

**Henry Ford Hospital**  
**Department of Internal Medicine**  
**Internal Medicine Residency Program**

**Competency Based, Milestone specific Integrated Curriculum**

**Rotation: Medical ICU**

Anticipated Learners: Categorical PGY-2. The team will consist of a senior staff physician, a critical care fellow, and approximately 4 residents. The internal medicine residents are typically PGY-2 house officers, however there may be rotating non-categorical interns and ER residents as well. The team may also include year-4 medical students.

Version Date: February 2019

Author: Jennifer Swiderek, MD

CMR Reviewer: Lindsey Aurora, MD

**Location:** Henry Ford Main Campus

**Rotation duration:** One month. Each resident will have approximately 3 MICU months.

**Rotation schedule:**

Each month, approximately 12 house officers will be assigned to the MICU service. Compliance with the ACGME work hour rules of less than 80 hours/week averaged over 4 weeks, 1 day-off per week averaged over 4 weeks, and no more frequent call than 1 in every 3 nights is strictly enforced during the MICU rotation. MICU teams follow 2 different models. In the shift model, teams have a separate night float system in which residents will rotate to cover the night shift for about 1 week of the rotation, while the day team residents will have admitting shifts until 8pm every 4th day. In our second model, residents complete an overnight 24 +4 hour call shift every 4 days. One resident from each team will be on-call each night, with direct supervision by a MICU fellow. The on-call resident is responsible for all admissions, procedures and cross-coverage issues overnight and may be asked to help out other residents doing the same should one team have more admissions than another team. During daytime hours of 7 AM- 5 PM, the MICU Fellow may assign newly admitted patients to residents who are not on call to balance workload. Rotating house staff must attend the daily MICU lecture series (weekdays, 8:00-8:30 AM in the MICU conference room).

During the MICU rotation, patient care will be provided in the Henry Ford Hospital Medical Intensive Care Unit (MICU). The Medical Intensive Care Unit is a 68-bed multidisciplinary ICU with three 16-bed MICU resident teams. Occasionally, patients will overflow into other ICU locations, including the SICU (P4), CVICU (P5), or NICU (C6W). UP to 2 overflows will be cared for by each MICU resident team.

**Time away allowed:** No vacation time during this rotation.

## **Rotation Goals and Educational Purpose**

During the Medical Intensive Care Unit (MICU) rotation, house officers will be responsible for the diagnosis and therapy of patients with a variety of critical care diseases encompassing acute respiratory failure; circulatory failure and shock syndromes; sepsis syndromes and multi system organ failure; renal disorders including electrolyte and acid-base disturbances and acute renal failure; hematologic and coagulation disorders associated with critical illness; immunosuppressed conditions and infections; neurologic emergencies; and disorders of the gastrointestinal system. The MICU rotation's major educational activity is the daily bedside teaching rounds with the senior staff intensivist. In addition, house-staff will take an active role in their education by reviewing diagnostic studies, presenting journal articles, and raising alternative diagnoses and therapeutic strategies.

## **Learning Objectives – Following completion of the MICU rotation, residents will be expected to:**

1. Modify the differential diagnosis and care plan base on clinical course and data as appropriate.
2. Work effectively as a member within the inter-professional team to ensure safe patient care for the critically ill patient and communicate appropriately to consultants involved in the care of the patient.
3. Maintain awareness of the situation in the moment and respond to meet situational needs and demonstrate the ability to utilize and interpret physiologic data, lab testing, and radiologic studies in the critically ill.
4. Engage patient/advocate in shared decision making for difficult, ambiguous, or controversial scenarios including end-of-life scenarios.
5. Appropriately perform invasive procedures and provide post-procedure care management for common procedures.
6. Demonstrate sufficient knowledge to identify and treat medical conditions that require intensive care.
7. Respond promptly and appropriately to clinical responsibilities including but not limited to calls and pages.
8. Be familiar with ICU protocols and policies as quality assurance and improvement tools and effectively collaborate in ICU quality initiatives targeting restraint documentation, infection control, ventilator bundle performance, and sepsis treatment goals.
9. Recognize the limits of medical care and end-of-life discussions.

## **Teaching & Assessment methods for the above Learning objectives**

1. Daily presentations and discussions on rounds with observation by senior staff of team patients.
2. Daily discussion and review of pathophysiology of the critically ill patient as appropriate to patients on service.
3. Utilization of online resources including online reading list (below) to obtain evidence based medicine.
4. Utilization of ICU protocols and policies and review by staff of quality initiatives.
5. Demonstration of appropriate communication with members of health care team including nurses, case-workers, and consultants.

6. Review of physiologic data, lab tests, and radiologic studies by senior staff during rounds with observation of resident's ability to interpret data and knowledge of appropriateness of imaging.
7. Role-modeling by senior staff of how to have end-of life discussions and engage patient and family in shared decision making.
8. Daily MICU lecture series before rounds

### **Reading List/On-line Resources**

Multiple resources are available to supplement education for the resident during this rotation. Updated February 2019:

### **Supplementary Reading List:**

#### **Hemodynamic Monitoring**

Boldt, J. 2002. Clinical review: hemodynamic monitoring in the intensive care unit. Crit Care 6(1):52-59.

[PubMed Abstract](#) | [Full-Text Article](#) | [PDF Article](#)

Bernard, G. R., G. Sopko, et al. 2000. Pulmonary artery catheterization and clinical outcomes: National Heart, Lung, and Blood Institute and Food and Drug Administration Workshop Report. Consensus Statement. JAMA 283(19):2568-2572.

[PubMed Abstract](#) | [Full-Text Article](#)

Laher. A review of hemodynamic monitoring techniques, methods and devices for the emergency physician. Amer J Emer Med 2017; 35(9): 1335-1347.

[PubMed Abstract](#) [Full-Text Article](#)

Marik. Noninvasive hemodynamic monitoring in the intensive care unit. Crit Care Clin 2007; 23(3):383.

[PubMed Abstract](#) [Full-Text Article](#)

#### **Respiratory Failure: Mechanical and Noninvasive Ventilation and High-Flow Oxygen**

Pham. Mechanical ventilation: state of the art. Mayo Clin Proc 2017; 92(9)1382-1400.

[PubMed Abstract](#) [Full-Text Article](#)

Kelly. Noninvasive positive-pressure ventilation. N Engl J Med 2015; 372:e30.

[PubMed Abstract](#) [Full-Text Article](#)

Antonelli, M., G. Conti, et al. 1998. A comparison of noninvasive positive-pressure ventilation and conventional mechanical ventilation in patients with acute respiratory failure. N Engl J Med 339(7):429-435.

[PubMed Abstract](#) | [Full-Text Article](#) | [PDF Article](#)

Official ERS/ATS clinical practice guidelines: noninvasive ventilation for acute respiratory failure. Eur Resp J 2017; 50(2): 1602426.

[PubMed Abstract](#) [Full-Text Article](#)

Tobin, M. J. 1994. Mechanical ventilation. N Engl J Med 330(15):1056-1061.

[PubMed Abstract](#) | [Full-Text Article](#)

Tobin, M. J. 2001. Advances in mechanical ventilation. N Engl J Med 344(26):1986-1996.

[PubMed Abstract](#) | [Full-Text Article](#)

Pham. Mechanical ventilation: state of the art. May Clin Proc 2017; 92(9): 1382-1400.

[PubMed Abstract](#) [Full-Text Article](#)

Frat JP, Thille AW, Mercat A, et al. High-flow oxygen through nasal cannula in acute hypoxemic respiratory failure. N Engl J Med 2015;372(23): 2185-2196.

[PubMed Abstract](#) [Full-Text Article](#) [PDF Article](#)

## **ARDS**

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

[PubMed Abstract](#) [Full-Text Article](#)

The ARDS Definition Task Force. Acute respiratory distress syndrome. The Berlin Definition. JAMA 2012; 307(23):2526-33.

[PubMed Abstract](#) [Full-Text Article](#)

Papazian. Neuromuscular blockers in early acute respiratory distress syndrome. N Engl J Med 2010; 363:1107-1116.

[PubMed Abstract](#) [Full-Text Article](#)

Guérin. Prone Positioning in Severe Acute Respiratory Distress Syndrome (PROSEVA). New Engl J Med 2013; 368:2159-2168

[PubMed Abstract](#) [Full-Text Article](#)

Peek. Efficacy and economic assessment of conventional ventilatory support versus extracorporeal membrane oxygenation for severe adult respiratory failure (CESAR): A multicentre randomised controlled trial. Lancet 2009. 374(9698):1351-1363.

[PubMed Abstract](#) [Full-Text Article](#)

Amato. Driving pressure and survival in the acute respiratory distress syndrome. N Engl J Med 2015; 372:747-755.

[PubMed Abstract](#) [Full-Text Article](#)

### **ICU Delirium/Sedation**

Balas. Effectiveness and safety of the Awakening and Breathing Coordination, Delirium Monitoring/ Management, and Early Exercise/Mobility (ABCDE) bundle. Crit Care Med 2014; 42(5): 1024-1036.

[PubMed Abstract](#) [Full-Text Article](#) [PDF Article](#)

Devlin. Clinical practice guidelines for the prevention and management of pain, agitation/sedation, delirium, immobility, and sleep disruption in adult patients in the ICU. Crit Care Med 2018; 46(9): e825-e873.

[PubMed Abstract](#) [Full-Text Article](#)

Marra. The ABCDEF bundle in critical care. Crit Care Clin 2017; 33(2):225-243.

[PubMed Abstract](#) [Full-Text Article](#) [PDF Article](#)

Pun. Caring for critically ill patients with the ABCDEF bundle: results of the ICU Liberation Collaborative in over 15,000 adults. Crit Care Med 2019; 47(1): 3-14.

[PubMed Abstract](#) [Full-Text Article](#)

Kress. Daily interruption of sedative infusions in critically ill patients undergoing mechanical ventilation. N Engl J Med 2000; 342: 1471-1477.

[PubMed Abstract](#) [Full-Text Article](#)

### **Fluids**

Choi, P. T., G. Yip, et al. 1999. Crystalloids vs. colloids in fluid resuscitation: a systematic review. Crit Care Med 27:200-210.

[PubMed Abstract](#) | [Full-Text Article](#) | PDF Article Not Available

Groeneveld, A. B. 2000. Albumin and artificial colloids in fluid management: where does the clinical evidence of their utility stand? Crit Care 4 Suppl 2:S16-20.

[PubMed Abstract](#) | [Full-Text Article](#) | [PDF Article](#)

Fluid management for critically ill patients: a review of the current state of fluid therapy in the intensive care unit. Kid Dis 2016; 2(2): 64-71.

[PubMed Abstract](#) [Full-Text Article](#) [PDF Article](#)

### **Blood Transfusion**

Herbert PC, Wells G, Blajchman MA, et al. A multicenter, randomized clinical trial of transfusion requirements in critical care. Transfusion Requirements in Critical Care Investigators, Canadian Critical Care Trials Group. N Engl J Med 340(6):409-417.

[PubMed Abstract](#) [Full-Text Article](#)

Goodnough, L. T., M. E. Brecher, et al. 1999. Transfusion medicine. First of two parts--blood transfusion. N Engl J Med 340(6):438-447.

[PubMed Abstract](#) | [Full-Text Article](#)

Goodnough, L. T., M. E. Brecher, et al. 1999. Transfusion medicine. Second of two parts--blood conservation. N Engl J Med 340(7):525-533.

[PubMed Abstract](#) | [Full-Text Article](#)

### **Oxygen Delivery and Consumption**

Vincent, J. L. 1996. Determination of oxygen delivery and consumption versus cardiac index and oxygen extraction ratio. Crit Care Clin 12(4):995-1006.

[PubMed Abstract](#) | [Full-Text Article](#)

### **Acid-Base**

Magder. Practical approach to physical-chemical acid-base management. Ann Amer Thorac Soc 2015; 12(1): 111-117.

[PubMed Abstract](#) [Full-Text Article](#)

Adrogué, H. J., and N. E. Madias. 1998. Management of life-threatening acid-base disorders. First of two parts. N Engl J Med 338(1):26-34.

[PubMed Abstract](#) | [Full-Text Article](#)

Adrogué, H. J., and N. E. Madias. 1998. Management of life-threatening acid-base disorders. Second of two parts. N Engl J Med 338(2):107-111.

[PubMed Abstract](#) | [Full-Text Article](#)

### **Electrolytes**

Buffington. Hyponatremia: a review. J Int Care Med 2016; 31(4): 223-236.

[PubMed Abstract](#) [Full-Text Article](#)

Sterns RH. Disorders of plasma sodium--causes, consequences, and correction. N Engl J Med. 2015 Jan 1;372(1):55-65.

[PubMed Abstract](#) [Full-Text Article](#)

Gennari, F. J. 1998. Hypokalemia. N Engl J Med 339(7):451-458.

[PubMed Abstract](#) | [Full-Text Article](#)

## **Sepsis and Septic Shock**

Parrillo, J. E. 1993. Pathogenetic mechanisms of septic shock. N Engl J Med 328(20):1471-1477.

[PubMed Abstract](#) | [Full-Text Article](#)

Emanuel Rivers et al. Early goal-directed therapy in the treatment of severe sepsis and septic shock. N Engl J Med 2001; 345:1368-1377.

[PubMed Abstract](#) [Full-Text Article](#)

The ProCESS Investigators. A randomized trial of Protocol-Based Care for Early Septic Shock (ProCESS study). New Engl J Med 2014; 370: 1683-1693.

[PubMed Abstract](#) [Full-Text Article](#)

The ARISE Investigators. Goal-directed resuscitation for patients with early septic shock. N Engl J Med 2014;371(16):1496-1506.

[PubMed Abstract](#) [Full-Text Article](#)

Mouncey The ProMISE Trial Investigators. Trial of early, goal-directed resuscitation for septic shock. N Engl J Med 2015; 372(14):1301-1311.

[PubMed Abstract](#) [Full-Text Article](#)

Surviving Sepsis Campaign: international guidelines for management of sepsis and septic shock 2016. Crit Care Med 2017; 45(3):486-552.

[PubMed Abstract](#) [Full-Text Article](#)

Marik. Hydrocortisone, vitamin C, and thiamine for the treatment of severe sepsis and septic shock. Chest 2017; 151(6): 1229-1238.

[PubMed Abstract](#) [Full-Text Article](#)

Annane. Corticosteroids in the Treatment of severe sepsis and septic shock in adults. JAMA 2009;301(22):2362-2375

[PubMed Abstract](#) [Full-Text Article](#)

Sprung. Hydrocortisone therapy for patients with septic shock. N Engl J Med 2008; 358:111-124.

[PubMed Abstract](#) [Full-Text Article](#)

Rochwerg. corticosteroids in sepsis: an updated systematic review and meta-analysis. Crit Care Med 2018; 46(9):1411-1420.

[PubMed Abstract](#) [Full-Text Article](#)

## **Shock**

Landry, D. W., and J. A. Oliver. 2001. The pathogenesis of vasodilatory shock. N Engl J Med 345(8):588-595.

[PubMed Abstract](#) | [Full-Text Article](#)

Shokoohi. Bedside ultrasound reduces diagnostic uncertainty and guides resuscitation in patients with undifferentiated hypotension. Crit Care Med 2015; 42(12): 2562-2569.

[PubMed Abstract](#) [Full-Text Article](#)

Gamper. Vasopressors for hypotensive shock (Cochrane Review) 2016.

[PubMed Abstract](#) [Full-Text Article](#)

## **Renal Failure**

Levey. Acute kidney injury. Ann Int Med 2017;167(9):ITC66-ITC80.

[PubMed Abstract](#) [Full-Text Article](#)

Ostermann. Acute kidney injury 2016: diagnosis and diagnostic workup. Crit Care 2016; 20:299.

[PubMed Abstract](#) [Full-Text Article](#) [PDF Article](#)

Levey. Chronic kidney disease. Lancet 2012; 379(9811): 165-180.

[PubMed Abstract](#) [Full-Text Article](#)

## **Pulmonary Embolism**

Antithrombotic therapy for VTE disease: CHEST guideline and expert panel report.

Chest 2016; 149(2): 315-352.

[PubMed Abstract](#) [Full-Text Article](#)

Raja. Evaluation of patients with suspected acute pulmonary embolism: best practice advice from the Clinical Guidelines Committee of the American College of Physicians.

Ann Intern Med 2015; 163:701-711.

[PubMed Abstract](#) [Full-Text Article](#)

2014 ESC Guidelines on the diagnosis and management of acute pulmonary embolism:

The Task Force for the Diagnosis and Management of Acute Pulmonary Embolism of the European Society of Cardiology (ESC). Eur Heart J 2014; 35(43): 3033-3069.

[PubMed Abstract](#) [Full-Text Article](#)

Meyer. Fibrinolysis for patients with intermediate-risk pulmonary embolism. N Engl J Med 2014; 370: 1402-1411.

[PubMed Abstract](#) [Full-Text Article](#) [PDF Article](#)

## **Miscellaneous**

International ERS/ATS guidelines on definition, evaluation, and treatment of severe asthma. Eur Resp J 2014; 43:343-373.

[PubMed Abstract](#) [Full-Text Article](#) [PDF Article](#)

Management of adults with hospital-acquired and ventilator-associated pneumonia: 2016 clinical practice guidelines by the Infectious Diseases Society of America and the American Thoracic Society. Clin Inf Dis 2016; 63(5): e61-e111.

[PubMed Abstract](#) [Full-Text Article](#) [PDF Article](#)

Nielsen. Targeted temperature management at 33°C versus 36°C after cardiac arrest. N Engl J Med 2013; 369:2197-2206

[PubMed Abstract](#) [Full-Text Article](#)

Fishman, JA. Infection in solid-organ transplant recipients. N Engl J Med 2007;357(25):2601-2614.

[PubMed Abstract](#) [Full-Text Article](#)

*Updated and Revised by Dr. Jennifer Swiderek on February 7, 2019*

If the journal article is not available full-text, the Sladen Library would be glad to obtain a photocopy of the article for you from another library. Click here for the [Request Form](#).

## **Evaluation Tool**

All evaluations will occur through the Henry Ford Health System's graduate medical education evaluation tool (MyEvaluations)

All Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. The resident will professionally represent the Division of General Medicine and Henry Ford Health System during their time on this rotation. Residents will be expected to provide the skills, care and attitudes set forth by the ACGME's 6 core competencies (see link at section IV.A.5:

[https://www.acgme.org/acgmeweb/Portals/0/PFAssets/2013-PR-FAQ-PIF/140 internal medicine 07012013.pdf](https://www.acgme.org/acgmeweb/Portals/0/PFAssets/2013-PR-FAQ-PIF/140%20internal%20medicine%2007012013.pdf) )

See Appendix 1 for additional/specific expectations and responsibilities.

## **Appendix 1: Expectations & Responsibilities**

### **Resident Expectations & Responsibilities**

- a. Residents will be punctual, be responsive to their patient's needs, adhere to the highest regard of ethics, and show sensitivity to the diverse group of patients cared for during this rotation.
- b. Complete timely H&Ps on all new admissions and transfers from other services and avoid unapproved abbreviations in EMR.

- c. Adhere to policies and procedures regarding order writing, daily progress notes, and chain of command.
- d. Attend 100% of academic sessions including daily teaching sessions which occur at 8:00 am in the conference room
- e. Teach junior medical students.
- f. Adhere to duty hours. Of less than 80 hours per week averaged over 4 weeks, 1 day off per week averaged over 4 weeks, and no more frequent call than 1 in every 3 nights.
- g. Residents will be expected to achieve >70% score on post-test
- h. The on call resident is responsible for admissions, procedures, cross-coverage issues overnight and may be asked to help out with other pods.
- i. During the daytime hours of 7 am to 5 pm, the MICU fellow may assign newly admitted patients to residents who are not on call to balance workload.

### **Faculty Expectations & Responsibilities**

- a. Daily review and document in the inpatient charts.
- b. Provide feedback to residents regarding their skills and behaviors set forth in curriculum objectives
- c. Attending or covering physician will be available to the residents and patients at all times. Call schedule for covering physician can be found on hfhpulm.com website. On home page, on left under Quick Links, click Schedules then link to call schedule and rounding/ICU Gap schedule is located under "Staff call schedule".
- d. Teach residents to utilize medical resources (including tests and consult services) efficiently.
- e. Adhere to the curriculum as a teaching and evaluation tool.
- f. Complete resident evaluation forms in a timely fashion and provide constructive feedback to interns and residents at the end of the rotation.
- g. Adhere to rounding times: 8:30 AM start time during the week.
- h. Enforce and monitor duty hours for all students and house officers.

**AUTHOR:** The following information will outline educational goals as well as responsibilities for all participants of this rotation. Please contact Jennifer Swiderek, MD (jswider1@hfhs.org) if there are any questions or concerns.