

Pediatric Critical Care Medicine Fellowship Training Program

Competency-Based Goals and Objectives

Table of Contents

Title	Page
Specific Goals and Objectives of the Training Program	
General Competencies.....	3
A. Patient Care.....	3
B. Medical Knowledge.....	3-18
• Goal I Resuscitation, Stabilization, Shock, Airway.....	4-6
• Goal II Transport.....	6
• Goal III Assessing, evaluating and managing common signs.....	6-9
and symptoms characterizing critically ill pediatrics patients	
• Goal IV Learning the management of common conditions.....	9-14
encountered in critically ill or injured pediatric patient	
• Goal V Diagnostic testing in the PICU.....	14-15
• Goal VI Practice of Monitoring.....	16-18
• Goal VII Nutrition Therapies.....	18
C. Practice-Based Learning and Improvement.....	18-20
D. Interpersonal and Communication Skills.....	20-21
E. Professionalism.....	21-22
F. Systems-Based Practice.....	22-23
Anesthesia Goals and Objective.....	24
Research Goals and Objectives.....	25-26

SPECIFIC GOALS AND OBJECTIVES OF THE TRAINING PROGRAM

I. General Competencies:

The training program in Pediatric Critical Care Medicine is designed to ensure that graduates possess the attributes, skills, and competencies necessary to the practice pediatric intensive care and to develop an area of scholarly activity and expertise. The program is structured to ensure development of specific subspecialty skills and those reflected in the competencies listed below. The training in the Pediatric Critical Care Medicine Program meets requirements set forth by the RRC and the American Board of Pediatrics Subspecialty Board and conforms to the guidelines established for training in this subspecialty by the Society of Critical Care Medicine. The faculty and fellows are supplied with a copy of these Goals and Objectives.

A. Patient Care: Fellows are expected to provide patient care that is compassionate, appropriate and effective for the promotion of health, prevention of illness, and treatment of disease within the spectrum of illnesses and patients cared for by Pediatric Intensivists. The general skills necessary are listed below:

- Gather accurate, essential information from all sources, including medical interviews, physical examinations, medical records and diagnostic and/or therapeutic procedures.
- Make informed recommendations about diagnostic and therapeutic options and interventions that are based on clinical judgment, scientific evidence, and patient preference.
- Develop, negotiate and implement effective patient management plans and integration of patient care.
- Perform competently the diagnostic and therapeutic procedures considered essential to the practice of pediatric critical care.

B. Medical Knowledge: Fellows are expected to demonstrate knowledge of established and evolving clinical, biomedical, therapeutic and social sciences, and to effectively apply this knowledge to both patient care and the education of others. In general, fellows are expected to:

- Apply an open-minded, analytical approach to acquiring new knowledge
- Access and critically evaluate current medical information and scientific evidence
- Develop clinically applicable knowledge of the basic and clinical sciences fundamental to the best practice of pediatric critical care medicine
- Apply this knowledge to clinical problem-solving, clinical decision-making, and critical thinking.

The knowledge to be gained in this training program is substantial. Specific areas of critical care knowledge base are presented in the graded manner anticipated to be

achieved through the course of the training time (see PCCM Medical Knowledge Goals below)

Because of the unique opportunity provided by training in Pediatric Critical Care Medicine, learning both the Patient Care and Medical Knowledge Goals are tightly assimilated and occur in tandem. Thus, in order to obtain these objectives within the context of assuming graded responsibilities, the fellowship program has the following specific medical knowledge goals that are typically learned in a graded fashion through the course of the three year training program. For the purposes of this outline, the described levels (I, II, III) correspond to the year of training in the program (1st, 2nd, or 3rd). This list is not meant to be exhaustive and for the full curriculum goals espoused by the ABP, the fellows are referred to the following site:

<https://www.abp.org/ABPWebSite/certinfo/subspec/suboutlines/crit.pdf/>. This site provides the complete content outline for medical knowledge that is tested on the Pediatric Critical Care Subspecialty Certifying exam. Important foundations of this curriculum include the following goals:

Goal I. Resuscitation, Stabilization, Shock, Airway

Follows need to understand how to rapidly resuscitate and stabilize the critically ill child in the PICU and other inpatient sites:

Objective:

1. Describe, identify etiology, and anticipate the common causes of acute deterioration in the critically ill pediatric patient.
2. Be able to describe, demonstrate knowledge of, and know the relevant pathophysiology of and pharmacology needed to treat acute deteriorations.
3. Be able to manage the following situations:
 - A. Cardiopulmonary resuscitation
 - B. Shock
 1. Recognition
 2. Vascular access
 3. Treatment pharmacology
 4. Diagnostic differential
 - C. Respiratory Failure/Airway Obstruction
 1. Endotracheal intubation
 2. Neuro-protective management of patients with increased intracranial pressure
 3. Recognition and management of the difficult airway, including indications for backup/consultation

(Pediatric Anesthesia and/or
Otorhinolaryngology experts)

Level 1

1. Participate in resuscitation, stabilization with supervision by staff or senior fellow.
2. Develop differential diagnosis of etiology of shock for different age groups.
3. Supervise resident care team in treatment algorithm.
4. Demonstrate ability to bag mask ventilate.
5. Demonstrate ability to perform elective intubation in stable patients.
6. Recognize, describe difficult airway
7. Maintain PALS certification
8. Knowledge of routine medication used for endotracheal intubation and side effects.

Level 2

1. Successfully completed year one.
2. Demonstrate ability to be in charge of resuscitation/code and RRT teams at patient's bedside.
3. Demonstrate evidence for decision-making in management of subtypes of shock (e.g. use of steroids, vasopressin, and vasodilators).
4. Independently supervise bedside team in treatment of shock, recognize anticipated treatment targets or failures and order appropriate follow-up.
5. Autonomous ability to perform elective intubation.
6. Demonstrate appropriate consultation in management of critical airway.
7. Recognize need for and pharmacology of a neuroprotective intubation.
8. Become a pediatric advanced life support instructor
9. Run mock codes on the wards for the pediatric residents

Level 3

1. Successfully completed year two
2. Can teach principles of resuscitation
3. Can cite current evidence in resuscitation research.
4. Demonstrate ability to teach shock pathophysiology and management to students and residents.
5. Communicate and counsel families on the sequelae and outcomes of shock
6. Be independent in airway management.
7. Recognize appropriate role for, and utilizes anesthesia, otolaryngology consultation in management of complex critical airway.
8. Demonstrate awareness of and manages impact of multi-organ failure on intubation, airway management
9. Teach the pediatric advanced life support course to hospital personnel.

10. Run mock codes on the wards for the pediatric residents

Goal II: Transport

Objective:

1. Demonstrate knowledge and ability to organize the management of the critically-ill pediatric patient during intra- and inter-hospital transport.
2. Recognize and anticipate sedative, airway protection, and vascular access needs during transport.

At all Levels, fellows must:

1. Demonstrate ability to interact with referral physician, charge nurse, transport center. Requires attending supervision.
2. Demonstrate ability to recognize patient's needs (airway, sedation) for intra-hospital transport.
3. Takes adequate history in order to assess patient's needs.

Goal III: Assessing, evaluating and managing common signs and symptoms characterizing critically ill pediatric patients:

Overall objective: PCCM fellows must understand how to RECOGNIZE common signs and symptoms encountered in the Pediatric Critical Care Patient. They must be adept at generating a DIFFERENTIAL DIAGNOSIS and skilled in the MANAGEMENT of these common signs and/or symptoms that reflect physiologic deterioration. In each case, the fellows are trained to

- Recognize importance of the sign, symptom with appropriate history and physical, laboratory and radiographic data.
- Formulate a differential diagnosis
- Know indications for intervention and stabilization.
- Develop an effective decision-making plan for further evaluation and management

These common presentations include, but are not limited to the following:

- A. Hypoxemia, Hypercarbia
 1. Differential (including DOPE: Dislodgement, Obstruction, Pneumothorax, Equipment failure)
 2. Non-invasive treatment modalities
 3. Mechanical ventilation treatment modalities
 4. Non-conventional (HFOV, surfactant, ECMO, etc.) treatment options and intended consequences

B. Agitation, Anxiety

1. Differential
2. Scoring systems; both verbal and non-verbal
3. Treatments and risks/side-effects and benefits of treatments
4. Anticipate outcomes of therapies

C. Pain

1. Differential
2. Scoring, verbal and non-verbal
3. Physiology, pharmacology of treatment
4. Anticipate outcomes of therapies

D. Coma

1. Differential diagnosis, anatomic diagnosis of coma
2. Indications for:
 - a. imaging
 - b. intervention
 - c. Pediatric neurology and/or neurosurgery consultation

E. Cardiovascular:

1. Monitoring, differential diagnosis and treatment principles of:
 - a. Cyanosis
 - b. Tachycardia
 - c. Arrhythmias
 - d. Hypotension
 - e. Hypertension

F. Respiratory:

1. Monitoring, differential diagnosis and treatment principles of:
 - a. Tachypnea
 - b. Bradypnea
 - c. Apnea
 - d. Increased work of breathing
 - e. Bronchospasm/wheezing
 - f. Stridor/sturdor

G. Skin: Monitoring, differential diagnosis and treatment principles of:

- a. Petechiae
- b. Purpura
- c. Rash
- d. Capillary refill time

H. Gastrointestinal: Monitoring, differential diagnosis and treatment principles of:

- a. Acute abdomen
- b. Jaundice

- c. Gastrointestinal bleeding
- d. Vomiting
- e. Diarrhea
- f. Ascites

I. Renal: Monitoring, differential diagnosis and treatment principles of:

- a. Anuria
- b. Polyuria
- c. Edema

For each of these common presentations, level-based, fellow goals are:

Level 1

1. Be able to generate an appropriate differential diagnosis for each sign or symptom.
2. Demonstrate familiarity with general pediatric information.
3. Demonstrate ability to guide medical students, residents through appropriate diagnostic evaluation and supervise their documentation (orders, medical record).
4. Demonstrate accountability in following up results of diagnostic tests and evaluations.

Level 2

1. Demonstrate familiarity with content of current pediatric critical care textbooks.
2. Be able to independently supervise bedside care team's evaluation and treatment of each sign or symptom.
3. Can demonstrate use of evidence to justify or explain clinical approach.
4. Demonstrate thorough documentation, including family/patient communication.
5. Familiar with risk and benefits of diagnostic therapeutic management.
6. Understands indications for consultative input.
7. Demonstrates basic knowledge of charges, hospital costs.

Level 3

1. Demonstrate thorough knowledge of evidence-based guidelines, practice management profiles for topic.
2. Demonstrate ability to communicate significance of results of tests, treatment to patient and/or family in a cogent and empathic manner.
3. Has clear knowledge of costs, charges and collections.
4. Can teach residents and/or students as exemplified by making a handout, giving a short talk on relevant topic, teaching on rounds at bedside, and/or presenting core lecture.
5. Adequate billing documentation.
6. Can synthesize, supervise, and integrate input from consultants into management plan.

Goal IV: Learning the management of common conditions encountered in critically ill or injured pediatric patient:

General Objective:

- A. Each condition requires monitoring by both serial examinations and technology-based systems. Effective management plans should be based on a clear understanding by the trainees of:
 1. Pathophysiology of process
 2. Indications for admission, discharge, consultation
 3. Risk of death, disability, complications, long-term effect on quality of life
 4. Unlike, single organ-based subspecialists, trainees must know the impact management strategies have on the function of other highly integrated organ systems. Failure to consider this can lead to Multiple Organ Dysfunction Syndrome (MODS) which is a harbinger of poor outcomes in the PICU

- B. Common Conditions:
 1. Neurologic
 - a. coma
 - b. increased intracranial pressure (ICP)
 - c. hypoxic ischemic injury
 - d. status epilepticus
 - e. weakness
 - f. brain death

 2. Airway
 - a. acute, chronic upper airway obstruction
 - 1) infection (e.g. laryngotracheobronchitis)
 - 2) trauma
 - 3) congenital/anatomic
 - 4) acquired (e.g. subglottic stenosis)
 - 5) foreign body

 - b. tracheobronchial malacia
 - c. obstructive sleep apnea
 - d. Intubation sequelae

 3. Cardiovascular
 - a. shock
 - 1) anemic
 - 2) anoxic
 - 3) hypovolemic
 - 4) cardiogenic

- 5) distributive
 - b. congestive heart failure
 - c. pulmonary hypertension
 - d. congenital heart disease (see separate competency-based goals and objectives for the Pediatric CardioThoracic Unit rotations)
 - e. myocarditis
 - f. cardiomyopathy
4. Respiratory
- a. indications for initiation and cessation of mechanical support
 - b. management of mechanical ventilation
 - 1) non-invasive ventilation strategies (CPAP, BiPAP)
 - 2) Volume- or Pressure-control modes of ventilation
 - 3) Interactive (SIMV) versus Assist control modes of ventilation
 - 4) Pressure regulated-volume control (PRVC) mode
 - 5) high frequency oscillatory ventilation (HFOV)
 - c. interpretation of pulmonary function
 - 1) peak flow
 - 2) vital capacity
 - 3) flow volume, pressure volume loops
 - 4) lung volumes
 - 5) airway resistance
 - 6) flow/time curves
 - d. diseases/conditions
 - 1) bronchiolitis
 - 2) Acute Lung Injury (ALI)/ARDS
 - 3) pneumonia
 - 4) atelectasis
 - 5) status asthmaticus
 - 6) pleural effusion/empyema
 - 7) nosocomial or aspiration pneumonia
 - 8) Bronchopulmonary dysplasia
 - 9) Neuromuscular weakness
5. Gastrointestinal
- a. Hemorrhage
 - 1) upper GI
 - 2) lower GI
 - b. Hepatic Failure
 - c. Pancreatitis
 - d. Hyperbilirubinemia
 - e. Malabsorption/malnutrition
 - f. GI reflux

- g. Hemorrhagic diarrhea (e.g. GVHD, typhlitis)
- h. Acute (surgical) abdomen
- i. Intraabdominal hypertension

6. Hematologic

- a. Consumptive coagulopathy
- b. Disseminated intravascular coagulopathy (DIC)
- c. Thrombocytopenia
- d. Strategies for anti-coagulation (in setting of DVT) and work-up for hypercoagulable state
- e. Crises associated with hemoglobinopathies (e.g. Acute chest syndrome, vaso-occlusive crisis)
- f. Other hemoglobinopathies (met- and carboxy-hemoglobinemia)

7. Skin

- a. Pressure necrosis
- b. Hypersensitive urticaria
- c. Stevens-Johnson syndrome
- d. Erythromderma (e.g. toxic-shock syndrome)

8. Renal

- a. Recognition of renal failure utilizing the RIFLE criteria
- b. Hemolytic uremic syndrome
- c. Indications for, initiation and management of renal replacement therapies*:
 - 1) Acute hemodialysis
 - 2) Continuous venovenous hemofiltration \pm dialysis
 - 3) Peritoneal dialysis

9. Nutrition

- a. Malnutrition:
 - 1) primary
 - 2) acquired
- b. Central venous hyperalimentation
- c. Use of resting energy expenditure measurements

10. Fluids and electrolytes

- a. Fluid requirements as effected by age, size and disease state
- b. High and low values of:
 - 1) sodium
 - 2) potassium
 - 3) calcium
 - 4) magnesium
 - 5) phosphorus
- c. Metabolic acidosis and alkalosis, anion gap

11. Abnormal Metabolic States
 - a. Diabetic ketoacidosis (DKA)
 - b. SIADH
 - c. Adrenal insufficiency
 - d. Thyroid function in critical illness
 - e. Diabetes insipidus
 - f. Cerebral salt wasting syndrome
 - g. Hypoglycemia
 - h. Inborn errors of metabolism

12. Trauma
 - a. shock
 - b. drowning, immersion, submersion
 - c. burn
 - d. child abuse
 - e. smoke inhalation
 - f. insect bites/stings
 - g. head injury
 - h. Carbon monoxide poisoning
 - i. Multiple trauma

13. Poisoning, ingestion, and overdose
 - a. Suicide
 - b. Accidental
 - c. Iatrogenic
 - d. Substance abuse

14. Transplantation
 - a. Pharmacology of immune suppression
 - b. Graft vs. host disease (GVHD)
 - c. Management principles in kidney transplantation
 - d. Management principles in hepatic transplantation
 - e. Management principles in bone marrow transplantation
 - f. Management of organ rejection

15. Palliative, End of Life
 - a. Advance directives/DNR
 - b. Comfort care
 - c. Withdrawal of Life Sustaining Medical Treatment
 - d. Palliative care
 - e. Bereavement support
 - f. Brain death

16. Inflammation

- a. Molecular Intensive Care
- b. Systemic Inflammatory Response Syndrome
- c. Shock
- d. Multiple Organ Dysfunction System (MODS)
- e. Toxic Shock Syndromes
- f. Connective Tissue Disorders
- g. Anaphylaxis

17. Infectious Disease

- a. Sepsis
- b. Pneumonia
- c. Empyema
- d. Nosocomial Infections
- e. Meningitis and Encephalitis
- f. Meningococemia
- g. Peritonitis
- i. Human Immunodeficiency Virus infection

For each of these disease states, level-based, fellow goals are:

Level 1

1. Demonstrates familiarity with etiology and pathophysiology of these common disease entities.
2. Demonstrates ability to organize a diagnostic evaluation with attending prompting.
3. Can supervise early management by PICU care team.
4. Knows definitions of organ failures (e.g. P/F ratio, Glasgow coma score, RIFLE, etc.)
5. Recognizes onset and/or deterioration of organ failure in clinical situations.
6. Documentation requires some attending input.

Level 2

1. Demonstrate familiarity with pediatric critical care textbook knowledge of condition, definition, and management.
2. Acquires additional insight from current literature and can cite evidence to support judgment.
3. Can effectively communicate strategy to patient, family, and care team.
4. Demonstrate leadership by organizing and supervising early stabilization of disease process upon admission to the PICU.
5. With attending input, can complete diagnostic evaluation and develop management strategy with appropriate consultation.
6. Demonstrates adequate documentation.

Level 3

1. Can autonomously orchestrate care in complex patients with multiple consultants.
2. Can independently manage a team meeting to define and prioritize needs of patients, family, and care team.
3. Demonstrate autonomous documentation.
4. Demonstrates ability to communicate with family as a partner in care.
5. Recognizes and deals appropriately with futile intervention(s)
6. Demonstrate use of independently evidence-based management.
7. Can prepare a didactic presentation for trainees, which reviews assessment, diagnosis and management of a common condition (e.g. “Diabetic ketoacidosis”)

Goal V: Diagnostic testing in the PICU

The principal objective is to assist fellows in understanding how to use and interpret laboratory and imaging studies in the PICU patient. This includes: learning the indications for and limitations (false positives/negatives) of specific diagnostic tests, interpreting abnormality in context of the clinical condition, knowing the therapeutic options for correction, and effectively communicating results to patient, family and staff. To achieve these goals, fellows are trained to know:

- A. Age and Disease Specific Values
- B. Indications and Limitations of:
 1. Body Fluid Tests
 - a. CBC, differential, indices
 - b. Coagulation factors, platelets
 - c. Cultures
 - d. Spinal fluid
 - e. Serum chemistries
 - f. Liver function tests
 - g. Nutritional indices
 - h. Renal function tests
 - i. Fractional excretion of sodium
 - j. Arterial, capillary and venous blood gases
 - k. Urinalysis
 - l. Drug levels
 - 1) half-life
 - 2) clearance
 - 3) distribution
 2. Imaging studies:
 - a. CT scans: head, chest, abdomen and pelvis
 - b. MRI: head, heart, abdomen
 - c. A/P Chest x-ray
 - d. A/P and cross-table abdominal films

- e. Ventriculo-peritoneal shunt series
- f. Airway fluoroscopy
- g. Cervical spine films (A/P, Water's, flexion/extension)
- h. Airway views (A/P and lateral)
- i. Nuclear medicine studies

For each of these tests, level-based, fellow goals are:

Level 1

1. Demonstrates knowledge of sensitivity, specificity, and accuracy of study
2. Obtains appropriate consent when indicated.
3. Is accountable for timely follow-up of results.
4. Informs family, patient, and care team of results effectively and in a timely manner
5. Demonstrates adequate documentation in a timely manner.

Level 2

1. Demonstrate judgment of relative value of a test in evaluating the clinical problem.
2. Understands value of a critical pathway and practice management in use of a diagnostic test.
3. Exhibits ability to integrate data obtained into further work-up.
4. Communicates significance and implications of test to family.
5. Can cite evidence-supporting value of test in clinical situation (e.g. CXR in asthma, CT scan with first seizure).
6. Demonstrates knowledge of hospital costs, charges.

Level 3

1. Recognizes critical pathways for use of diagnostic tool.
2. Accurately reports, documents complications resulting from orders, interpretation.
3. Can prioritize input from a variety of consultants to best meet patient needs.
4. Demonstrates sound judgment in ordering minimally necessary daily tests while supervising the PICU as senior fellow.

Goal VI: Practice of Monitoring

The overall objective is to teach fellows to understand the application of physiologic monitoring and other special technology common to the PICU. To achieve this goal, fellows will learn:

- A. Non-invasive monitoring technology, indications, practical use and limitations to include: Dynamap blood pressure monitoring, pulse oximetry, end-tidal CO₂ monitoring/capnometry, ventilator graphics, BIS monitoring and NIRS.

For each of these monitoring technologies, level-based, fellow goals are to:

Level 1

1. Know indications for use of each monitor/device.
2. Understand limitations of non-invasive devices.
3. Understand the role of data in protocolizing care (e.g. weaning, ventilation management).
4. Be aware of Unit protocols and policies regarding the use of monitors
5. Communicate to patient, families, staff the indications and anticipated performance of monitors

Level 2

1. Demonstrate understanding of mechanics of device and operating principles.
2. Interpret data accurately including recognizing spurious values or failed performance.
3. Demonstrate knowledge of significance of data

Level 3

1. Demonstrate knowledge of common pitfalls.
 2. Troubleshoot device failure.
 3. Know the cost/benefit of using the device.
 4. Demonstrate knowledge of alternatives and limitations.
- B. Invasive monitoring technology, indications, practical use and limitations including: central venous and arterial pressure monitoring, ICP monitoring, abdominal pressure/bladder pressure monitoring, and in-line co-oximetry monitoring. To achieve this goal requires both knowledge of the technical performance of the invasive monitor, but also the skills to insert vascular access for the purposes of invasive monitoring. Thus, this objective also entails Procedural Competency in vascular access techniques and data interpretation. For this purpose procedures are logged and technical skill and competency evaluated by all faculty for each fellow on a semi-annual basis. To achieve this goal, fellows are expected to know the indications for initiation, the risks and benefits and the indications for cessation of each monitoring technology. They should develop an ability to interpret the data, understand spurious values and trouble-shoot performance for each of the following: central venous, intra-arterial, and atrial pressure monitoring devices. They should understand the principles and management of intracranial pressure monitoring.

A great deal of emphasis is placed on using and understanding high technology monitoring equipment in the PICU. Each bed space is equipped with ECG, two to three pressure monitors, respiratory monitors, pulse oximetry and capnography at all times. Several sessions in the PCCM core curriculum are allocated for this topic.

Fellows are expected to develop competency in the following technical procedures that will facilitate these monitoring capabilities.

1. Central venous cannulation
 - a. femoral
 - b. internal jugular
 - c. subclavian

2. Arterial cannulation
 - a. radial
 - b. dorsal pedal
 - c. posterior tibial
 - d. femoral

With regards to each of these monitoring and technical competencies, level-based, fellow goals are to:

Level 1

1. Understand the principles and importance of and can acquire informed consent
2. Understand guiding principles of a JCAHO-mandated “time out” for patient safety
3. Is compliant with NACHRI-base line insertion bundle (see additional competency-based goals below)
4. Demonstrates knowledge of normal numerical values.
5. Performs technical procedures with direct assistance of supervising attending
6. Maintains updated and complete procedure log

Level 2

1. Demonstrates knowledge of pathophysiologic significance of data.
2. Can identify common sources of error in measurement and interpretation.
3. Can interpret data to distinguish artifact and spurious values valid data
4. Can demonstrate knowledge of indications, alternatives, and complications.
5. Can perform procedures without direct assistance from supervising attending.

Level 3

1. Can independently set up and calibrate devices.
2. Can cite evidence from current literature regarding complication rates, sequelae utility of monitoring devices to alter patient outcomes (e.g. PA catheter)
3. Understands how to evaluate a new device for integration into practice.
4. Can develop cost benefit analysis for a new device or technology.
5. Can perform technical procedures with only visual supervision by supervising attending

Goal VII: Nutrition therapies

The overall objective is to teach fellows to understand the use of enteral and parenteral nutritional provision, modalities associated with each of these options and common complications encountered in nutritional therapy in the PICU. Fellows will be trained to understand caloric need determination, the metabolic effect of disease or condition on nutritional demands (e.g. post-operative, post-burn) and to identify refeeding syndrome. As fellows progress through the training program they will be expected to:

Level 1

1. Demonstrate knowledge of maintenance nutritional needs of the PICU patient.
2. Recognize risk/benefit of parenteral vs enteral feeds.
3. Ensure adequate nutritional needs (using Daily Goal Sheet reminder)

Level 2

1. Recognize need for altered metabolic needs in complex patients (burns, sepsis, fever).
2. Demonstrate ability to use resting energy expenditure measures to reconfigure and tailor metabolic needs.
3. Can independently write for and manage parenteral nutrition.
4. Understands impact of renal replacement therapies on parenteral protein requirements.

Level 3

1. Can teach junior house staff the basic nutritional needs of PICU patients.
2. Demonstrates ability to recognize malnourished states and refeeding problems.
3. Recognizes and manages impact of multi-system organ failure on nutritional needs
4. Understands lab assessment of nutritional status.

C. Practice-Based Learning and Improvement:

Fellows are expected to be able to use scientific evidence and methods to investigate, evaluate, and improve patient care practices by continually identifying areas for improvement and implementing strategies to enhance knowledge, skills, attitudes and processes of care. This should involve analyzing and evaluating practice experiences and implementing strategies to continually improve the quality of patient practice. This is best accomplished in an environment that has developed and maintained a willingness to learn from errors and use errors to improve the system or processes of care. In addition, fellows are oriented initially and then expected to maintain consistent use of information technology to access and manage information, support patient care decisions and enhance both patient and physician education. In addition to being exposed to this via their QI projects, their participation in the multidisciplinary, Morbidity and Mortality Conference

enforces the repetitive task of assessing “errors” or problems in patient care, pursuing a root cause analysis that identifies system problems, plans a remedial action and follows through on the execution of the solution.

Every fellow, approximately six months after beginning their fellowship training and every six months thereafter, is required to complete a core-competencies-based Individualized Learning Plan (ILP) questionnaire form that specifically requests self-evaluation of strengths and weaknesses, identification of desired areas for self-improvement, and delineation of a plan of action to attain targeted goals of learning and skills proficiency for the coming year. To assist fellows with self-assessment, feedback information from competency-based faculty evaluations and test scores from annual standardized in-training examinations (with topic-specific scoring breakdown) is readily made available to them during their second and third year meetings when this data is available. Each fellow must propose a self-initiated and self-tailored learning plan to remedy identified deficiencies. After initial completion, the ILP is reviewed with the Fellowship Program Director to discuss accuracy of self-assessment and feasibility of proposed learning plans, and any necessary modifications are made at this time. During this review, fellows are reminded of their unique areas of strengths to assure that the trainee receives positive feedback, maintains self-esteem, and remains motivated for self-improvement. An important component of this formal process is the early identification of potential professional career goals and anticipated/desired area(s) of expertise. Asking trainees to consider these career goals enables the Fellowship Program Director to direct trainee efforts to be better congruent with desired career tracks of pursuit, pair trainees with appropriate mentors who can provide career-specific guidance, and facilitate fellow experiences that can maximize the probability of success in ultimately achieving these stated academic and career goals. A particular strength of our program is the breadth of activities and pool of excellent mentors we can provide our trainees based on their specific personal interests and goals. Fellows further develop this competency by:

With regards to, Practice-Based Learning and Improvement, level-based, fellow goals are to:

Level I:

- 1) Complete ILP and identify a targeted area for growth and a plan to address this self identified deficiency. (Examples can include: additional or new rotations through various clinical services (e.g. Surgical ICU), attendance at topic-specific educational meetings (e.g. CRRT, ECMO, etc.), and targeted reading of didactic material (e.g. PCCM textbooks).
- 2) Complete orientation to electronic information resources
- 3) Attend the Pediatric Fellowship Core Lecture series that includes management, decision-making, and strategic planning under stressful situations as a clinical care leader
- 4) Present reviews of the Pediatric Critical Care textbook to the fellows.
- 5) Complete one-third of web-based educational materials (Tufts course) covering management, decision-making, and strategic planning under stressful situations as a clinical care leader

Level II:

- 1) Complete ILP and identify new targeted area for improvement utilizing primarily feedback from in-service training exam. Then devise plan to remedy this knowledge deficiency by utilizing primarily didactic sessions and textbook resources. Program director and Associate Director will be responsible for ensuring completion
- 2) Attend the Pediatric Fellowship Core Lecture series
- 3) Coordinate care with multiple consultants
- 4) Present reviews of the Pediatric Critical Care textbook to the fellows.
- 5) Complete second third of web-based educational materials (Tufts course)

Level III:

- 1) Complete ILP and identify new targeted area for improvement utilizing primarily feedback from in-service training exam. Then devise plan to remedy this knowledge deficiency by constructing a talk covering this pertinent topic to be provided during the PCCM Fellows' Conference.
- 2) Provide Journal Club addressing either an Evidence-Based Decision-Making topic or a Cost/Risk Benefit Analysis.
- 3) Attend the required Pediatric Fellowship Core Lecture series
- 4) Organize the review session for the fellows. This occurs over a three year cycle and includes assigning chapters from the Pediatric Critical Care textbook to each fellow. The review occurs twice a month and includes two chapters.
- 5) Complete final third of web-based educational materials (Tufts course)

D. Interpersonal and Communication Skills: Fellows are expected to demonstrate interpersonal and communication skills that enable them to establish and maintain professional relationships with patients, families, and other members of health care teams. It is expected fellows will learn to: Provide effective and professional consultation to other physicians and health care professionals and sustain therapeutic and ethically sound professional relationships with patients, their families, and colleagues; Use effective listening, nonverbal, questioning, and narrative skills to communicate with patients and families; Interact with consultants in a respectful, appropriate manner; Maintain comprehensive, timely, and legible medical records

With regards to, Interpersonal and Communication Skills, these competencies are expected to be achieved in each year of fellowship training as they are so fundamentally important to learn in order to provide the highest level of quality care in the PICU setting. With regards to level-based goals, fellows are expected to:

Level I:

- 1) Receive all sub-specialty surgical patients upon admission to the PICU to establish effective intake/listening skills
- 2) Participate as an observer in all family meetings that occur while on clinical service.
- 3) Handle all outside referral calls from transferring hospitals that are requesting direct admission to the PICU, assisting with the care of the patient, coordinate the transfer of the patient and complete the transfer form

- 4) Learn to document procedure notes
- 5) Provide two didactic lectures to the Division of Critical Care Medicine
- 6) Present two journal club reviews to the Division of Critical Care Medicine

Level II

- 1) Co-manage all sub-specialty surgical patients admitted to the PICU that necessitates effective communication and cooperation among these teams and the PICU staff.
- 2) Lead a multidisciplinary family meeting that is aimed at determining the best course of action for a complex, critically ill child.
- 3) Observe a family discussion involving possible withdrawal of life-sustaining care or DO NOT RESUSCITATE order.
- 4) Handle all outside referral calls from transferring hospitals that are requesting direct admission to the PICU, assisting with the care of the patient ,coordinate the transfer of the patient and complete the transfer form
- 5) Provide two didactic lectures to the Division of Critical Care Medicine
- 6) Present two journal club reviews to the Division of Critical Care Medicine

Level III

- 1) Manage and lead rounds on all sub-specialty surgical patients admitted to the PICU that necessitates effective communication and cooperation among these teams and the PICU staff.
- 2) Lead multidisciplinary morning work rounds.
- 3) Spend 1 month rotation on Palliative Care Program consults observing and participating in End-of-Life discussions
- 4) Provide two didactic lectures to the Division of Critical Care Medicine
- 5) Present two journal club reviews to the Division of Critical Care Medicine

E. Professionalism: Fellows are expected to demonstrate behaviors that reflect a commitment to continuous professional development, ethical practice, an understanding and sensitivity to cultural diversity and a responsible attitude toward their patients, their profession, and society. Fellows completing their training should:

- Demonstrate respect, compassion, integrity, and altruism in relationships with patients, families, and colleagues.
- Demonstrate sensitivity and responsiveness to the gender, age, culture, religion, sexual preference, socioeconomic status, beliefs, behaviors and disabilities of patients and professional colleagues.
- Adhere to principles of confidentiality, scientific/academic integrity, and informed consent.
- Recognize and identify deficiencies in peer performance.

Objective: To exhibit the components of professionalism in the practice of pediatric critical care medicine including but not limited to:

1. **Honesty/Integrity:** Is truthful with patients, peers, and in professional work (e.g. documentation, communication, presentations, and research).
2. **Reliability/Responsibility:** Is accountable to patients and colleagues. Can be counted on to complete assigned duties and tasks. Accepts responsibility for errors.
3. **Respectful of Others:** Talks about and treats all persons with respect and regard for their individual worth and dignity; is fair and non-discriminatory. Routinely inquires about or expresses awareness of the emotional, personal, family, and cultural influences on patient well-being and their rights and choices off medical care; is respectful of other members of the health care team. Maintains confidentiality.
4. **Compassion/Empathy: Listens** attentively and responds humanely to patient's and family members concerns; provides appropriate relief of pain, discomfort, anxiety.
5. **Self-improvement:** Regularly contributes to patient care or educational conferences with information from current professional literature; seeks to learn from errors; aspires to excellence through self-evaluation and acceptance of the critiques of others.
6. **Self-awareness/Knowledge of Limits:** Recognizes need for guidance and supervision when faced with new or complex responsibility; is insightful of the impact of one's behavior on others and cognizant of appropriate professional boundaries.
7. **Communication/Collaboration: Works** cooperatively and communicates effectively to achieve common patient care and educational goals of all involved health care providers.
8. **Altruism/Advocacy: Adheres** to best interest of the patient; puts best interest of the patient above self-interest and the interest of other parties.

All Levels:

Trainees should achieve a “meets expectation” evaluation (Monthly evaluation of trainee, anonymous and confidential) by the faculty. Trainees should exhibit sensitivity, empathy, and understanding of cultural differences in the delivery of care.

(See Department and University Policy guidelines). Fellows will be made aware of University Policies on Diversity, Attends Workshops, Departmental activities on topic

F. Systems-Based Practice: Fellows are expected to demonstrate both an understanding of the contexts and systems in which health care is provided, and the ability to apply this knowledge to improve and optimize health care. This is a particularly strong emphasis of the activities in the PICU. This fertile environment provides the opportunity for fellows to:

- Understand, access, and utilize the resources, providers and systems necessary to provide optimal care.
- Understand the limitations and opportunities inherent in various practice types and delivery systems, and develop strategies to optimize care for the individual patient.
- Apply evidence-based, cost-conscious strategies to prevention, diagnosis, and disease management.

- Collaborate with other members of the health care team to assist patients in dealing effectively with complex systems and to improve systematic processes of care.

Level based goals include:

Level I:

- 1) Observe/Participate the Monthly M and M Conference
- 2) Identify an Quality Initiative Project
- 3) Complete Tufts modules relevant to Systems-Based Practice

Level II:

- 1) Provide progress update to Program Director at annual evaluation of QI project activity
- 2) Participate in the monthly M and M Conference

Level III

- 1) Participate in the monthly M and M Conferences
- 2) Complete QI project

ANESTHESIA ROTATION GOALS AND OBJECTIVES

During these two 1month long rotations the first year PCCM fellows will integrate into the anesthesia system interacting on a daily basis with the anesthesia attendings, residents, CRNA staff and patients/families. They will be exposed to preoperative evaluations of the patients gathering effective histories and performing physical exams. They will discover the length and breadth of pediatric surgical procedures with various pediatric surgical sub specialties including but not limited to Neurosurgery, Cardiothoracic, Orthopedic, Otorhinolaryngology, Trauma, Short procedures by Gastroenterology and Hematology/Oncology, and General Pediatric Surgery. They will also participate in the emergence of pediatric patients and learn about the effective PACU monitoring techniques. It is also expected that they will learn to deliver an effective summary of the anesthetic course and a proper hand off to the accepting team. The majority of their time will be spent however, learning proper techniques in management of the pediatric airway.

Level I only:

1. Observe and perform effective history and physical exam in the pre-anesthesia holding area including estimation of ASA classification and Mallampati classifications of various levels of pediatric patients.
2. Observe and perform effective positioning of the pediatric airway and support of the pediatric patient during bag mask ventilation.
3. Observe and perform effective direct laryngoscopy and insertion of an artificial airway in a pediatric patient. Fellow should become comfortable with the use of multiple laryngoscopic blade types including the Mactintosh, Miller and Wis Hipple blades.
4. Observe and perform correct insertion of various airway adjuncts including, Oral airways, Laryngeal mask airways, Nasopharyngeal airways, and ETT exchange devices.
5. Learn to correctly identify pediatric syndromes that may be associated with difficult airways and the proper adjunctive devices and techniques that may be helpful clinically. Examples include Bronchoscopic intubation, Lightwand assisted intubation, LMA assisted intubation, needle cricothyroidotomy with hand jet ventilation, etc.
6. Observe the anesthetic management of patients during surgical procedures of various durations and be aware of the hemodynamic, neurologic and respiratory ramifications of various anesthetic medications both inhaled and intravenous.
7. Observe and perform evaluations at the end of procedures that lead to successful extubation and recovery of the pediatric patient. Examples include various tests of respiratory strength, neurologic recovery, Train of four etc.

RESEARCH GOALS AND OBJECTIVES

In accordance with ACGME guidelines, PCCM fellows engage in “scholarly activity” for 16 months of their fellowship. This activity is guided by a primary mentor and supervised by a scholarship oversight committee (SOC) assembled in consultation with the mentor and fellowship director. By the end of the fellowship, this scholarly activity is expected to result in a “work product” that the SOC deems to represent adequate time and effort investment by the fellow to become board eligible. Typically this work product is a first-author published manuscript in a peer reviewed journal.

Scholarly activity may take several forms. Fellows may design and pursue a project as part of any basic science laboratory at the University of Florida. They may engage in retrospective or prospective clinical trials with a clinical investigator. Lastly, they may enroll in a graduate program such as a Masters in Public Health as long as the degree can be completed within the duration of the fellowship.

Level I:

Research time in the first year is generally devoted to establishing the scholarly activity plan, designing the project, acquiring background knowledge, and learning methods. Specifically, in this year the fellow should:

1. Decide the type of scholarly activity to be pursued (basic science, clinical science, alternate degree).
2. Identify 2-3 general areas of scientific interest.
3. Consider various primary investigators (PIs) within the University who do work in these areas of study and who may serve as the primary mentor to assist in focusing a research question and guide the scholarly activity throughout the fellowship.
4. Establish a scholarship oversight committee to assist and supervise the fellow through the course of the project. In addition to the primary mentor, the committee should include at least one faculty member from the PCCM division and one other faculty member with a good track record of successful research.
5. Delineate specific goals for years 1 – 3.
6. Focus on learning the investigational techniques to be employed. If the project is clinical, the IRB protocol should be submitted in this year.
7. Successfully enroll in a Masters program if such a track is chosen.
8. Explore funding opportunities to support the area of study, and prepare (and possibly submit) an application if an appropriate mechanism is identified.

Level II:

The second year is devoted to the implementation of the project plan and the acquisition of data, or the continuation of coursework as applicable. By the end of the year, the fellow should be initiating analysis of collected data as well as preparing the introduction and methods sections of the work product.

1. For a basic science track; the hypothesis should be tested in the laboratory with data collection and analysis dominating the year. If the research is animal based, data collection and analysis of pathophysiologically measured parameters is the expected goal.
2. For a clinical research track; it is expected that the study retain IRB approval and collection of patients with data analysis should occur.
3. For those pursuing a masters in public health, completion of assigned coursework with the eventual goal of thesis completion are the main goals.

Level III:

Regardless of chosen track, the fellow should be concluding the project within the third year. Their primary focus during this year is on completion of remaining experiments, data analysis, preparation of the results and discussion sections of the work-product, and manuscript submission to a peer-reviewed journal. If enrolled in a Masters program, the fellow should complete the program requirements including the writing and defense of a thesis. Though not required, at the beginning of this year the fellow is strongly encouraged to submit an abstract of the scholarly work to a national meeting and attend the meeting to present it.

In exceptional cases, the project may not be able to be completed in its entirety during the fellowship period. In such an event, 2nd-author manuscripts or other efforts may be considered as adequate IF: a clear novel question or objective was posed; sufficient methods were applied to answer the question or reach the objective; the fellow put forth honest, consistent effort; the work entailed the acquisition of substantial investigational skill sets; and the resulting work-product represents a collection of knowledge that is an important contribution to the area of study. The fellow will still be required to prepare a document of scholarly activity that provides details about the project from its beginning to its current status. In all instances the adequacy of the work product will be decided upon by the SOC and certified by the fellowship director.

All finalized work-products will be submitted promptly by the fellowship director to the American Board of Pediatrics, sub-board of Pediatric Critical Medicine. Eligibility to sit for the certification exam will depend upon approval by the Board.