



AMERICAN ACADEMY OF
FAMILY PHYSICIANS

AAFP Reprint No. 291

Recommended Curriculum Guidelines for Family Medicine Residents

Care of the Critically Ill Adult

This document was endorsed by the American Academy of Family Physicians (AAFP).

Introduction

This Curriculum Guideline defines a recommended training strategy for family medicine residents. Attitudes, behaviors, knowledge, and skills that are critical to family medicine should be attained through longitudinal experience that promotes educational competencies defined by the Accreditation Council for Graduate Medical Education (ACGME), www.acgme.org. The family medicine curriculum must include structured experience in several specified areas. Much of the resident's knowledge will be gained by caring for ambulatory patients who visit the family medicine center, although additional experience gained in various other settings (e.g., an inpatient setting, a patient's home, a long-term care facility, the emergency department, the community) is critical for well-rounded residency training. The residents should be able to develop a skill set and apply their skills appropriately to all patient care settings.

Structured didactic lectures, conferences, journal clubs, and workshops must be included in the curriculum to supplement experiential learning, with an emphasis on outcomes-oriented, evidence-based studies that delineate common diseases affecting patients of all ages. Patient-centered care, and targeted techniques of health promotion and disease prevention are hallmarks of family medicine and should be integrated in all settings. Appropriate referral patterns, transitions of care, and the provision of cost-effective care should also be part of the curriculum.

Program requirements specific to family medicine residencies may be found on the ACGME website. Current AAFP Curriculum Guidelines may be found online at www.aafp.org/cg. These guidelines are periodically updated and endorsed by the AAFP and, in many instances, other specialty societies, as indicated on each guideline.

Each residency program is responsible for its own curriculum. **This guideline provides a useful strategy to help residency programs form their curricula for educating family physicians.**

Preamble

Family physicians are the most broadly trained specialists in the medical profession. Therefore, critical care continues to be part of the training and responsibilities of the family physician. There is a need for family physicians to provide care to critically ill adults, especially in rural areas and in smaller hospitals. Clinical experience in critical care is essential for all residents. The depth of the critical care experience for each resident will depend upon the expected practice situation of the resident, including the anticipated practice location, available facilities, and accessibility of subspecialist consultants.

This Curriculum Guideline expands upon knowledge and skills needed for critical care competency that are not expanded upon in other Curriculum Guidelines. Related Curriculum Guidelines are Reprint Nos. 259 (Care of the Surgical Patient), 269 (Palliative and End-of-Life Care), 279 (Medical Ethics), and 285 (Urgent and Emergent Care).

Family physicians caring for hospitalized adult patients require skills and knowledge in ascertaining signs, symptoms, and laboratory abnormalities of the critically ill. They must become masterful in recognition and diagnosis, and competent in the initial resuscitation and management of such cases. They must also acquire the ability to coordinate the chronological flow of care in the hospital (i.e., from admission to discharge) and take into consideration the psychosocial issues applicable to each individual patient and the patient's caregivers.

Health care expenditures in the United States continue to rise with hospital spending accounting for a significant segment of health care dollars. Hospitals are under continuous demands to provide more efficient care with restricted funds. Managed care capitation, government scrutiny, and health care professional shortages have generated a need in many organizations for physicians to be able to provide high-quality critical care. Family physicians must efficiently coordinate care and resources in all settings but especially so in the hospital setting.

Meanwhile, medical advances are being made in areas such as electronic health records (EHRs), imaging studies, diagnostic tests, pharmacotherapy, and invasive and noninvasive procedures. This has led to the need for reassessment of the quality and safety of health care provision within critical care units, along with stressing better coordination and communication.

Preventive medicine, which has traditionally played a key role in ambulatory care, has become an important component in critical care. Strategies have emerged to prevent deep venous thrombosis (DVT), maintain euglycemia, and prevent hospital-acquired infections. These infections burden the health care system both economically and in terms of patient outcomes. Inpatient quality and safety measures are being

promulgated, and evidence-based medicine (EBM) is the ideal approach to manage critically ill patients.

With adequate training and preparation, residents can acquire skills to enact best practices from admission through discharge and during care transitions, leading to safe, patient-centered, cost-efficient quality care.

The COVID-19 pandemic brought new challenges to society and the health care system. These challenges were felt most acutely in the critical care setting, where new diagnostic approaches and treatment strategies were developed in real time. Family physicians and family medicine residents must be aware of the scientific advances made in the care of critically ill patients with COVID-19.

Competencies

At the completion of residency training, a family medicine resident should be able to:

- Perform standardized, comprehensive critical care assessments and develop acute treatment plans (Patient Care, Medical Knowledge)
- Optimize treatment plans using a systematic approach to medical decision making and patient care, combining scientific evidence and clinical judgment with patient values and preferences; knowledge should be evidence based and derived from nationally recognized resources (Systems-based Practice, Practice-based Learning and Improvement)
- Lead and engage multidisciplinary team rounds in intensive care units (ICU) (i.e., nursing, dietary, physical therapy, respiratory therapy, residents, social services, pharmacy, patient, and/or patient's family) with inclusion of their perspectives into the goals/plan of care
- Coordinate admissions, inpatient care, and throughput within the hospital system (Systems-based Practice)
- Communicate in multiple modalities with patients, families, other health care professionals, and administrators; effective communication is central to the role of the family physician to promote efficient, safe, and high-quality care (Interpersonal and Communication Skills, Professionalism)
- Recognize self-limitations about practice and seek consultation with other health care professionals to provide optimal care; assess medical information to support self-directed learning (Medical Knowledge, Practice-based Learning and Improvement)
- Demonstrate compassion, empathy, and sensitivity to hospitalized patients and their families; appreciate that informed adults with decision-making capacity may refuse recommended medical treatment (Professionalism)
- Demonstrate compassion, empathy, and sensitivity to patients who are critically ill and their families when all avenues of treatment become futile and death is imminent; when hospice care is not available, the family physician must handle those duties appropriately (Interpersonal and Communication Skills, Professionalism)

Attitudes

The resident should demonstrate attitudes that encompass:

- Promptly recognizing critical illness
- Balancing working quickly and effectively in acute critical care situations with maintaining care oversight of patients who need longer term care in the critical care unit
- Recognizing that appropriate subspecialist physician consultation is important in the care of adults who are critically ill
- Communicating effectively, ensuring excellence in handoffs and transfers, and working well with all members of the health care team
- Compassionate sensitivity to, and appropriate support of, the needs of family members of the adult who is critically ill and communicating effectively with them

Knowledge

In the appropriate setting, the resident should demonstrate the ability to apply knowledge of:

1. Underlying physiologic changes associated with the patient who is critically ill in the various body systems, including diminished homeostatic abilities, altered metabolism, effects of drugs, and other changes
2. Conditions encountered in the hospital setting that are significantly life threatening or likely to have significant impact in changing care processes leading to quality improvement and efficiency
3. Unique modes of presentation of patients who are critically ill, including altered and nonspecific presentations of diseases
4. Financial aspects of critical care and the mechanisms by which medical innovations influence health care patterns and decisions
5. Processes and systems of care that span multiple disease entities and require multidisciplinary input to support quality care and efficiency
6. Processes and communication required for the safe transition of patients from one clinical setting to another
7. Formulation of pretest probability using initial history, physical examination, and preliminary diagnostic information (when available), and the relevance of sensitivity and specificity in interpreting diagnostic findings
8. Evaluation of benefits, harms, and financial costs of drug therapies for individual patients, as well as recognition of risks of adverse drug events at the time of transfer

of care

9. Reconciliation of medication documentation at the time of discharge
10. Equitable health resources for patients and recognition that overutilization of resources may not promote patient safety, quality care, or satisfaction
11. Relationship of value, quality, cost, and incorporation of patient wishes to optimal health care
12. Sources for the best available evidence to support clinical decisions and process improvements at the individual and institutional levels
13. Advocacy for provision of high-quality, point-of-care evidence-based medicine (EBM) information resources within the institution
14. Role played by an assisting subspecialist consultant in promoting improved care, optimized resource utilization, and enhanced patient safety
15. Access to, and interpretation of, data, images, and other information from available clinical information systems
16. Use of methods and materials to educate, reassure, and empower patients and families to participate in the creation and implementation of a care plan
17. Clinical practices and interventions that improve patient safety and the effects of recommended interventions across the continuum of care
18. Common types of health care-associated infections, including risk factors
19. Use of hospital antibiograms in delineation of antimicrobial resistance patterns for selection of appropriate empiric antibiotics and as a major resource for infection control information
20. Medical practice conduct to ensure appropriate risk management
21. Incorporation of palliative care teams when appropriate on the continuum of critical care illness
22. Non-judgmental, inclusive, and innovative approaches to the care of patients who are morbidly obese, low income, and “non-compliant”
23. The following clinical conditions that are relevant to management of adults who are critically ill:
 - a. Basic science review
 - i. Circulation
 - b. Respiration renal disease and metabolic disorders
 - i. Acute kidney injury
 - ii. Acid-base disorders

- iii. Electrolyte abnormalities
- c. Cardiovascular conditions
 - i. Acute coronary syndromes
 - ii. Cardiopulmonary arrest
 - iii. Dysrhythmia
 - 1) Tachycardia
 - 2) Bradycardia
 - iv. Hypertensive urgency and emergency
 - v. Heart failure
 - vi. Cardiogenic pulmonary edema
 - vii. Use of vasoactive medications
- d. Endocrine
 - i. Diabetic ketoacidosis
 - ii. Thyroid storm and myxedema coma
 - iii. Hyperosmolar nonketotic syndromes
 - iv. Adrenal dysfunctions
 - v. Other endocrine emergencies
- e. Hematologic
 - i. Bleeding disorders
 - ii. Coagulopathies
 - iii. Transfusion therapy and reactions
 - iv. Venous thromboembolic disease
- f. Gastrointestinal
 - i. Acute abdomen
 - ii. Gastrointestinal bleeding
 - iii. Hepatic failure
 - iv. Pancreatitis
- g. Pulmonary
 - i. Respiratory failure
 - 1) Hypoxemia
 - 2) Hypercapnia
 - ii. Acute respiratory distress syndrome (ARDS)
 - iii. Pulmonary embolism
 - iv. Pneumonia
 - v. Pulmonary hypertension
 - vi. Severe airflow obstruction
 - vii. Obesity-hypoventilation syndrome and obstructive sleep apnea
- h. Neurological
 - i. Coma and delirium
 - j. Anxiety and depression
 - ii. Cerebral vascular accidents
 - iii. Hemorrhagic
 - 1) Ischemic
 - a) Thrombolytic therapy
 - 2) Subarachnoid
 - iv. Central nervous system (CNS) infections

- 1) Meningitis
- 2) Encephalitis
- v. Brain and spinal cord trauma and disease
- vi. Seizures and status epilepticus
- vii. Neuroleptic malignant syndrome
- viii. Serotonin syndrome
- ix. Movement disorders
- x. Neurological emergencies
- xi. Analgesia
- xii. Sedation
- xiii. Post-arrest-induced hypothermia cerebral protection strategies
- xiv. Cognitive recovery protocols
- i. Infectious disease
 - i. SARS-CoV-2 (COVID-19), prevention, recognition, and treatment: outpatient, inpatient, and ICU care best practices
 - ii. Systemic inflammatory response syndrome (SIRS), sepsis, severe sepsis, septic shock
 - iii. Early resuscitative therapy for sepsis
 - iv. Antimicrobial therapy
 - v. Antiviral therapy
 - vi. Antifungal therapy
 - vii. Immunocompromised patients
 - viii. *Clostridium difficile* and pseudomembranous colitis
- k. Multisystem
 - i. Shock states
 - 1) Septic
 - 2) Cardiogenic
 - ii. Hypothermia
 - iii. Hyperthermia
 - iv. Rhabdomyolysis
 - v. Multisystem organ failure
 - vi. Overdose and poisonings
 - vii. Alcohol and drug withdrawal
 - viii. Trauma
 - ix. Thermal injury
- l. Perioperative care
 - i. Preoperative risk assessment
 - ii. Preoperative antibiotic therapy
 - iii. Postoperative management (pain, glycemic control, antibiotics)
 - iv. Postoperative crisis
- m. Preventive practices
 - i. Alimentary
 - ii. Nosocomial infections including:
 - 1) Central line infections
 - 2) Ventilator-acquired pneumonia
 - iii. Venous thromboembolism
 - iv. Decubitus ulcers

- n. Nutrition and metabolism
 - i. Metabolic requirements
 - ii. Enteral and parenteral feeding
- o. Coexisting conditions
 - i. Obesity
 - ii. Pregnancy
 - iii. Elderly
- p. End-of-life
 - i. Palliative care team incorporation
 - ii. Hospice evaluation
 - iii. Advanced life support utilization
 - iv. Organ donation and transplantation
 - v. Pronouncement of death

Skills

In the appropriate setting, the resident should demonstrate the ability to independently perform or appropriately refer the following:

1. Obtain a comprehensive history and physical examination in the hospital setting
2. Appropriately select, interpret, and perform diagnostic procedures
3. Develop practical problem lists that consider clinical, functional, psychological, and social causes of disease
4. Set appropriate priorities and limitations for investigation and treatment
5. Perform the basic elements of the advanced cardiac life support (ACLS) protocol and procedures
 - a. Electrical and chemical cardioversion
 - b. Electrocardiogram interpretation
 - c. Obtaining appropriate vascular access
6. Perform invasive procedures as needed, including:
 - a. Arterial blood gas
 - b. Central venous access via jugular, subclavian, and femoral veins
 - c. Needle decompression
7. Perform ventilator management, including:
 - a. Airway management (recognition and management of the difficult airway)
 - b. Noninvasive and invasive ventilation
 - i. Application and use of mask interfaces and noninvasive methods
 - ii. Lung protective strategies (low tidal volume ventilation)
 - iii. Prone positioning

- c. Usage of sedation, analgesia, and paralytic agents
 - d. Optimization of fluid management in patients with acute respiratory distress syndrome (ARDS)
 - e. Troubleshooting ventilatory emergencies
 - f. Liberation from ventilator support
8. Imaging interpretation
- a. Chest X-ray interpretation
 - b. Chest computed tomography (CT) interpretation
 - c. Point-of-care ultrasound
9. Early sepsis recognition and resuscitative management
- a. Appropriate fluid resuscitation techniques
 - i. Assessment of volume status and crystalloid utilization
 - ii. Assessment of serial lactate clearance
 - iii. Appropriate central venous access utilization
 - iv. Appropriate vasopressor initiation and usage
 - b. Appropriate empiric antibiotic selection
10. Rapid response team involvement and leadership
11. Appropriate blood product utilization
12. Diagnostic and therapeutic procedures
- a. Arterial blood gases
 - b. Lumbar puncture
 - c. Thoracentesis
 - d. Arthrocentesis
 - e. Paracentesis
 - f. Catheter placement (peripheral IV, arterial line, central venous access)
 - g. Urinary catheter placement (urethral, suprapubic)
 - h. Medical ultrasonography
 - i. Central line placement guidance
 - ii. Resuscitation
13. Mental status assessment
- a. Glasgow Coma Scale
 - b. Richmond Agitation-Sedation Scale (RASS)
 - c. Clinical Institute Withdrawal Assessment (CIWA) scale (alcohol withdrawal)
14. Moderate sedation, conscious sedation, and prevention of delirium

15. Manage patient monitoring information and technology
16. Use the multidisciplinary approach with regard to patient education, quality improvement, and transitions of care
17. Coordinate a range of services appropriate to the patient's needs and support systems
18. Efficiently communicate with patients and/or caregivers regarding the proposed investigation and treatment plans in a way that promotes understanding, compliance, and appropriate attitudes
19. Manage post-intensive care unit (ICU) complications and rehabilitative requirements
 - a. Neurologic
 - b. Psychosocial
 - c. Physiologic
20. Deal with ethical issues in patients who are terminally ill, including:
 - a. Decision-making capacity
 - b. Euthanasia
 - c. Health care rationing
 - d. Palliative and end-of-life care
21. Generate documentation that demonstrates compliance and facilitates proper billing and coding for services provided

Implementation

This curriculum should be implemented in block rotations in the medical ICU. Experiences may also be obtained in critical care units, such as surgical intensive care, coronary care, and neurologic intensive care, as well as in related rotations (e.g., cardiology, nephrology, pulmonary, neurology, gastroenterology, surgery). Residents will also obtain substantial experience through longitudinal experience over the course of the three years. To enhance the critical care experience, programs should consider resident completion of the Fundamental Critical Care Support course sponsored by the Society of Critical Care Medicine. Physicians who have demonstrated skill in caring for adults who are critically ill and who are proficient in hospital medicine should be available to act as role models and consultants for residents. These physicians should be available to give support and advice to residents who are managing patients. A multidisciplinary approach is an appropriate way of structuring teaching experiences in this area.

Residents must have responsibility for adult patients who are critically ill and be active in the decision-making process. A significant number of intensive care and critical care patients should be a part of each resident's panel of patients. Residents should be

required to have the experience of continuing the care of these patients upon discharge to either home, sub-acute rehabilitation facilities, long-term care facilities, assisted-living facilities, and/or the ambulatory setting (i.e., the family medicine center).

Resources

Bhimraj A, Morgan RL, Shumaker AH, et al. Infectious Diseases Society of America guidelines on the treatment and management of patients with COVID-19. *Clin Infect Dis*. 2020;ciaa478.

Bleck T, Dellinger R, Dries D, et al. *ACCP Critical Care Medicine Board Review*. 21st ed. American College of Chest Physicians; 2012.

Devlin JW, Skrobik Y, Gélinas C, et al. 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.

Esan A, Hess DR, Raouf S, et al. Severe hypoxemic respiratory failure: part 1--ventilatory strategies. *Chest*. 2010;137(5):1203-1216.

Grissom CK, Hirshberg EL, Dickerson JB, et al. Fluid management with a simplified conservative protocol for the acute respiratory distress syndrome. *Crit Care Med*. 2015;43(2):288-295.

Hager DN, Krishnan JA, Hayden DL, et al. Tidal volume reduction in patients with acute lung injury when plateau pressures are not high. *Am J Respir Crit Care*. 2005;172(10):1241-5.

Irwin RS, Lilly CM, Mayo PH, et al. *Irwin & Rippe's Intensive Care Medicine*. 8th ed. Lippincott Williams & Wilkins; 2017.

Kollef M, Isakow W, eds. *The Washington Manual of Critical Care*. 3rd ed. Lippincott Williams & Wilkins; 2017.

Levy MM, Evans LE, Rhodes A. The Surviving Sepsis Campaign bundle: 2018 update. *Intensive Care Med*. 2018;44:925-928.

Marini JJ, Dries DJ. *Critical Care Medicine: The Essentials and More*. 5th ed. Lippincott Williams & Wilkins; 2018.

Marino P. *The ICU Book*. 4th ed. Lippincott Williams & Wilkins; 2013.

McClave S, Martindale RG, Rice TW, et al. Feeding the critically ill patient. *Crit Care Med*. 2014;42(12):2600-2610.

Moores LK, Tritschler T, Brosnahan S, et al. Prevention, diagnosis, and treatment of VTE in patients with coronavirus disease 2019: CHEST guideline and expert panel report. *Chest*. 2020;158(3):1143-1163.

Mouncey PR, Osborn TM, Power GS, et al. Trial of early, goal-directed resuscitation for septic shock. *N Engl J Med*. 2015;372(14):1301-1311.

Pandharipande PP, Girard TD, Jackson JC, et al. Long-term cognitive impairment after critical illness. *N Engl J Med*. 2013;369(14):1306-1316.

Parillo JE, Dellinger R. *Critical Care Medicine: Principles of Diagnosis and Management in the Adult*. 5th ed. Elsevier, 2019.

ProCESS Investigators. A randomized trial of protocol-based care for early septic shock. *N Engl J Med*. 2014;370(18):1683-1693.

Society of Critical Care Medicine. *Fundamental Critical Care Support*. 6th ed. Society of Critical Care Medicine; 2017.

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(18):1301-1308.

Website Resources

American Academy of Family Physicians (AAFP). www.aafp.org

American College of Chest Physicians. www.chestnet.org

American College of Physicians (ACP). www.acponline.org

American Hospital Organization (AHA). www.aha.org

Association of American Medical Colleges (AAMC). www.aamc.org

Institute for Healthcare Improvement (IHI). www.ihl.org

Society of Critical Care Medicine (SCCM). www.sccm.org

Society of Hospital Medicine (SHM). www.hospitalmedicine.org

First published 6/2003

Revised 1/2008 by Southside Hospital Family Medicine Residency Program

Revised 6/2011 by John Peter Smith Hospital Family Medicine Residency Program

Revised 6/2015 by CHRISTUS Santa Rosa Family Medicine Residency Program,
San Antonio, TX

Revised 10/2020 by ProMedica Monroe Family Medicine Residency Program, Monroe, MI