Pediatric Critical Care Rotation

Department: Pediatrics
Faculty Coordinator: Leslie Garner, MD
Location: Children's Medical Center of Dallas

I. Rotation Description:

The primary goals of the critical care rotation are to equip the residents with a pathophysiologically based understanding of common life-threatening pediatric conditions and to help them acquire the skills and knowledge necessary to evaluate, stabilize, and appropriately refer critically ill patients to a higher level of care.

Residents will function as an integral part of a multidisciplinary team providing comprehensive medical care to critically ill neonates, infants, and children. Residents will directly participate in the care of patients with heart disease, respiratory illnesses and respiratory failure, neurological illnesses, infectious disease, and a variety of other pediatric illnesses.

Residents will be divided into two patient care teams. The resident "practice" will consist of up to 28 patients with the patients being distributed equitably among the residents according to their level of training and between the two teams to in such a way as to evenly distribute the work load among residents, fellows, and attendings. Each resident is expected to actively participate in all aspects of daily patient management (as described in detail below) and to take ownership of his/her patients. The residents will be assisted and supervised in these activities by the PICU faculty and fellows.

II. Course Goals and Objectives:

(based on the ACGME core competencies for resident education) This document outlines the learning objectives that we would like each resident to master by the end of their third year. We realize that learning occurs along a continuum, and our goal is that each resident would progress at a steady pace toward mastery of these items. The evaluation tool will reflect the continuum of learning rather than simply checking off the accomplishment of goals.

Competency I Patient Care:

Residents must be able to provide patient care that is developmentally appropriate, compassionate, and effective for the treatment of critical illness.

Residents are expected to…

- Gather and be familiar with essential and accurate information about their patients using medical history, appropriately detailed physical exam, pertinent diagnostic studies, recommendations by consultants, and physiologic variables
- Use patient's medical information, clinical judgment, and current scientific evidence to make informed diagnostic and therapeutic recommendations
- Develop and carry out appropriate medical management plans in conjunction with the PICU fellow and attending
- Counsel patients and families in the understanding of the patient's illness and available/recommended treatment options

- Participate in the medical decision making process and in obtaining informed consent for diagnostic and therapeutic procedures
- Attend and participate appropriately in discussions between the medical staff and families regarding end of life issues including…
    - Futility of medical care
    - Comfort/Hospice care
    - Do Not Resuscitate (DNR) orders
    - Withdrawal/withholding of life support
    - Brain death (definition, criteria for pronouncement) and organ donation (when asked by family)
- Describe how to formulate management plans for terminally ill patients including…
    - Management of pain/comfort
    - Minimizing invasive procedures
    - Involvement of ancillary services to support patient and family (i.e social work, child life, chaplain)
    - Outpatient management for patients going home

***Competency II Medical Knowledge*:**

Residents are expected to know, critically evaluate, and apply current medical information and scientific evidence to provide appropriate patient care

PICU Admission

- Identify and discuss the indications for PICU admission based upon physical assessment of the patient
- Identify and discuss situations in which planned PICU admissions should be considered (i.e. post operatively, need for invasive procedure in an infant, initiation of chemotherapy in patient at risk for tumor lysis syndrome)

Resuscitation and Stabilization

- Explain and perform steps in the resuscitation and stabilization of a critically ill pediatric patient including airway management, assisted ventilation, and cardiovascular management
- Describe common causes of deterioration in the previously stable PICU patient
- Function appropriately in a resuscitation or code as part of the PICU team

Common Signs and Symptoms

Residents are expected to demonstrate knowledge and proficiency in the recognition, initial treatment, and stabilization of children presenting to the PICU with the following symptoms…

- Cardiovascular: acute life threatening event (ALTE), bradycardia, cardiopulmonary arrest, congestive heart failure, cyanosis, hypertension, hypotension, arrhythmias
- Respiratory: apnea, cyanosis/hypoxemia, increased work of breathing, poor respiratory effort, stridor, wheezing, hemoptysis, respiratory failure
- Neurologic: altered mental status, coma, seizures, focal neurologic deficit
- Renal: oliguria/anuria, polyuria, electrolyte disturbance
- GI: abdominal distension, jaundice, GI bleeding
- Infectious Disease: sepsis, fever, meningitis, encephalitis, rash
- Hematologic: petechiae/purpura, coagulopathy, severe bleeding

Common Conditions

Residents are expected to develop a pathophysiologically based understanding of common pediatric critical care illnesses (including those listed below) and to evaluate and manage them appropriately under the supervision of the ICU attending and/or fellow. The cardiovascular conditions and neurologic conditions associated with traumatic injury (i.e. increased ICP and brain injury) will be covered in didactic lectures during the resident noon conference and will require self directed reading on the part of the resident.

- General: common intoxications, drug overdoses, shock, inhalational injury, non-accidental trauma, submersion injury, caustic ingestion
- Cardiovascular: congestive heart failure, hypertension, myocarditis/cardiomyopathy, arrhythmias
- Pulmonary: respiratory failure, ARDS, croup/bacterial tracheitis, status asthmaticus, foreign body aspiration, pneumothorax
- Fluids/Metabolic: inborn errors of metabolism, dehydration (including hyper- and hyponatremia), hyperkalemia, metabolic acidosis
- Endocrine: Diabetes insipidus, SIADH, adrenal insufficiency, DKA, hypoglycemia, hyperglycemia
- RENAL: renal failure, hemolytic uremic syndrome
- GI: fulminant hepatic failure, pancreatitis, surgical abdomen, acute GI bleeding
- Hematologic: anemia, acute chest syndrome, DIC, tumor lysis syndrome
- Neurologic: increased ICP, taumatic brain injury, cerebrovascular accident, Guillain–Barré, status epilepticus, myasthenia gravis, brain death
- Infectious: pneumonia/empyema, sepsis/septic shock, meningitis, encephalitis

ICU Monitoring and Supportive Therapies

Residents are expected to develop proficiency in the use of the most common monitoring techniques utilized in the PICU including…

- Pulse oximetry
- End-tidal CO2 monitoring
- Arterial blood pressure monitoring
- Central venous pressure monitoring
- Intracranial pressure monitoring

Residents are expected to be familiar with the use of the following treatment modalities in the PICU and be able to discuss the potential limitations and complications of these therapies…

- Oxygen administration by nasal cannula, mask, hood
- Noninvasive ventilation (i.e. CPAP, BIPAP)
- Endotracheal intubation
- Mechanical ventilation
- Use of vasoactive agents
- Analgesia, sedation, and chemical paralysis
- Enteral and Parenteral nutrition
- Blood and blood product administration
- Pharmacologic support including important drug- drug interactions, principles of dosing with renal insufficiency, dosage alterations based on drug levels and kinetics, etc.
- Dialysis (peritoneal, continuous venovenous hemodialysis, traditional hemodialysis)

Procedures

Residents are expected to demonstrate an understanding of the indications and contraindications for, potential complications of, need for sedation/analgesia for, and appropriate monitoring during the following procedures. Residents may have an opportunity to perform one or more of these procedures, but this will be dependent upon the interest level and degree of participation in patient care demonstrated by the residents and upon the availability of medical staff and/or fellows to assist and instruct the resident during the procedure.

- Arterial stick, Art line insertion
- Central venous line insertion
- Thoracentesis, Chest tube insertion
- Paracentesis
- Endotracheal intubation

Competency III Practice Based Learning and Improvement:

Residents must demonstrate the knowledge, skills, and attitude required for continuous self-assessment and be able to use scientific methods and evidence to evaluate and improve their patient care practices.
Residents are expected to…

- Locate and assimilate evidence from scientific studies related to the health care problems of their patients
- Use available evidence and information to make educated diagnoses and clinical management plans

- Recognize that in certain clinical situations, it is appropriate and necessary to accept/admit uncertainty
- Recognize their own personal limitations with regard to knowledge, skills, and tolerance for stress and ask for help appropriately
- Actively participate in the education of PICU team members, patients, and families
- Acknowledge mistakes and learn from them
- Use evaluations of performance and objective measures of knowledge (i.e. online PICU post test) to improve their own patient care practices

Competency IV Interpersonal Skills and Communication:

Residents must be able to demonstrate interpersonal and communication skills that result in the effective exchange of information among members of the PICU team, consultants, patients, and families.

Residents must be able to…

- Recognize the value of a team approach to the delivery of pediatric health care
- Communicate effectively with the PICU team members and other health care professionals
- Develop a problem oriented approach to the formal presentation of patient data in which pertinent exam findings, lab results, etc. are communicated in an organized fashion and are linked to the specific diagnoses/problems of each patient
- Produce accurate, timely, and legally appropriate medical records for pediatric patients
- Ensure that appropriately detailed medical information is passed on to cross-covering physicians for night call and days off such that patient care is seamless
- Actively participate in daily patient care/teaching rounds
- Share knowledge gained from past experience and reading with PICU team members
- Communicate with patients and family members in an unhurried and thorough manner using language that can be easily understood (i.e. without use of medical jargon)

Competency V Professionalism

Residents must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diverse patient populations.

Residents are expected to…

- Demonstrate a respect for and responsiveness to the needs of patients and their families including the demonstration of personal accountability for each patient's medical care
- Demonstrate honesty, integrity, compassion, and empathy in dealing with patients and their families

- Demonstrate a respect for patient privacy and confidentiality
- Demonstrate sensitivity to the age, gender, culture, and disabilities of each patient
- Exhibit professional and ethical behavior in all interactions with members of the PICU team and the medical staff

Competency VI Systems Based Practice

Residents must understand how to practice high quality health care and advocate for patients within the context of a health care system.

Residents are expected to…

- Generate patient-centered clinical questions to drive knowledge acquisition
- Strive to incorporate evidence based medicine into their daily patient management practice
- Acknowledge and explore medical errors without assigning blame for the purpose of preventing future errors and improving overall patient care
- Recognize patient and family needs and advocate for assistance during the hospital stay and after discharge

III. Methods of Instruction

Bedside Teaching:

- Formal rounds are conducted by the PICU attendings each morning between 7:30 and 12:00pm. On weekdays, every effort will be made to complete rounds by 12:00pm so that the residents can attend their regularly scheduled noon conferences. This requires that the residents be prepared for rounds and present their patients in a complete yet concise manner.
- Residents should prepare for rounds by examining each of their assigned patients, collecting pertinent diagnostic data, and developing a plan of care for each patient.
- Bedside teachers may include attending physicians, consulting physicians, fellows, senior residents (including those from other specialties), pediatric nurse practitioners, and ancillary staff including dieticians, pharmacists, nurses, respiratory therapists, physical therapists, and occupational therapists.
- Informal teaching occurs frequently at the bedside during rounds and as disease processes evolve throughout the day. It is important and expected that the residents participate actively in this process.
- Daily check-out rounds occur at 3:00pm and are conducted by the on-call fellow (s).

Didactic Teaching:

- Residents are encouraged but not required to attend the weekly PICU conferences given by the faculty, fellows, and staff…

- Research Conference: Monday, 12:15-1:00am
- Physiology Conference Thursday, 12:00-1:00pm
- Noon Conference Wednesday, 12:00-1:00pm

- Bimonthly Interactive Ventilator Lectures will be given by the PICU fellows in conjunction with an PICU respiratory therapy educator; dates to be announced

- Informal didactic lectures will be given to the on service residents by the PICU fellows, dates to be determined

- Didactic lectures on core critical care topics (i.e. sepsis, respiratory failure, traumatic brain injury, etc.) will be given as part of the established pediatric noon conference lecture series.

Self Study:

- Residents are expected to read about the illnesses of their patients and evaluate pertinent medical literature in order to further their own education and to participate in the education of other PICU team members.
- A PICU Resident manual will be distributed to each resident which contains a compilation articles and educational materials on key PICU topics. While this is not intended to be a comprehensive guide, it will serve as a basic foundation on many of the issues facing our PICU patients.
- Additionally, a collection of additional reading material in PDF format will be available on disc through the chief residents office for supplemental self study.

IV. Methods of Resident Evaluation

Written Evaluation

- Based on achievement of stated learning objectives
- Attending should discuss the progress of individual residents mid-way through the rotation and provide constructive feedback to help improve the resident's performance

Computerized PICU Post-Rotation Exam

- Developed by the pediatric resident education committee of the Society of Critical Care Medicine
- Residents are required to take this exam prior to the completion of their rotation. Note will be made on the evaluations of residents who fail to complete the exam.
- Scores will be ultimately be used to compare the achievement of our residents to others around the country (once this data is available from the website). Additionally, information obtained from the exam scores will be used to identify areas which might require more focused teaching on the part of the PICU faculty. Finally, the scores can be used by the residents to critically evaluate their own critical care knowledge and progress from year to year.