

# **BURN CRITICAL CARE FELLOWSHIPS: GUIDELINES**

## **I. GENERAL PHILOSOPHY**

Optimal care of patients with burn injuries requires an interactive multidisciplinary team, led by a general or plastic surgeon skillful and knowledgeable in the complex surgical and medical problems associated with the sub specialty of burn care. This document describes guidelines for fellowships designed to prepare post-residency surgeons to provide such leadership in the care of burn patients.

The objectives of the Burn Critical Care Fellowship should be to provide one year of advanced training and education in a teaching role in the management of adult and pediatric burn patients. The fellowship should have the educational, clinical, and administrative resources for residents to develop advanced proficiency in the management of critically ill surgical patients, to develop the qualifications necessary to supervise surgical critical care units, and to conduct scholarly activities in surgical critical care. The educational program must be an integral part of the fellowship. The accredited Burn Critical Care Fellowship should include in depth experience in resuscitation, critical care management, operative planning, operative management, postoperative care, and management of late burn care issues, including reconstruction.

Teaching, process improvement, patient safety and Quality Improvement (QI) should be central tenants of the training process. Whenever possible, completion of a research project is recommended but not required.

An accredited Burn Critical Care Fellowship should augment training of general surgery residents, rather than creating competition between the Fellow and the General Surgery Residents for management of the burn patient.

An accredited Burn Critical Care Fellowship should be structured to:

1. Provide the educational resources appropriate for the development of proficiency in managing critically injured burn patients.
2. Be based in a verified ABA burn center with a volume of burn patients and burn care organizations that meet American College of Surgeons (ACS)/ABA verification guidelines.
3. Be an integral part of an institution with a fully Residency Review Committee (RRC) accredited general surgery residency training program and be administratively attached to an accredited core program in general surgery or plastic surgery
4. Coordinate with the Surgical Critical Care Program Directors Society Fellowship Curriculum
5. Begin after the successful completion of a general surgery residency that includes trauma experience and/or plastic surgery or pediatric surgery residency as required by the criteria of the ACS, or be completed, at the least after three years of general or plastic surgery training.
6. Be of at least 1 year in duration.

7. Include eligibility to obtain a critical care certificate
8. Provide the fundamentals to prepare the Fellow for administrative leadership of a burn program, a surgical intensive care unit and in national burn and critical care activities.

## **II. PREREQUISITES**

Completion of an RRC approved general surgery or plastic surgery residency, or completion of at least three years of general or plastic training and with subsequent completion of resident training. The fellow must be Board-Certified or in the examination process by the American Board of Surgery (i.e., "board eligible"). The program director may grant exemptions to this prerequisite for an international candidate if the candidate has comparable training.

## **III. OBJECTIVES**

It is expected that individuals completing training in a Burn Critical Care Fellowship will be able to do the following:

1. Organize and direct a Burn Service. This objective includes the ability to appoint, train, and supervise specialized personnel; establish policies and procedures for management of burn patients and administration of the service; and coordinate the activities of the service with other administrative units.
2. Teach the special body of knowledge required for the comprehensive management of the burn patient.
3. Develop research in the various areas of burn care such as prevention, critical care, acute care, and rehabilitation.
4. Understand the principles of critical care especially applicable to the problems of burn patients.
5. Learn burn surgical techniques including basic approaches for reconstruction.
6. Learn the medical management of burn patients.
7. Develop the ability to plan rehabilitation of a burn patient.

## **IV. ORGANIZATION**

### **Clinical and Educational Facilities and Personnel Resources**

1. The fellowship should be housed at a hospital with an institutional and administrative commitment to care of the injured patient. Meeting the requirements of an ABA/ACS verified burn center is a requirement for the training facility.
2. An adequate hospital or university library and/or computer library must be readily available to provide access to information for patient care or scholarly pursuits.

3. Conveniently located and adequate space for conferences and self-study are essential
4. Record keeping and quality assurance programs must comply with ABA Verification criteria. Additional quality assurance activities such as the American College of Surgeons National Quality Improvement Program (NSQIP) or UHC Quality Improvement programs are encouraged.
5. An infrastructure for advancement of knowledge through basic science, clinical or outcomes research must be present.
  - a. Personnel should include burn registry staff, research staff and adequate secretarial support
  - b. Personnel should include specifically trained nurses and therapists who are skilled in burn care and qualified in critical care, wound care and late effects of burn injuries.
  - c. Personnel should include surgical residents who rotate on the service and spend time in the intensive care unit, acute care floors and operating room
  - d. Objectives of a comprehensive Burn Fellowship can best be achieved when the program is based within an institution that has approved training programs in the surgical specialties and in disciplines that particularly relate to surgery
    - i. This includes orthopedics, neurosurgery, radiology, pathology, neurology, internal medicine, pediatrics, geriatrics, psychology, physiatry, and anesthesiology
6. The fellowship must maintain an overall average 75% pass rate on the critical care board examination for fellows completing the training program.

#### **ABA Accredited Burn Fellowship Director**

1. A single program director must be responsible for the training program. The person designated with this authority is accountable for the operation of the program. The program director must follow the requirements of the RRC. In the event of a change of either program director or department chair, the program director should promptly notify the executive director of the RRC through the Web Accreditation Data System of the Accreditation Council for Graduate Medical Education (ACGME.)
2. The program director, together with the faculty, is responsible for the general administration of the program, and for the establishment and maintenance of a stable educational environment. Adequate lengths of appointment for both the program director and faculty are essential to maintaining such an appropriate continuity of leadership.
3. The program director must be board certified in critical care.
4. The program director must meet the qualifications of a Burn Center Director or Co-Director as defined in the ACS/ABA Resource Document.
5. The Program Director should be responsible to, and should be evaluated by, the director of the core general surgery residency program regarding teaching, scholarly research productivity, patient care activities, and administrative capabilities.
6. The Program Director shall have administrative responsibility for the Burn Care Fellowship and

shall be responsible for all residents and teaching staff of the burn program and shall determine their duties.

7. The Program Director and the fellowship should be evaluated by the ABA accreditation committee every 3 years to be coordinated with verification process

**Other ABA Accredited Burn Fellowship Faculty:**

1. At least one other general or plastic surgeon with critical care certification should assist with the fellowship training. That person should also fit the qualifications to manage burn patients as per Verification requirements.
2. At least one reconstructive surgeon for complicated burn reconstruction.
3. The burn care program director and surgical teaching staff must have unrestricted privileges regarding the admission, treatment, and discharge of their own patients on the burn center. In the teaching environment of the surgical care unit, it is recognized that the teaching staff in surgery, the surgical specialties, and anesthesia may be involved in the care of burn patients; however, overall responsibility for care of the burn patient will remain with the responsible burn surgeon.
4. The Burn Service teaching staff must have real and demonstrated interest in teaching and set an example for trainees by documented scholarly pursuits, including
  - a. Participation in their own continuing surgical education,
  - b. Participation in regional and national surgical scientific societies,
  - c. Presentation and publication of scientific studies,
  - d. Demonstration of an active interest in research as it pertains to burn care problems.
5. The Burn Service teaching staff should provide the program director with regular evaluations of the trainee(s).

**V. DURATION AND SCOPE OF TRAINING**

1. The 12-month training period must be devoted to educational activities related to the care of thermally injured patients and to the organization and delivery of burn care.
2. The fellowship may include up to three months of non-burn related elective rotations such as trauma critical care, pulmonary critical care, medical critical care, pediatric critical care, or anesthesia.
3. The fellowship should be based on an 80 hour work week with the assumption that time on call from home is not included in the 80 hours.
4. As per the guidelines for qualifying for critical care certification, 80% of the trainee's time should be spent focused on critical care management in and out of the operating room including:
  - a. Patient care

- b. Teaching
  - c. Patient / family care conferences
  - d. Bedside and operating room procedures
  - e. QI conferences
  - f. System improvement
  - g. Clinical documentation
  - h. Innovative knowledge acquisition
5. The Fellow may devote up to 20% of their time to direct operative management of critically ill burn patients. During such operative care, the critical care resident and chief resident in general surgery may not share primary responsibility for the same patient. However, in the non-operative management of critically ill burn patients the burn critical care residents and general surgery residents may interact as long as they share primary responsibility in patient management decisions. The final decision and responsibility rests with the supervising attending surgeon.
6. The fellowship should include up to 20 hours per week of non-critical care patient management including
- a. Weekly outpatient clinics to expose the trainee to immediate and late complications experienced by burn patients
  - b. Reconstructive surgical procedures
  - c. Educational programs
  - d. Research opportunities
7. The program could include participation in an affiliated trauma / critical care fellowship (not to exceed 3 months) with up to three electives in the following areas:
- a. Trauma /critical care
  - b. Anesthesia
  - c. Pediatric critical care
  - d. Pulmonary critical care

## VI. THE EDUCATIONAL PROGRAM

Each section of the curriculum should be structured to meets ACGME core competencies.

The Burn Fellows are required to obtain competence in the six areas listed below to the level expected of a new practitioner. Programs are expected to provide educational experiences necessary for the fellows to demonstrate the following in each area of their core curriculum:

1. *Patient care* that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Burn Fellows must:
  - a) Demonstrate manual dexterity appropriate for their training level.
  - b) Be able to develop and execute patient care plans consistent with the skills of a junior attending.
2. *Medical Knowledge* about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences, as well as the application of this knowledge to care of the burn patient. Burn fellows are expected to:

- a) Critically evaluate and demonstrate knowledge of pertinent scientific information.
3. *Practice-based learning and improvement* that involves the investigation and evaluation of care for their patients, the appraisal and assimilation of scientific evidence, and improvements in care of burn patients. Burn fellows are expected to:
- a) Critique personal practice outcomes.
  - b) Demonstrate recognition of the importance of lifelong learning in surgical practice.
4. *Interpersonal and communication skills* that result in the effective exchange of information and collaboration with patients, their families, and other health professionals. Burn fellows are expected to:
- a) Communicate effectively with other health care professionals.
  - b) Counsel and educate patients and families.
  - c) Effectively document practice activities.
5. *Professionalism*, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to patients of diverse backgrounds. Burn fellows are expected to:
- a) Maintain high standards of ethical behavior.
  - b) Demonstrate a commitment to continuity of patient care.
  - c) Demonstrate sensitivity to age, gender and culture of patients and other health care professionals.
6. *Systems-based practice*, as manifested by actions that demonstrate awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. Burn fellows are expected to:
- a) Practice high quality, cost effective patient care.
  - b) Demonstrate knowledge of risk-benefit analysis.
  - c) Demonstrate understanding of the role of different specialists and other health care professionals in interdisciplinary patient management.

### **Comprehensive Burn Critical Care Core Curriculum:**

*Upon completion of training, the fellow should be able in each of the following areas to:*

1. **Administration and Quality Improvement**
  - a. Demonstrate competency in the implementation of clinical protocols to the care of critically ill patients
  - b. Demonstrate competency in the implementation of institutional quality improvement protocols to the care of critically ill patients
  - c. Demonstrate competency in the implementation of methods for monitoring patient outcomes and reporting complications
  - d. Demonstrate knowledge of the difference between a protocol and guideline, and demonstrate competency in their development and implementation
  - e. Demonstrate understanding of institutional, regional and national disaster management protocols
  - f. Demonstrate knowledge of and competency in documentation for delivery of critical care

- g. Demonstrate understanding of fiscal management of the intensive care unit, including the monitoring of costs, charges, appropriate coding, billing, and collection
- h. Demonstrate understanding of federal and state regulations and laws that apply to critical care practice, and develop a basic understanding of medico-legal aspects
- i. Demonstrate understanding of criteria used for faculty recruitment and advancement
- j. Demonstrate understanding of criteria used for recruitment and retention of nursing staff and ancillary personnel
- k. Demonstrate understanding of the importance of multimodality care
- l. Demonstrate competency in effective communication strategies, and leadership skills, including strategies for conflict resolution and managing up
- m. Demonstrate understanding of the different styles and roles of critical care practice in open, closed, and consultative units
- n. Demonstrate understanding of the role of critical care units in the health system
- o. Develop effective relationships with consultants, surgeons, nurses, and other health care providers
- p. Demonstrate sound ethical principles
- q. Demonstrate understanding of the need for the enforcement of quality control measures
- r. Demonstrate understanding of the need for developing and implementing effective patient safety protocols
- s. Demonstrate understanding of the need for developing and implementing quality improvement measures
- t. Demonstrate understanding of the need for developing and implementing tools for tracking clinical outcomes
- u. Demonstrate understanding of the need for developing and implementing methods for ensuring physician training, maintenance of skills, credentialing and testing
- v. Demonstrate active participation in quality improvement activities
- w. Demonstrates understanding of the Burn Quality Improvement Program (BQIP), National Surgical Quality Improvement Program (NSQIP) and Trauma Quality Improvement Program (TQIP).

## **2. Cardiovascular Physiology, Pathophysiology and Therapy:**

- a. Demonstrate knowledge and competency in goal directed resuscitation and optimization of tissue oxygen delivery in patients with shock understanding the major differences between hypovolemic, hemorrhagic, and neurogenic shock.
- b. Demonstrate knowledge and competency in the interpretation and application of data from noninvasive and invasive, diagnostic, and monitoring techniques (eg, echocardiography, arterial catheters, central venous pressure monitors, pulmonary artery catheter, tissue perfusion monitors, and other methods for measuring cardiac performance)
- c. Demonstrate competency in the appropriate selection and effective use of different inotropic and vasoactive agents in patients with different types of shock (cardiogenic, neurogenic, septic, or mixed)
- d. Demonstrate competency in selecting and using appropriate mechanical support devices in patients with cardiogenic shock (eg, ventricular assist device, intra-aortic balloon pump) or poor oxygenation (extra corporeal membrane oxygenation)
- e. Demonstrate ability to interpret radiographic studies, including chest X-rays, computed tomography (CT) scans, arteriograms, and magnetic resonance studies, and apply the data to the management of patients with cardiovascular diseases
- f. Develop competency in performing cardiovascular procedures, including:

- Ultrasound to diagnose pericardial tamponade
  - Pericardiocentesis
  - Closed and open cardiac compression
  - Placement of arterial and venous catheters for hemodynamic monitoring and/or delivery of therapies
  - Placement of temporary pacemakers
- g. Demonstrate knowledge and competency in the diagnosis and management of cardiac arrhythmias and ischemic events
  - h. Demonstrate knowledge and competency in the appropriate application of advanced cardiac support (ACLS) guidelines
  - i. Demonstrate competency in diagnosis and management of arterial diseases due to various etiologies (eg, thrombotic, embolic, atherosclerosis, aneurismal)
  - j. Demonstrate competency in appropriate control of high blood pressure in various patient populations
  - k. Demonstrate appropriate selection and application of various prevention strategies for thromboembolic events, including sequential compression devices, drugs, and vena cava filters
  - l. Demonstrate ability to diagnose compartment syndrome of the extremities, abdomen and trunk and competency in performing escharotomies, fasciotomies and decompressive laparotomies.
  - m. Demonstrate understanding of severity and competency in management of critically ill patients with multi-organ failure

### **3. Inhalation Injury/Respiratory Failure:**

- a. Demonstrate competency in interpreting and applying arterial blood gas data
- b. Demonstrate the ability to interpret radiographic data, including chest X-rays and CT scans, and to apply these data to clinical management plans
- c. Demonstrate knowledge of difficult airway characteristics and advanced methods for intubation of the difficult airway
- d. Demonstrate competency with diagnosis and management of inhalation injury and carbon monoxide poisoning;
- e. Demonstrate competency in diagnosis and treatment of acute exacerbations of COPD vs inhalation injury
- f. Demonstrate competency with airway management, including intubation, tracheostomy; management of endotracheal tubes; bronchoscopy, and pleural drainage
- g. Demonstrate competency with weaning from mechanical ventilation; suction techniques; monitoring airway and intrathoracic pressures
- h. Demonstrate competency in diagnosing and managing pulmonary dysfunction in critically ill patients
- i. Demonstrate competency in diagnosing and managing patients with pulmonary infections, including pneumonia, ventilator-associated pneumonia, empyema, lung abscess, tracheobronchitis and proficiency with interpretation of sputum cultures
- j. Demonstrate competency with appropriate use of mechanical ventilators and other devices to support gas exchange, and interpretation of blood gases.
- k. Demonstrate competency in the appropriate application of various weaning strategies to mechanically ventilated patients

**4. Ethics and Palliative Care**

- a. Demonstrate awareness of own feelings, attitudes, and beliefs about death and dying
- b. Demonstrate ways to integrate ethics and palliative care into curative care
- c. Demonstrate knowledge regarding trajectories of the dying process and how surgical disease affects this process
- d. Demonstrate competency in withdrawal of life sustaining measures including family and/or patient discussions
- e. Demonstrate knowledge of and competency with nonpharmacological and pharmacological management of pain and other associated end-of-life symptoms (eg, nausea, dyspnea, cough, excessive secretions)
- f. Demonstrate management of pain and other symptoms during critical illness
- g. Demonstrate empathy to patients and their families during critical illness
- h. Demonstrate understanding of determining goals of care
- i. Demonstrate understanding of advanced care planning, specifically roles of decision-maker and advance care directives
- j. Demonstrate skills required to resolve conflicts between and amongst families and medical care-givers
- k. Demonstrate effective concern over patient privacy
- l. Demonstrate effective communication to patients and their families
- m. Demonstrate understanding of traditions, beliefs and practices among major religions, cultures, and ethnic groups and their effect on medical decision-making
- n. Demonstrate appreciation for equitable, logical, ethical and fair allocation of limited resources
- o. Demonstrate understanding of end-of-life issues
- p. Demonstrate understanding of opportunities and protocols for organ donation

**5. Gastrointestinal disorders**

- a. Demonstrate knowledge in and competency in diagnosing upper from lower gastrointestinal (GI) bleeding sources
- b. Demonstrate how to resuscitate patients with GI bleeding
- c. Demonstrate knowledge regarding the indications for urgent or emergent endoscopy for upper GI bleeding
- d. Describe endoscopic techniques for control of upper GI bleeding as they apply to the various causes of upper GI bleeding
  - i. Injection
  - ii. Sclerosis
  - iii. Heater probe
  - iv. Clips/banding
- e. Demonstrate knowledge regarding indications for bleeding scans and arteriography for localization of GI bleeding
- f. Demonstrate familiarity with potential interventional techniques that can be performed during arteriography (eg, catheter-based infusions and embolization) for control of GI bleeding
- g. Describe the causes and medical management of liver failure
- h. Describe the causes and treatment of hepatic encephalopathy
- i. Cite the indications for a Sengstaken-Blakemore tube for bleeding esophageal varices and demonstrate its placement

- j. Know the acute medical management of bleeding varices
- k. Cite the indications and complications for the placement of a transjugular intrahepatic portosystemic shunt (TIPS)
- l. Demonstrate ability to manage hepatorenal syndrome
- m. Demonstrate understanding and competency in diagnosis and treatment of the differential diagnosis and management of ileus in the critically ill patient
- n. Describe the workup and indications for the neostigmine challenge for colonic pseudo-obstruction
- o. Demonstrate knowledge and competency in the workup and management of patients with bowel ischemia
- p. Demonstrate knowledge of and management of patients with acalculus cholecystitis
- q. Cite the signs, symptoms, and management of ascending cholangitis
- r. Demonstrate knowledge of the work up and management of pancreatitis

#### **6. Endocrine disorders**

- a. Demonstrate knowledge and competency in the evaluation and management of critically ill patients with thyroid, parathyroid, pancreatic, and adrenal disorders
- b. Demonstrate knowledge and competency in the evaluation and management of hyperglycemia and diabetes including the role of hemoglobin A<sub>1c</sub> in critically ill patients.
- c. Demonstrate knowledge in the evaluation and management of endocrine insufficiencies
- d. Demonstrate knowledge of the neuroendocrine axis role in response to stress

#### **7. Hematologic disorders**

- a. Demonstrate knowledge and competency in the evaluation and assessment of white blood cell (WBC), red blood cell (RBC), and platelet disorders that affect critically ill patients
- b. Demonstrate knowledge and competency in the evaluation and management of bleeding and clotting disorders in critically ill patients
- c. Demonstrate knowledge and competency in the management of critically ill patients with WBC, RBC, and platelet disorders
- d. Demonstrate knowledge and competency in the diagnosis and treatment of patients with heparin-induced thrombocytopenia and thrombosis (HITT)

#### **8. Infectious Disease**

- a. Demonstrate a working knowledge of the workup of the febrile patient in the surgical ICU
- b. Demonstrate understanding of the diagnosis, management and differences between sepsis, systemic inflammatory response system (SIRS), and septic shock and multi organ failure
- c. Demonstrate knowledge of strategies to prevent hospital acquired infectious complications
- d. Demonstrate understanding of proper perioperative antibiotic prophylaxis strategies
- e. Demonstrate understanding of the prevention, diagnosis and treatment of ventilator-associated pneumonia (VAP), central line infections and urinary tract infections
- f. Demonstrate a working knowledge of the care and treatment of the patient with necrotizing soft tissue infection
- g. Demonstrate understanding of invasive burn wound sepsis and infections occurring in patients with thermal injury
- h. Demonstrate understanding of the diagnosis and management of peritonitis
- i. Demonstrate understanding of the etiologies, diagnosis, and management of intra-abdominal abscesses
- j. Demonstrate understanding of the diagnosis and management of meningitis

- k. Explain the difference between and indications for prophylactic, empiric, and therapeutic antibiotic choices, as well as appropriate drug selection for specific clinical situations
- l. Demonstrate the ability to monitor antibiotic levels and appropriate dose adjustment
- m. Demonstrate knowledge of the workup of nonbacterial sources of infections (eg, fungal, viral, and other unusual pathogens) in ICU patients
- n. Demonstrate understanding of the special considerations in patients who are immunosuppressed by disease processes (e.g., HIV infection, diabetes, and cirrhosis) and medications (e.g., steroids, chemotherapy, and anti-rejection medications)
- o. Demonstrate understanding of methods for controlling of nosocomial infections and techniques of isolation
- p. Demonstrate understanding of mechanisms for protection of health care providers.
- q. Demonstrate understanding of multi-drug resistance

## **9. Neurology**

- a. Demonstrate appropriate and timely evaluation and management of patient with anoxic encephalopathy
- b. Demonstrate appropriate and timely evaluation and management of acute neurologic decompensation
- c. Demonstrate appropriate utilization and interpretation of brain and spinal cord imaging
- d. Demonstrate understanding of algorithms for clinical clearance of spine injuries and competency with proper assessment and management of patients with spinal cord injury, including airway and hemodynamic management
- e. Demonstrate appropriate understanding and interpretation of information from monitors of intracranial pressure (ICP), neurophysiology (including electroencephalography and evoked potentials), brain tissue oxygenation, and cerebral blood flow
- f. Demonstrate appropriate management of extracerebral parameters to minimize risk of secondary brain injury
- g. Demonstrate knowledge and competency in the evaluation and nonoperative management of severe closed head injury
- h. Demonstrate knowledge of the diagnosis and treatment of abnormalities of sodium homeostasis related to neurologic diseases, including diabetes insipidus, syndrome of inappropriate antidiuretic hormone (SIADH), and cerebral salt wasting
- i. Demonstrate competency in diagnosis and management of the patient with a stroke (ischemic or hemorrhagic)
- j. Demonstrate competency in diagnosis and management of a patient with subarachnoid hemorrhage, including prevention and management of cerebral vasospasm
- k. Demonstrate competency in diagnosis and management of patients with intracranial hypertension, including evaluation of data from intracranial pressure monitors or extraventricular drains
- l. Demonstrate appropriate consultation with consultants in physical medicine and rehabilitation and with rehabilitation facilities
- m. Demonstrate proper performance of brain death certification
- n. Demonstrate basic principles of support for potential organ donors

## **10. Nutrition/Metabolic Support:**

- a. Demonstrate competency in the evaluation and ongoing assessment of the nutritional needs of critically ill surgical patients

- b. Demonstrate competency in the management of enteral and parenteral nutrition
- c. Demonstrate competency in the placement of nasogastric and nasointestinal feeding tubes
- d. Demonstrate competency in the placement of percutaneous endoscopic gastrostomies, open and laparoscopic gastrostomies, and jejunostomies
- e. Demonstrate knowledge of the role of micronutrients in nutritional support of critically ill patients
- f. Demonstrate understanding of options for promoting metabolic support and decreasing catabolism
- g. Demonstrate knowledge of means for prevention and management of gastrointestinal bleeding
- h. Demonstrate competency in managing electrolyte abnormalities

### **11. Obstetrical disorders**

- a. Demonstrate knowledge regarding the management of the pregnant patient with critical illness unrelated to pregnancy
- b. Demonstrate knowledge of pregnancy-related conditions, including pre-eclampsia/eclampsia, HELLP (hemolysis, elevated liver enzymes, low platelets) syndrome, gestational cardiomyopathy, amniotic fluid embolism, peripartum hemorrhage (placenta previa, placental abruption), and pulmonary edema
- c. Demonstrate the ability to appropriately select radiographic studies to maximize maternal and fetal well-being when managing the pregnant patient who is critically ill
- d. Demonstrate understanding of strategies for managing obstetrical hemorrhage, including coagulopathy, disseminated intravascular coagulopathy (DIC), and massive transfusion
- e. Describe the physiologic changes (including respiratory, cardiovascular, renal, and gastrointestinal) associated with pregnancy, delivery, and the immediate postpartum period
- f. Demonstrate knowledge of how physiologic changes of pregnancy influence critical care management, including hemodynamic and pulmonary monitoring, pharmacologic concerns, and selection of imaging studies
- g. Demonstrate knowledge of the pathophysiology of fetal oxygenation and appropriate monitoring strategies
- h. Understand the risks for fetal demise related to maternal diagnosis and condition
- i. Demonstrate knowledge of how pregnancy and postpartum states influence the appropriate selection of different pharmacological agents

### **12. Pediatrics**

- a. Demonstrate competency in the initial assessment, triage, and resuscitation of injured patients as outlined in the PALS (or equivalent) course
- b. Demonstrate appropriate and timely evaluation of pediatric patients with acute respiratory decompensation, including asthma
- c. Demonstrate appropriate and timely evaluation of pediatric patients with shock
- d. Demonstrate knowledge of how resuscitative needs of infants and small children differ from adults
- e. Demonstrate knowledge of techniques for intubation of infants and children
- f. Demonstrate knowledge of techniques for vascular access procedures in infants and children

- g. Demonstrate knowledge of ventilator management strategies used for children, including pressure-regulated volume control (PRVC) and high-frequency oscillatory ventilation (HFOV)
- h. Demonstrate knowledge of signs and history consistent with child abuse and appropriate intervention

**13. Pharmacology**

- a. Demonstrate appropriate choice of medications and adjustments in medication dosing based upon the principles of drug absorption, distribution, metabolism, and excretion
- b. Demonstrate appropriate identification and management of potential drug interactions
- c. Demonstrate understanding of choice of cost effective medications

**14. Psychosocial**

- a. Demonstrate understanding of the role of psychological stress of the family and patient
- b. Demonstrate understanding of the role of social services, psychologists, psychiatrists and spiritual care in the management of the burn patient
- c. Demonstrate the ability to recognize child, spousal and elder abuse
- d. Demonstrate the ability to recognize substance abuse and potential for intervention in preventing recidivism.
- e. Demonstrate understanding of the need for efforts in reentry into society (return to work and return to school).
- f. Demonstrate understanding and competency in end of life decisions, including decisions not to resuscitate, withdrawal of care, establishment of comfort care measures, discussing the issues with family members and or the patient
- g. Demonstrate understanding and competency in promoting family centered care
- h. Demonstrate competency in the management of pain, anxiety, including treatment of background pain, procedural pain, breakthrough pain, neuropathic pain, itch and opioid weaning after the wounds have healed

**15. Rehabilitation:**

- a. Demonstrate understanding of the need for early and continuous intervention by burn rehabilitation therapists in the recovery of critically ill patients
- b. Demonstrate understanding of the principles of splinting and pressure appliances
- c. Demonstrate understanding of the surgical procedures for contractures, resurfacings, and reconstructions.
- d. Demonstrate understanding of criteria for inpatient rehabilitation, including intensive requirements for attaining ADLs and / or those with hypoxic brain injury due to an inhalation injury

**16. Renal Failure**

- a. Demonstrate competency in the management of oliguria in critically ill patients
- b. Demonstrate appropriate management of electrolytes, intravascular volume status, and drug dosing in patients with acute kidney injury
- c. Demonstrate knowledge of nutritional requirements of patients with acute and chronic renal failure in the ICU
- d. Describe the relative and absolute indications for renal replacement therapies

- e. Demonstrate understanding of the principles of modes of dialysis and solute transport

### **17. Transplantation**

- a. Demonstrate competency in managing patients with acute and chronic liver failure, including hepatic encephalopathy, GI bleeding, infections, hepatorenal and hepatopulmonary syndromes, and large volume ascites production
- b. Demonstrate competency in managing patients with portal hypertension, including indications for and complications of portal-systemic shunts, including transjugular intra-hepatic portal-systemic shunts
- c. Demonstrate knowledge of unique surgical challenges encountered in patients with liver failure and renal failure, including chronic malnutrition, delayed wound healing, electrolyte derangements (eg, hyponatremia, hyperaldosteronism), and the effects of chronic steroid and/or immunosuppressant use
- d. Demonstrate appropriate and titrated pre- and postoperative care for the patient with fulminant hepatic failure, with specific focus on the management of encephalopathy, intracranial pressure, and oxygen delivery to the brain
- e. Demonstrate competency in the management of infection and surgical decision-making in immunocompromised patients
- f. Demonstrate understanding of indications and protocols for organ donation

### **18. Trauma**

- a. Demonstrate competency in the initial assessment, triage, and resuscitation of injured patients as outlined in the ATLS course
- b. Demonstrate knowledge of the differences and commonalities between patients with isolated burn injuries and those with concomitant blunt or penetrating trauma
- c. Demonstrate competency in airway assessment and management, including rapid sequence intubation (RSI) and cricothyroidotomy
- d. Demonstrate competency in recognizing and managing thoracic injury, including simple and tension pneumothorax, [massive] hemothorax, rib fractures and flail chest, pulmonary contusion, and great vessel injury
- e. Demonstrate familiarity with such procedures as needle chest decompression and tube thoracostomy
- f. Demonstrate competency in appropriate performance of emergency department thoracotomy
- g. Demonstrate familiarity with appropriate use of crystalloids, colloids and blood products for resuscitation
- h. Demonstrate competency in implementing a massive transfusion protocol
- i. Demonstrate knowledge of the advantages and disadvantages of endpoints of resuscitation, including vital signs and other physical examination findings, base deficit, lactate levels, and global oxygen delivery and consumption variables
- j. Demonstrate familiarity with the type and placement of vascular access and the use of massive transfusion devices
- k. Demonstrate competency in diagnosing intra-abdominal injury
- l. Demonstrate competency in recognizing and managing abdominal compartment syndrome and temporary abdominal closure techniques
- m. Demonstrate competency in the diagnosis and management of pelvic fractures, including recognition of associated injuries

- n. Demonstrate competency in the management of patients with traumatic brain injury, spinal cord injury, and blunt cerebrovascular injury, including the selection and use of intracranial pressure monitoring devices and other brain monitoring devices
- o. Demonstrate competency in appropriate timing and selection of radiographic studies in the evaluation of the injured patient
- p. Demonstrate the ability to interpret radiologic and laboratory data to develop comprehensive management plans
- q. Demonstrate knowledge and competency of specific trauma patient populations (eg, pediatric, geriatric, and obstetric)

**19. Wound Management:**

- a. Demonstrate competency with estimation of extent and depth of injury
- b. Demonstrate understanding of the indications and competency with escharotomies
- c. Demonstrate knowledge and competency with decision making regarding timing and appropriateness of excision of burn wounds
- d. Demonstrate understanding the pros and cons of tangential excision vs. fascial excisions
- e. Demonstrate understanding of the care of burns to special areas, including the hands, face, feet, and perineum
- f. Demonstrate understanding wound management in children and elderly patients
- g. Demonstrate understanding with different wound coverage options including allograft, xenograft, cultured skin products and dermal substitutes
- h. Demonstrate understanding of the different antimicrobial dressings for burn wounds including their indications and contraindications
- i. Demonstrate competency with tangential and fascial excision of burn wounds
- j. Demonstrate understanding and competency with techniques to maximize functional and aesthetic outcomes
- k. Demonstrate understanding and competency in the management of chemical and electrical injuries
- l. Demonstrate knowledge and competency the diagnosis and management of life threatening dermatologic problems, including toxic epidermal necrolysis, epidermolysis bullosa, pemphigus, scalded skin syndrome and necrotizing fasciitis

**20. Out-patient management:**

- a. Understanding patient management after grafting, including outpatient therapy, immobilization, and pressure therapy
- b. Understanding wound maturation and hypertrophic scarring
- c. Management of pain and itching
- d. Understanding impairment ratings
- e. Understanding of issues related to vocational therapy including return to work or school and needs for work hardening or retraining.

**21. Areas of special emphasis:**

- a. Performance Improvement and Patient Safety
- b. Administration: Leadership, Finance, Personnel

- c. Development of Burn / Trauma Systems including Pre-Hospital Transport Systems
- d. Disaster and Mass Casualties Management
- e. Injury Prevention: Principles and Methodology
- f. Family Centered Care
- g. Ethics
- h. End of Life Care
- i. Understand the basics of organ retrieval after death

## **VII. DIDACTIC SESSIONS**

1. A weekly teaching session that focus on burn specific management issues enumerated above
  - a. This should focus on the core curriculum for each area of burn care
2. A weekly M&M meeting (in conjunction with the surgery department)
3. A semi-weekly multidisciplinary meeting to discuss patients and to provide clinical teaching on multi-disciplinary issues that affect the entire team.
4. A monthly journal club for burn physicians and other care providers
5. A monthly multi-disciplinary burn QI meeting where a root cause analysis is performed for burn patient specific adverse events or complications and loop closure is established
6. A quarterly or semi-annual review of all burn patient deaths with review of cause of death, autopsy results and determination of need for loop closure
7. ABLIS training and ABLIS instructor training
8. ATLS Training
9. PALS Training
10. Attendance at the Annual meeting of the ABA; preferably with presentation of an abstract culminating in submission of a manuscript

## **VIII. EVALUATION**

1. The trainees must be evaluated by the fellowship faculty with regular written reports covering the six core competencies:
  - a. Patient Care
  - b. Medical Knowledge
  - c. Practice-based learning and improvement
  - d. Interpersonal and communication
  - e. Professionalism
  - f. Systems-based practice
2. The program director and the trainee will have scheduled meetings at least every 6 months to provide feedback and evaluation.
3. The trainee shall evaluate the program, the program director, and faculty on a regular basis, at least every 6 months.