



AMERICAN ACADEMY OF
FAMILY PHYSICIANS

AAFP Reprint No. 291

Recommended Curriculum Guidelines for Family Practice Residents

Care of the Critically Ill Adult

This document was endorsed by the American Academy of Family Physicians (AAFP), the Association of Departments of Family Medicine (ADFM), the Association of Family Medicine Residency Directors (AFMRD), and the Society of Teachers of Family Medicine (STFM).

Introduction

This Curriculum Guideline defines a recommended training strategy for family medicine residents. Topic competencies, attitudes, 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) <http://www.acgme.org>. The curriculum must include structured experience in several specified areas. Most of the resident's knowledge will be gained by caring for ambulatory patients who visit the family medicine center. Structured didactic lectures, conferences, journal clubs, and workshops must be included in the curriculum with an emphasis on outcomes-oriented, evidence-based studies that delineate common and chronic diseases affecting patients of all ages. Targeted techniques of health promotion and disease prevention are hallmarks of family medicine. Appropriate referral patterns and 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 Web site. Current AAFP Curriculum Guidelines may be found online at <http://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 health care 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 be able to provide care to the critically ill adult, especially in rural areas and in smaller hospitals. The depth of the critical care experience for each resident will depend upon the expected practice situation of the resident, including the practice location, available facilities, and accessibility of subspecialist consultants.

The knowledge and skills needed for critical care competency not expanded upon in other Curriculum Guidelines are expanded upon here. Other related Curriculum Guidelines are Reprint Nos. 259 (Care of the Surgical Patient), 269 (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 the recognition and diagnosis, competent in the initial resuscitation and management of such cases, as well as acquire the ability to coordinate the chronological flow of care in the hospital (from admission to discharge) and take into consideration the psychosocial issues applicable to each individual patient and his or her caregivers.

Health care expenditure in the U.S. continues 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 provider 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 the hospital setting.

Meanwhile, medical advances are being made with regards to technology, e.g., electronic medical records, new imaging studies; diagnostic tests; pharmacotherapy; and invasive as well as non-invasive procedures. This has led to the need for reassessing the quality and safety of health care provision within critical care units.

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, 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 management of critically ill patients.

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

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)
- Be able to 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 from nationally recognized resources. (Systems-based Practice, Practice-based Learning and Improvement)
- Coordinate admissions, inpatient care, and throughput within the hospital system. (Systems-based Practice)
- Demonstrate the ability to communicate in multiple modalities with patients, families, other health care providers, 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 with regards to practice and seek consultation with other health care providers to provide optimal care. Assess medical information to support self-directed learning (Medical Knowledge, Practice-based Learning and Improvement)
- Demonstrate compassion, empathy, and sensitivity towards hospitalized patients and appreciate that informed adults with decision-making capacity may refuse recommended medical treatment. (Professionalism)

Attitudes

The resident should develop attitudes that encompass:

- Vigilance in the prompt recognition of critical illness.
- An ability to balance working quickly and effectively in acute critical care situations as well as maintaining care oversight of patients needing longer term care in the critical care unit.
- The recognition that appropriate subspecialist physician consultation is important in the care of the critically ill adult.
- The capacity to communicate effectively, ensure excellence in hand offs and transfers, and work well with all members of the health care team.
- Compassionate sensitivity to and appropriate support of the needs of the family members of the critically ill adult while communicating effectively with them.

Knowledge

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

1. The underlying physiologic changes in the various body systems, including diminished homeostatic abilities, altered metabolism, effects of drugs, and other changes relating to the critically ill patient
2. The 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. The unique modes of presentation of critically ill patients, including altered and nonspecific presentations of diseases
4. The financial aspects of critical care and the mechanisms by which medical innovations influence health care patterns and decisions
5. The processes and systems of care that span multiple disease entities and require multidisciplinary input to create quality care and efficiency
6. The processes and communication required for the safe transition of patients from one clinical setting to another
7. The formulation of pretest probability using initial history, physical examination, and preliminary diagnostic information when available, as well as the relevance of sensitivity and specificity in interpreting diagnostic findings
8. The 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. Reconciliation of documentation of medications at the time of discharge
9. Equitable health resources for patients and the recognition that over-utilization of resources may not promote patient safety, quality care, or satisfaction
10. The relationship between value, quality, cost, and incorporating patient wishes into optimal health care
11. The sources for the best available evidence to support clinical decisions and process improvements at the individual and institutional level
12. Advocacy for provision of high quality point-of-care EBM information resources within the institution
13. The role played by an assisting subspecialist consultant in promoting improved care, optimized resource utilization, and enhanced patient safety

14. The access and interpretation of data, images, and other information from available clinical information systems
15. The use of methods and materials to educate, reassure, and empower patients and families to participate in the creation and implementation of a care plan
16. The clinical practices and interventions that improve patient safety and the effects of recommended interventions across the continuum of care
17. The common types of health care-associated infections, including the risk factors
18. The use of hospital antibiogram in delineating antimicrobial resistance patterns and the major resources for infection control information
19. Medical practice conduct to ensure risk management
20. Incorporation of palliative care teams when appropriate during the continuum of critical care illness
21. The following clinical conditions that are relevant to management of the critically ill adult:
 - a. Basic science review:
 - i. Circulation
 - ii. Respiration
 - b. Renal disease and metabolic disorders:
 - i. Acute Kidney Injury
 - ii. Acid-base
 - iii. Electrolyte abnormalities
 - c. Cardiovascular conditions:
 - i. Acute coronary syndromes
 - ii. Cardiopulmonary arrest
 - iii. Dysrhythmias
 - 1) Tachycardias
 - 2) Bradycardias
 - iv. Hypertensive urgency and emergency
 - v. Heart failure
 - vi. Cardiogenic pulmonary edema
 - vii. Use of vasoactive medications
 - d. Endocrine:
 - i. DKA
 - 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. ARDS
 - iii. Pulmonary embolism
 - iv. Pneumonia
 - v. Pulmonary hypertension
 - vi. Severe airflow obstruction
 - vii. Obesity Hypoventilation Syndromes and Obstructive Sleep Apnea
- h. Neurological:
 - i. Coma and Delirium
 - ii. Cerebral vascular accidents
 - iii. Hemorrhagic
 - 1) Ischemic
 - a) Thrombolytic therapy
 - 2) Subarachnoid
 - iv. 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
- i. Infectious disease:
 - i. SIRS, Sepsis, Severe Sepsis, Septic Shock
 - ii. Early Goal Directed Therapy
 - iii. Antimicrobial therapy
 - iv. Immunocompromised patients
 - v. Clostridium difficile and pseudomembranous colitis

- j. 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
- k. Perioperative care:
 - i. preoperative clearance
 - ii. Preoperative antibiotic therapy
 - iii. Postoperative management (pain, glycemic control, antibiotics)
 - iv. Postoperative crisis
- l. Preventative practices:
 - i. Alimentary
 - ii. Nosocomial infections including:
 - 1) Central line infections
 - 2) Ventilator acquired pneumonia
 - iii. Venous thromboembolism
 - iv. Decubitus ulcers
- m. Nutrition and metabolism:
 - i. Metabolic requirements
 - ii. Enteral and parenteral feeding
- n. Coexisting conditions:
 - i. Obesity
 - ii. Pregnancy
 - iii. Elderly
- o. 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:

1. Obtaining a comprehensive history and physical examination in the hospital setting
2. Appropriate selection, interpretation, and performance of diagnostic procedures
3. Developing problem lists in practical, clinical, functional, psychological, and social terms
4. Setting appropriate priorities and limitations for investigation and treatment
5. Performing the basic elements of the ACLS protocol and procedures:
 - a. Cardioversion
 - b. Electrical and chemical
 - c. External temporary pacemaker application
 - d. Electrocardiogram interpretation
 - e. Obtaining vascular access
6. Performing ATLS as needed, including:
 - a. Tube thorostomy
 - b. Needle decompression
 - c. Paracentesis
 - d. Arterial blood gas
 - e. Central venous access via jugular, subclavian and femoral veins
7. Ventilator management, including:
 - a. Chest X-ray interpretation
 - b. Non-invasive and invasive ventilation
 - c. Issues in sedation, analgesia, and paralytic agents usage
 - d. Airway management
 - e. Ventilator crisis
 - f. Weaning from ventilator support
 - g. Recognition and management of the difficult airway

8. Early goal directed therapy in sepsis recognition and management
 - a. Code sepsis team leadership
9. Moderate Sedation and Conscious Sedation
10. Diagnostic and therapeutic procedures:
 - a. ABGs
 - b. Lumbar puncture
 - c. Thoracentesis
 - d. Arthrocentesis
 - e. Paracentesis
 - f. Catheter placement (arterial line or central venous access)
 - g. Medical ultrasonography
 - i. Central line placement guidance
 - ii. Resuscitation
11. Glasgow Coma Scale assessment, CIWA scale (alcohol withdrawal)
12. Management of patient monitoring information and technology
13. Utilizing the multidisciplinary approach with regards to patient education, quality improvement, transition of care
14. Coordinating a range of services appropriate to the patient's needs and support systems
15. Appropriate communication with patients and / or caregivers regarding the proposed investigation and treatment plans in such a way as to promote understanding, compliance, and appropriate attitudes
16. Dealing with ethical issues in the terminally ill to include:
 - a. Decision-making capacity
 - b. Euthanasia
 - c. Health care rationing
 - d. Palliative and end-of-life care

Implementation

Implementation of this curriculum should be obtained in block rotations in the medical intensive care unit. Experiences may also be obtained in critical care units such as surgical intensive care, coronary care, neurologic intensive care, as well as in related rotations such as cardiology, nephrology, pulmonary, neurology, gastroenterology, and surgery. Residents will obtain substantial additional experiences throughout the three years by way of longitudinal experience. Residents should complete the Fundamental Critical Care Support course sponsored by the Society of Critical Care. Physicians who have demonstrated skills in caring for critically ill adults and who are proficient in hospital medicine should be available to act as role models and consultants for the residents. These physicians should be available to give support and advice to residents in the management of their own patients. A multidisciplinary approach is an appropriate way of structuring teaching experience in this area.

The resident must have responsibility for critically ill adult patients 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. It should be required that the resident have the experience of continuing the care of these patients upon discharge to either home, subacute rehabilitation facilities, long-term care facilities, assisted living facilities, and / or the ambulatory setting, i.e., the family medicine center).

Resources

Bleck TP, Dellinger RP, Dries DJ, et al. *ACCP Critical Care Medicine Board Review*. 20th ed. Northbrook, IL: American College of Chest Physicians; 2009

Brenner M. *Current Clinical Strategies: Critical Care Medicine*. Current Clinical Strategies Publishing; 2006.

Marini JJ, Wheeler AD. *Critical Care Medicine: The Essentials*. 3rd ed. Philadelphia, Pa: Lippincott Williams & Wilkins, 2006.

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McLean B, Zimmerman JL. *Fundamental Critical Care Support*. 4th ed. Mount Prospect, IL: Society of Critical Care Medicine; 2007.

Irwin RS, Rippe JM. *Manual of Intensive Care Medicine*. 5th ed. Philadelphia, Pa: Lippincott Williams & Wilkins, 2009.

Kollef MH, Bedient TJ, Isakow W, et al. *The Washington Manual of Critical Care*. Philadelphia, Pa: Lippincott Williams & Wilkins, 2007.

Website Resources

American Academy of Family Physicians. www.aafp.org.

American College of Chest Physicians. www.chestnet.org.

American College of Physicians. www.acponline.org.

American Hospital Organization. www.aha.org.

Association of American Medical colleges. www.aamc.org.

Institute for Healthcare Improvement. www.ihl.org.

Society of Critical Care Medicine. www.sccm.org.

Society of Hospital Medicine. www.hospitalmedicine.org.

First Published 06/2003

Revised 1/2008 by Southside Hospital Family Medicine Residency Program

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