation feedback from the attending to discuss performance and recommendations for improvement.
- House staff will evaluate attendings via New Innovations. Please complete these evaluations in a timely manner as they are very useful to attendings and the department.
- House staff log procedures performed via New Innovations. Attendings, or other supervising physicians, documents satisfactory performance through the electronic procedure logger.

Methods of Rotation Evaluation by the IM Training Program

- The IM Training Program evaluates the quality of the rotation based on resident feedback, including self reported resident stress and fatigue levels and duty hours, quality of educational experience, quality of faculty teaching, among other parameters, on a regular basis. Re-design of the staffing model, hours or educational experience will be done as needed, in conjunction with the Director of the MICU, the Division Chief of Pulmonary, Critical Care and Sleep Medicine and the Chair of Medicine.

Required Reading/Resources

The Acute Respiratory Distress Syndrome Network. Ventilation with lower tidal volumes as compared with traditional tidal volumes for acute lung injury and ARDS. N Engl J Med 2000; 342:1301–1308

Ware LB, Matthay MA. The acute respiratory distress syndrome. N Engl J Med 2000; 342:1334–1347

Rivers E, Nguyen B, Havstad S, et al. Early goal directed therapy in the treatment of severe sepsis and septic shock.
N Engl J Med 2001; 345:1368–1377

Finfer S, Bellomo R, Boyce N, et al. A comparison of albumin and saline for fluid resuscitation in the intensive care unit.
N Engl J Med 2004; 350:2247–2256

Schiffl H, Lang SM, Fischer R. Daily hemodialysis and the outcome of acute renal failure. N Engl J Med 2002; 346:305–310

McGilvray ID, Greig PD. Critical care of the liver transplant patient: an update.
Curr Opin Crit Care 2002;8:178–182

Naylor DF, Olson MM. Critical care obstetrics and gynecology.
Crit Care Clin 2003; 19:127–149

Slutsky A. Mechanical ventilation.
Chest 1993;104:1833–1859

Richard F, Teboul JL. Predicting fluid responsiveness in ICU patients.
Chest 2002; 121:2000–2008

Bartlett JG, Perl TM. The new *Clostridium difficile*: what does it mean?
N Engl J Med 2005; 353:2503–2505

Baron TH, Morgan DE. Acute necrotizing pancreatitis.
N Engl J Med 1999; 340:1412–1417

Fencel V, Jabor A, Kazda A, et al. Diagnosis of metabolic acid-base disturbances in critically ill patients.
Am J Respir Crit Care Med 2000; 162:2246–2251

Forsythe SM, Schmidt GA. Sodium bicarbonate for the treatment of lactic acidosis.
Chest 2000;117:260–267

Corwin HL, Gettinger A, Pearl RG, et al. The CRIT Study: anemia and blood transfusion in the critically ill: current clinical practice in the United States.
Crit Care Med 2004; 32:39–52

Kreymann KG, Berger MM, Deutz NE, et al. ESPEN guidelines on enteral nutrition: intensive care.
Clin Nutr 2006; 25:210–223

Heyland DK, Dhaliwal R, Drover JW, et al. Clinical practice guidelines for nutrition support in the adult critically ill patient.

JPEN J Parenter Enteral Nutr 2003; 27:355–373

Clinical practice guidelines for the diagnosis and management of intravascular catheter-related infection: 2009 Update by the Infectious Diseases Society of America.

Clin Infect Dis. 2009;49:1-45.

Surviving Sepsis Campaign: international guidelines for management of severe sepsis and septic shock: 2008.*

*The correct citation for this article is Dellinger RP, Levy MM, Carlet JM, et al. Surviving Sepsis Campaign: international guidelines for management of severe sepsis and septic shock: 2008 [published correction appears in *Crit Care Med.* 2008;36:1394-1396]. *Crit Care Med.* 2008;36:296-327.

Guidelines for evaluation of new fever in critically ill adult patients: 2008 update from the American College of Critical Care Medicine and the Infectious Diseases Society of America.

Crit Care Med. 2008;36:1330-1349.