PICU Resident Rotation  
Alfred I duPont Hospital for Children  
Nemours Foundation  

Review  
And  
Proposed Curriculum  

July 2006- June 2007

Edward J. Cullen Jr., D.O.  
June 2006
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Overview
Nemours’ Pediatric Critical Care physicians supported by the multidisciplinary PICU team provide a pediatric critical care medicine exposure for:

- Thomas Jefferson University Pediatric 2nd-year residents
- Thomas Jefferson University Emergency Medicine 2nd-year residents
- Christiana Care Health System Emergency Medicine 2nd-year residents
- Christiana Care Health System 2nd- and 3rd-year Medicine-Pediatric and Internal Medicine-Emergency Medicine residents
- 4th year medical students from various programs.
- Pediatric resident elective in Transport Medicine / Airway and Intubation Skills (Combined program with Nemours Anesthesiologist)
- Pediatric Critical Care Fellows
- Pediatric Anesthesia Fellows
- Alfred I duPont Hospital for Children Emergency Medicine 1st-year Fellows
- Christiana Care Surgical Trauma Critical Care Fellows

We aim to introduce individual residents to the art of pediatric critical care in an environment where we need to balance:

- Consistent quality and safe bedside care of the critically ill child
- Residents’ expectations for a productive educational experience
- Resident’s PICU service obligations
- Resident’s commitment to outside-of-PICU program expectations
- Resident’s restricted duty hours
- Pediatric GME and SCCM viewpoints on time committed to resident ICU exposure
- Critical care attendings’ clinical, administrative, research, and other educational responsibilities
- Health care economics.

Since 1992, our PICU goals, curriculum, and future plans reflect ongoing development based on recommendations and observations from:

- American Medical Association, Graduate Medical Education Guidelines for Intensive Care Experience (NICU and PICU). Graduate Medical Education Directory, American Medical Association, 1996-1997, p 184
- Institute of Medicine “To Err is Human-Building a Safer Health Care System” Washington, DC: National Academies Press;1999
- Leap Frog Group for Patient Safety http://www.leapfroggroup.org/
- Accreditation Council of Graduate Medical Education. Outcomes project 2001.www.acgme.org/Outcome
• Nemours Education Innovation Program (2001-2005)
• Accreditation Council for Graduate Medical Education (ACGME) Work Group on Resident Duty Hours (June 2002)
• Nemours Foundation Drive to Excellence and Commitment to Medical Education (2003)
• The State of Pediatrics Residency Training: A Period of Transformation of Graduate Medical Education. Pediatrics 2004;114-832-841
• Integrating the Institute of Medicine’s six quality aims into pediatric critical care: Relevance and applications. Pediatric Critical Care 2005;6(3):264-269
• SCCM Pediatric ICU Resident Education Committee
• Alfred I duPont Hospital for Children Graduate Medical Education Office
• Continuous Quality Improvement via PICU nursing and PICU resident questionnaires
• Survey of practicing physicians who participated in our PICU rotation as residents
• Cooperation with the Thomas Jefferson University Pediatric Residency Program, Thomas Jefferson Emergency Medicine Residency Program, Christiana Care Emergency Medicine Residency Program and the Christiana Care Medicine Pediatrics Residency Program.
Background
**Nemours Vision**

Freedom from disabling conditions

**Nemous Mission**

To provide leadership, institutions, and services to restore and improve the health of children through care and programs not readily available, with one high standard of quality and distinction regardless of the recipient's financial status.

**Nemours Values**

Respect, Honor, Excel, Serve, Learn

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**Nemours Drive to Excellence and Education Goals**

The Nemours Foundation has defined itself as an organization seeking to be excellent in the delivery of patient-centered care.

A goal of the Nemours Foundation is to

- Become one of the top 10 pediatric research centers in the United States
- Become a national resource for pediatric subspecialty education
- Provide the national standard for pediatric patient and family education

Research and education are important because the best practitioners thrive and contribute their best in an environment of not only intellectual rigor, vitality and inquisitiveness, but also ethics, patient focus and personal commitment.

Nemours provides resources to fund education and research because it is their belief that the best outcomes derive from the best people who are constantly challenged and encouraged to seek improvement and change – on behalf of the patient.

*Nemours Vision, June 2003*
The Institute of Medicine of the National Academies states that medical education and training organizations are encouraged to develop outcomes based education system that better prepares clinicians to meet both the needs of patients and the requirements of a changing health system.

Education and training programs are encouraged to adopt a set of five core competencies:

- Provide Patient Centered Care
- Work in Interdisciplinary Teams
- Employ Evidence-based practices
- Apply Quality Improvement
- Utilize Informatics

Committee on the Health Profession Education Summit, “Health Professions Education: A Bridge to Quality”
The Accreditation Council for Graduate Medical Education (ACGME)
Residency Review and Institutional Review Committee
Outcomes Project

Residency programs must require its residents to obtain competencies in the 6 areas below to the level expected of a new practitioner.

Toward this end, programs must define the specific knowledge, skills, and attitudes required and provide educational experiences as needed in order for their residents to demonstrate:

a. **Patient Care** that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health

b. **Medical Knowledge** about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care

c. **Practice-Based Learning and Improvement** that involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence, and improvements in patient care

d. **Interpersonal and Communication Skills** that result in effective information exchange and teaming with patients, their families, and other health professionals

e. **Professionalism**, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population

f. **Systems-Based Practice**, as manifested by actions that demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value.

ACGME, Outcome Project
http://www.acgme.org/outcome/comp/compMin.asp
Goals for PICU Resident Rotation
The American College of Critical Care Medicine of the Society of Critical Care Medicine recommends that on completion of residency training, the physician should have achieved proficiency in the recognition and initial management of problems commonly encountered in the intensive care unit.

This proficiency includes, but is not limited to:
- acute respiratory failure
- hemodynamic instability
- sepsis
- acute neurologic insults
- acute electrolyte and endocrine disorder
- acute renal failure
- coagulation disorders
- overdoses and poisonings

For less common problems, the trainees gain a knowledge base that allows them to formulate a differential diagnosis, initiate a management plan, and request appropriate consultations.

*Guidelines for resident physician training in critical care medicine.*
*Crit Care Med 1995;23:1920-1923*

It is evident, after examination of the comprehensive list of ICU problems outlined in these guidelines that general residents cannot develop proficiency in the complete management of all pathophysiologic states noted.

Residents should, however, be able to recognize, stabilize and begin resuscitation of critically ill patients until a critical care specialist is available.

*General Guidelines for Resident Training in Critical Care Medicine.*
*New Horiz 1998;6:255-259*

Recent updated guidelines for critical care medicine training and continuing medical education emphasize that critical care physician education is a continuum from residency through subspecialty training and into continuing practice.

Learning in critical care medicine is optimized when the learner is intimately exposed to and participates in the cognitive and technical aspects of care.

Training should include a structured process that progressively transfers increasing levels of responsibility for decision making, ensures continued training in the practical aspects of care, and provides training and experience in the administrative and management functions of the ICU.

In addition to being an environment in which excellence in patient care is the foundation for learning to care for the critically ill and injured patient, the critical care environment should be an intensivist-directed, a collaborative multiple-professional team model of patient-centered care for all ICU patients.

The ICU should comply with ACCM guidelines. The training program director must demonstrate a commitment to and competence in all aspects of critical care medicine.
On completion of an ACGME approved graduate education program in a clinical specialty of medicine (e.g., anesthesiology, internal medicine, pediatrics, or surgery), each resident physician will have developed a measurable quantity of knowledge, learned a set of observable skills, demonstrated adequate decision making and possess a caring and compassionate attitude for patients who are critically ill.

On completion of an ACGME approved graduate education program, each resident physician will be able to perform the following:

**Clinical**

- Identify when a patient requires treatment best delivered in an ICU under the direction of a qualified intensivist.
- Diagnose and stabilize patients with impending organ failure (respiratory, cardiac, neurologic, hepatic, gastrointestinal, hemorrhagic, renal, etc.).
- Identify the need for and initiate cardiopulmonary resuscitation.
- Diagnose and prevent hemodynamic instability, and/or initiate treatment for cardiogenic, traumatic, hypovolemic and distributive shock.
- Identify and initiate treatment for life-threatening electrolyte and acid-base disturbances.
- Suspect and initiate treatment for common poisonings.
- Use data from appropriate invasive and noninvasive monitoring devices to titrate therapy in an ICU.
- Understand basic infection control techniques.
- Understand basic nutrition support techniques.
- Understand basic sedation and analgesia principles.
- Understand basic concepts of therapeutic decision making and medication safety.
- Recognize, use and help integrate the unique skills of ICU nurses and ancillary personnel in caring for critically ill patients into the multiple-professional team model.
- Consider ethical issues and patients’ wishes in making treatment decisions.

**Research**

- Understand the basic methods for searching, reviewing and evaluating the medical and scientific literature.
- Support ongoing basic and clinical science protocols as well as process improvement protocols within the ICU.

**Administrative**

- Communicate effectively with families and all members of the healthcare team about ICU capabilities and patient-specific issues.
- Communicate with and support patients, their families and all members of the healthcare team through the physical and psychological complexities of critical illness.
- Seek consultation, when appropriate, with specialty physicians in managing complex ICU problems.
- Maintain good relationships with other healthcare providers.
- Support initiatives to improve care of critically ill patients.
- Understand the need for patient safety monitoring and error reduction strategies.
- Understand the need for and help in the process of assessing patients and family satisfaction.
- Understand basic compensation methodologies for critical care services.
- Understand and ensure compliance with institutional and unit policies and procedures as well as regulatory policies from accreditors, regulators and payers.

All GME programs must ensure that each resident receives supervised exposure to an adequate number of critically ill patients. These patients should be cared for by appropriately trained individuals in appropriately staffed and equipped ICUs.
Since not all trainees will be exposed to the entire length and breadth of clinical problems during their ICU experience, a core critical care curriculum taught by clinical experts should supplement the clinical experience.

Case based education methodology is encouraged.

The program director should ensure that each resident achieves the competencies outlined.

Credentials and cognitive and procedural skills which are intended to serve as guides for both programs and individuals participating in the educational process are outlined below:

**I. Specific Credentials**

Each trainee should achieve provider and/or instructor status in one or more of the following:

1. Advanced Cardiac Life Support
2. Advanced Trauma Life Support
3. Pediatric Advanced Life Support
4. Fundamentals of Critical Care Support

**II. Cognitive Skills for Residents**

Acquisition of the following cognitive skills by trainees could be ensured by the training director through the use of any of a number of techniques, including didactic lectures, journal club sessions, and illustrative case reports.

**A. Cardiovascular Physiology, Pathology, Pathophysiology, and Therapy**

1. Shock (hypovolemic, neurogenic, septic, cardiogenic) and its complications
2. Myocardial infarction and its complications
3. Cardiac rhythm and conduction disturbances
4. Indications for and types of pacemakers
5. Pulmonary embolism—thrombus, air, fat, amniotic
6. Pulmonary edema—cardiogenic, noncardiogenic
7. Cardiac tamponade and other acute pericardial diseases
8. Acute and chronic life-threatening valvular disorders
9. Acute aortic and peripheral vascular disorders, including arteriovenous fistulas
10. Acute complications of cardiomyopathies and myocarditis
11. Vasoactive and inotropic therapy
12. Pulmonary hypertension and cor pulmonale
13. Complications of angioplasty
14. Principles of oxygen transport and utilization
15. Hemodynamic effects caused by ventilatory assist devices
16. Thrombolytic and anticoagulant therapy
17. Perioperative management of patient undergoing cardiovascular surgery
18. Recognition, evaluation, and management of hypertensive emergencies and urgencies
19. Congenital heart disease and the physiologic alterations with surgical repair
20. Noninvasive methods of cardiac output assessment (i.e., aortic Doppler, indicator dilution techniques, etc.)

**B. Respiratory Physiology, Pathology, Pathophysiology, and Therapy**

1. Acute respiratory failure
   a. Hypoxemic respiratory failure including acute respiratory distress syndrome
   b. Hypercapnic respiratory failure
   c. Acute on chronic respiratory failure
2. Status asthmaticus
3. Smoke inhalation, airway burns
4. Aspiration
5. Chest trauma (e.g., flail chest, pulmonary contusion, rib fractures)
6. Bronchopulmonary infections including bronchiolitis
7. Upper airway obstruction
8. Near drowning
9. Bronchopleural fistulas
10. Pulmonary mechanics and gas exchange
11. Oxygen therapy
12. Hyperbaric oxygenation
13. Mechanical ventilation
   a. Pressure and volume modes of mechanical ventilators
   b. Positive end-expiratory pressure, intermittent mandatory ventilation, continuous
      positive airway pressure, high-frequency ventilation, inverse ratio ventilation,
      pressure-support ventilation, volume support (airway pressure release ventilation,
      pressure-regulated volume control ventilation), negative pressure ventilation,
      differential lung ventilation, pressure control and noninvasive ventilation, split lung
      ventilation, one-lung ventilation
   c. Indications for and hazards of mechanical ventilation
   d. Barotrauma and volutrauma
   e. Criteria for extubation and weaning techniques
   f. Extracorporeal membrane oxygenation
   g. Permissive hypercapnia
   h. Liquid ventilation
   i. Pulmonary surfactant therapy
   j. High-frequency oscillatory ventilation
14. Airway maintenance
   a. Emergency airway management
   b. Endotracheal intubation
   c. Tracheostomy, open and percutaneous
   d. Long-term intubation vs. tracheostomy
15. Ventilatory muscle physiology, pathophysiology, and therapy, including polyneuropathy
    of the critically ill and prolonged effect of neuromuscular blockers
16. Pleural diseases
   a. Empyema
   b. Pleural effusion
   c. Pneumothorax
   d. Hemothorax
17. Pulmonary chylothorax, hemorrhage, and hemoptysis
18. Nitric oxide and prostaglandin therapies
19. Noninvasive ventilation
20. Positional therapy (i.e., prone position, rotational therapy)

C. Renal Physiology, Pathology, Pathophysiology, and Therapy
1. Renal regulation of fluid balance and electrolytes
2. Renal failure: Prerenal, renal, and postrenal
3. Derangements secondary to alterations in osmolality and electrolytes
4. Acid-base disorders and their management
5. Principles of renal replacement therapy and associated methodologies (hemodialysis,
    peritoneal dialysis, ultrafiltration, continuous arteriovenous hemofiltration, and continuous
    veno-venous hemofiltration)
6. Interpretation of urine electrolytes
7. Evaluation of oliguria
8. Drug dosing in renal failure
9. Rhabdomyolysis
10. Systemic diseases that involve the kidney (thrombotic thrombocytopenic purpura,
    hemolytic uremic syndrome)

D. Central Nervous System Physiology, Pathology, Pathophysiology, and Therapy
1. Coma
   a. Metabolic
   b. Traumatic
   c. Infectious
   d. Mass lesions
   e. Vascular-anoxic or ischemic
   f. Drug induced
   g. Assessment and prognosis
2. Hydrocephalus and shunt function and dysfunction
3. Psychiatric emergencies
4. Perioperative management of patient undergoing neurologic surgery
5. Brain death evaluation and certification
6. Diagnosis and management of persistent vegetative states
7. Management of increased intracranial pressure, including intracranial pressure monitors
8. Status epilepticus
9. Neuromuscular disease causing respiratory failure
   a. Guillain-Barré
   b. Amyotrophic lateral sclerosis
   c. Myasthenia gravis
   d. Myopathies (Duchenne’s, etc.)
   e. Neuropathy of critical illness
10. Traumatic and nontraumatic intracranial bleed
    a. Subarachnoid
    b. Intracerebral
    c. Epidural
    d. Others (subdurals)
    e. Traumatic brain injury
    f. Axonal shear injury
11. Conscious and deep sedation
12. Pain management: Intravenous, oral, transdermal, and regional and axial
13. Neuromuscular blockade: Use, monitoring, and complications

E. Metabolic and Endocrine Effects of Critical Illness
1. Colloid osmotic pressure
2. Nutritional support
   a. Enteral and parenteral
   b. Evaluation of nutritional needs including indirect calorimetry
   c. Immunonutrition and specialty formulas
3. Endocrine
   a. Disorders of thyroid function (thyroid storm, myxedema coma, sick euthyroid syndrome)
   b. Adrenal crisis and insufficiency (primary and secondary)
   c. Disorders of antidiuretic hormone metabolism
   d. Diabetes mellitus
      1. Ketotic and nonketotic hyperosmolar coma
      2. Hypoglycemia
   e. Pheochromocytoma
   f. Insulinoma
   g. Disorders of calcium, magnesium, and phosphate balance
   h. Inborn errors of metabolism
4. Electrolyte disorders including Na, K, Mg, Ca, PO₄
5. Glucose management

F. Infectious Disease Physiology, Pathology, Pathophysiology, and Therapy
1. Antibiotics
a. Antibacterial agents including aminoglycosides, penicillins, cephalosporins, quinolones, and newer emerging classes of antibiotics
b. Antifungal agents
c. Antituberculosis agents
d. Antiviral agents
e. Agents for parasitic infections
2. Infection control for special care units
   a. Development of antibiotic resistance
   b. Universal precautions
   c. Isolation and reverse isolation
3. Anaerobic infections
4. Sepsis definitions (sepsis, severe sepsis, septic shock)
5. Systemic inflammatory response syndrome
6. Tetanus
7. Hospital-acquired and opportunistic infections in the critically ill
8. Adverse reactions to antimicrobial agents
9. ICU support of the immunosuppressed patient
   a. Acquired immunodeficiency syndrome
   b. Transplant
   c. Oncologic
10. Infectious risks to healthcare workers
11. Evaluation of fever in the ICU patient
12. Biological modifiers (activated protein C, tissue factor, etc.)
13. Mechanisms of antibiotic resistance

G. Physiology, Pathology, Pathophysiology, and Therapy of Acute Hematologic and Oncologic Disorders
1. Acute defects in hemostasis
   a. Thrombocytopenia/thrombocytopathy
   b. Disseminated intravascular coagulation
2. Anticoagulation; fibrinolytic therapy
3. Principles of blood component therapy
   a. Packed red blood cell transfusions
   b. Fresh frozen plasma transfusions
   c. Platelet transfusions
   d. Cryoprecipitate transfusions
   e. Specific coagulation factor concentrates
   f. Albumin, plasma protein fraction
   g. Hemoglobin substitutes
   h. Pharmacologic agents that modify the need for transfusion (i.e., aminocaproic acid, aprotinin)
   i. Erythropoietin
4. Acute hemolytic disorders including thrombotic microangiopathies
5. Acute syndromes associated with neoplastic disease and antineoplastic therapy
6. Sickle cell crisis and acute chest syndrome
7. Plasmapheresis
8. Prophylaxis against thromboembolic disease
9. ICU-acquired anemia

H. Physiology, Pathology, Pathophysiology, and Therapy of Acute Gastrointestinal, Genitourinary, and Obstetrical-Gynecologic Disorders
1. Acute pancreatitis with shock
2. Upper gastrointestinal bleeding, including variceal bleeding
3. Lower gastrointestinal bleeding
4. Acute and fulminant hepatic failure
5. Toxic megacolon and pseudo-obstruction syndromes (i.e., Ogilvie’s)
6. Acute perforations of the gastrointestinal tract
7. Ruptured esophagus
8. Acute inflammatory diseases of the intestine
9. Acute vascular disorders of the intestine, including mesenteric infarction
10. Obstructive uropathy, acute urinary retention
11. Urinary tract bleeding
12. Toxemia of pregnancy, amniotic fluid embolism, HELLP (hemolysis, elevated liver function tests, and low platelet count) syndrome, ovarian hyperstimulation
13. Hydatidiform mole
14. Perioperative management of surgical patients
15. Stress ulcer prophylaxis
16. Drug dosing in hepatic failure
17. Acalculous cholecystitis
18. Postoperative complications including fistulas, wound infection, and evisceration
19. Placenta previa and abruption
20. Peripartum cardiomyopathy

I. Environmental Hazards
   1. Drug overdose and withdrawal
      a. Barbiturates
      b. Narcotics
      c. Salicylates
      d. Alcohols
      e. Cocaine
      f. Tricyclic antidepressants
      g. Acetaminophen
      h. Others
   2. Temperature-Related Injuries
      a. Hyperthermia, heat shock
      b. Hypothermia, frostbite
   3. Envenomation
   4. Altitude sickness
   5. Decompression sickness
   6. Skin and wound care
   7. Biological and chemical terrorism
   8. Radiation exposure

J. Immunology and Transplantation
   1. Principles of transplantation (organ donation, procurement, preservation, transportation, allocation, implantation, maintenance of organ donors, national organization of transplantation activities)
   2. Immunosuppression
   3. Organ transplantation: Indications preoperative and postoperative care
   4. Transplant-related infectious disease

K. Trauma, Burns
   1. Initial approach to the management of multiple system trauma
   2. Central nervous system trauma (brain and spinal cord)
   3. Skeletal trauma, including the spine and pelvis
   4. Chest trauma, blunt and penetrating
   5. Abdominal trauma, blunt and penetrating
   6. Crush injury
   7. Burns
   8. Electrical injury

L. Monitoring, Bioengineering, Biostatistics
1. Prognostic indexes, severity, and therapeutic intervention scores
2. Principles of electrocardiographic monitoring, measurement of skin temperature and resistance, transcutaneous measurements
3. Invasive hemodynamic monitoring
   a. Principles of strain gauge transducers
   b. Signal conditioners, calibration, gain, adjustment
   c. Display techniques
   d. Principles of arterial, central venous, and pulmonary artery pressure catheterization and monitoring
   e. Assessment of cardiac function and derived hemodynamic variables
4. Noninvasive hemodynamic monitoring
5. Electrical safety
6. Thermoregulation
7. Central nervous system brain monitoring (intracranial pressure, cerebral blood flow, cerebral metabolic rate, electroencephalogram, jugular venous bulb oxygenation, transcranial Doppler)
8. Respiratory monitoring (airway pressure, intrathoracic pressure, tidal volume, pulse oximetry, deadspace/tidal volume ratio, compliance, resistance, capnography, pneumotachography)
9. Metabolic monitoring (oxygen consumption, carbon dioxide production, respiratory quotient, indirect calorimetry)
10. Use of computers in critical care units

M. Ethics
1. Consent
2. Study enrollment
3. End-of-life decision making and care
4. Organ procurement
5. Outcome and futility
6. Quality of end of life
N. Administration
1. Team building
2. Contracting care
3. Patient triage
4. Physician, nurse, and ancillary staff staffing models
5. Documentation compliance and billing
6. Patient safety

O. Genetic
1. Congenital disease (trisomy, etc.)
2. Storage diseases (Hurlers, etc.)
3. Polymorphisms
P. Pharmacology
1. Pharmacokinetics
2. Pharmacodynamics
3. Safe medication practice
4. Drug dosing adjustments in hepatic disease
5. Drug dosing adjustments in renal disease
Core Procedural Skills for Residents

In addition to practical training in the following procedural skills, the resident must have an understanding of the indications, contraindications, complications, and pitfalls of these interventions. Due to the variability of individual training programs, practical experience may be limited for some procedures.

A. Airway Management
   1. Maintenance of an open airway in the nonintubated patient
   2. Ventilation by bag-mask
   3. Tracheal intubation
   4. Management of pneumothorax

B. Circulation
   1. Arterial puncture and cannulation
   2. Insertion of central venous catheters
   3. Pericardiocentesis in acute tamponade
   4. Dynamic electrocardiogram interpretation
   5. Cardioversion and defibrillation
   6. Pulmonary artery catheterization
   7. Transcutaneous pacing
   8. Electrocardiographic monitoring

C. Additional Procedures
   1. Thoracentesis
   2. Paracentesis
   3. Endoscopy
   4. Bronchoscopy

The Thomas Jefferson Pediatric Residency Program Goals for the Critical Care Rotation, Alfred I duPont Hospital for Children
Based on the APA Educational Guidelines for Pediatric Residency (www.ambpeds.org/EGweb/index.cfm) as edited by Keith J. Mann, MD, Assistant Director of the Thomas Jefferson University Pediatric Residency Program (3/31/05):

I. Resuscitation and Stabilization (PICU). Recognize the critically ill patient and initiate appropriate stabilization and/ or resuscitative measures.

- A) Explain and perform steps in resuscitation and stabilization, particularly airway management, volume replacement, and resuscitative pharmacology.

- B) Describe the common causes of acute deterioration in the previously stable patient in the PICU.

- C) Function appropriately in codes and resuscitations as part of the PICU team.

II. Common Signs and Symptoms (PICU). Evaluate and manage, under the supervision of an intensivist, common signs and symptoms seen in critically ill infants, children and adolescents in the intensive care setting.

- A) Evaluate and manage, under supervision of an intensivist, patients with signs and symptoms that present commonly to the intensive care unit (examples below):

  1. Cardiovascular: Acute life-threatening event, bradycardia, cardiopulmonary arrest, congestive heart failure, cyanosis, hypertension, hypotension, poor capillary perfusion, rhythm disturbances, tachycardia

  2. Endocrine: Signs and symptoms suggestive of hypo- and hyperglycemia and adrenal insufficiency/crisis

  3. GI: Abdominal distension, hematemesis and melena, icterus, peritoneal signs, vomiting

  4. Hematologic: Pallor, petechiae, purpura, uncontrolled bleeding

  5. Infectious Diseases: Endotoxic shock, fever

  6. Neurologic: Acute weakness, altered mental status, coma, delirium, encephalopathy, seizures, tetany, thermoregulatory abnormalities

  7. Renal: Anuria, hematuria, oliguria, polyuria, severe electrolyte disturbance

  8. Respiratory: Apnea, cyanosis, dyspnea, hemoptysis, hypercarbia, hyperpnea, hypoxemia, increased or decreased respiratory effort, poor air movement, pulmonary edema, respiratory failure, stridor, tachypnea, wheezing

III. Common Conditions (PICU). Recognize and manage, under the supervision of an intensivist, conditions that commonly present to the intensive care unit, using consultation when appropriate.

- A) Evaluate and manage, under the supervision of an intensivist, patients with conditions that present commonly to the intensive care unit (examples below):

  1. General: Burns (thermal, electrical), common intoxications, drug overdose, shock (cardiogenic, hypovolemic, distributive, toxic), inhalation injury, malignant hyperthermia, non-accidental trauma, submersion injury, toxic or caustic ingestion or inhalation injury, toxic shock syndrome

  2. Allergy Immunology: Anaphylaxis, life-threatening angioedema, Stevens Johnson Syndrome

  3. Cardiovascular: Arrhythmias, cardiac tamponade, congestive heart failure, cyanotic congenital heart disease, malignant hypertension, myocarditis cardiomyopathy
4. Endocrine: Diabetes insipidus and adrenal insufficiency/crisis, diabetic ketoacidosis, hypo- and hyperglycemia, syndrome of inappropriate antidiuretic hormone (SIADH)

5. Fluids, electrolytes, metabolic: Inborn errors of metabolism, severe dehydration (hyper-, normo-, or hyponatremic), severe acid-base disturbances, severe electrolyte disturbance

6. GI/Surgery: Abdominal trauma (blunt/penetrating), acute abdomen, acute GI bleeding, fulminant hepatic dysfunction, hepatic dysfunction, pancreatitis, pre- and post-operative management, stress ulcer

7. Hematologic: Anemia (severe), disseminated intravascular coagulopathy (DIC), Deep venous thrombosis (DVT), neutropenia, sickle crisis, polycythemia, thrombocytopenia, tumor lysis syndrome

8. Infectious disease: Encephalitis, infant botulism, meningitis, nosocomial infections, sepsis

9. Neurologic: Acute increased intracranial pressure, brain death, cerebral edema, cerebrovascular accident (CVA), coma, encephalopathy, Guillain-Barre, head injury, spinal muscle atrophy, status epilepticus

10. Pulmonary: Acute respiratory distress syndrome (ARDS), epiglottitis, pulmonary edema, pneumothorax, respiratory failure/impending respiratory failure, severe croup and bacterial tracheitis, status asthmaticus, upper airway obstruction (infectious, structural, foreign body)

11. Renal: Acute renal failure, hemolytic uremic syndrome

**IV. GOAL: Diagnostic Testing (PICU). Utilize common diagnostic tests and imaging studies appropriately in the intensive care unit, obtaining consultation as indicated for interpretation of results.**

A) Demonstrate understanding of common diagnostic tests and imaging studies used in the PICU by being able to:

1. Explain the indications for and limitations of each study.
2. Know or be able to locate readily age-appropriate normal ranges (lab studies).
3. Apply knowledge of diagnostic test properties, including the use of sensitivity, specificity, positive predictive value, negative predictive value, likelihood ratios, and receiver operating characteristic curves, to assess the utility of tests in various clinical settings
4. Discuss cost and utilization issues.
5. Interpret the results in the context of the specific patient.
6. Discuss therapeutic options for correction of abnormalities.

B) Use appropriately the following laboratory and imaging studies when indicated for patients in the PICU setting:

1. CBC with differential, platelet count, RBC indices
3. Renal function tests
4. Tests of hepatic function (PT, albumin) and damage (ammonia, bilirubin, liver enzymes)
5. Serologic tests for infection (e.g., hepatitis, HIV).
6. C-reactive protein, erythrocyte sedimentation rate.
7. Therapeutic drug concentrations
8. Coagulation studies: platelets, PT/PTT, fibrinogen, FSP, D-dimers, "DIC screen"
9. Arterial, capillary, and venous blood gases
10. Detection of bacterial, viral, and fungal pathogens
11. Urinalysis
12. CSF analysis
13. Stool studies
14. Toxicologic screens/drug levels
15. Other fluid studies (e.g. pleural fluid, joint fluid)
16. Chest x-ray and Abdominal series
17. Skeletal survey
18. Cervical spine films
19. CT scans of abdomen, chest and head
20. MRI scans

V. GOAL: Monitoring and Therapeutic Modalities (PICU). Understand how to use the physiologic monitoring, special technology and therapeutic modalities used commonly in the intensive care setting.

A) Demonstrate understanding of the monitoring techniques and special treatments commonly used in the PICU by being able to:

1. Discuss the indications, contraindications and complications.
2. Have a basic understanding of the general techniques (e.g. Seldinger technique for central venous line placement).
3. Interpret the results of monitoring

B) Use appropriately the following monitoring techniques in the intensive care unit under supervision of an intensivist:

1. Central venous pressure monitoring
2. Invasive arterial blood pressure monitoring
3. Intracranial pressure monitoring
4. Pulse oximetry
5. **End-tidal carbon dioxide monitoring**

   C) Utilize appropriately or be familiar with the following treatments and techniques in the intensive care unit, including monitoring effects and anticipating potential complications specific to each therapy:

   1. Oxygen administration by cannula, masks, hood
   2. Positive pressure ventilation including non-invasive modalities such as nasal/mask BiPAP/CPAP, bag and mask ventilation)
   3. Principles of ventilator management, intubation and extubation procedures and criteria
   4. Analgesics, sedatives, and paralytics
   5. Enteral and parenteral nutrition
   6. Blood and blood product transfusions
   7. Vasoactive drugs (pressors and inotropes)

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**VI. GOAL: Death, Acute Illness/Injury and Terminal Illness: Provide skillful medical care and empathic support to the acutely ill, injured or terminally ill child and his/her family.**

A) Discuss principles in the medical management of acutely ill, injured or terminally ill children, and demonstrate an understanding of the goals of treatment, including relevant medical, legal, and psychosocial issues such as:

1. Involving parents in decision-making processes
2. Redirection of the goals of care
3. Symptomatic management of pain, respiratory distress, and nutrition
4. In-hospital "hospice" care
5. Home hospice care
6. "Do Not Resuscitate" orders and termination of life support
7. Use of bioethics committees in difficult decision-making situations
8. Definition of brain death and criteria for organ donation
9. Concepts of futility, withdrawal, and withholding of care, as well as euthanasia

B) Discuss the principles of counseling parents regarding treatment options for terminally ill children, including the integration of relevant cultural and religious or spiritual values.

C) Describe the stages of the normal grieving process.

D) Describe the common reactions of siblings to the impending death of a sibling.

E) Counsel parents with regard to:
   1. The diagnosis of life-threatening illness
2. Persistent vegetative states
3. Grief counseling and referral for the child and other children in the family
4. Strategies to help siblings and other children cope with the death of a loved one

F) Describe how to formulate management plans for terminally ill patients, including:
   1. Pain/comfort management plan
   2. Outpatient plan for patients going home or to a hospice
   3. In-hospital, hospice-like plan for patients whose parents want them to remain in the hospital

G) Demonstrate sensitivity to the balance between involving the family in decision-making and placing inappropriate burdens for these decisions on parents.

H) Understand one's personal response and feelings when dealing with death and dying, including:
   1. Personal belief and religious/spiritual belief systems related to disease and management of the dying child
   2. The need to share feelings with others during times of stress or death

### VII. Technical and therapeutic procedures

Describe the following procedures, including how they work and when they should be used; competently perform those commonly used by the pediatrician in practice.

1. Arterial puncture
2. Cardioversion/defibrillation
3. Central line
4. Chest tube placement
5. Endotracheal intubation
6. Lumbar puncture

### IX. GOAL: Pediatric Competencies in Brief (PICU):

Demonstrate high standards of professional competence while working with patients in the Pediatric Intensive Care Unit. [For details see Pediatric Competencies]

A) Competency 1: Patient Care. Provide family centered patient care that is developmentally and age appropriate, compassionate, and effective for the treatment of health problems and the promotion of health.

1. Use a logical and appropriate clinical approach to the care of critically ill patients, applying principles of evidence-based decision-making and problem solving.

2. Provide sensitive support to patients with serious illness and to their families, and arrange for on-going support or preventive services if needed.

B) Competency 2: Medical Knowledge. Understand the scope of established and evolving biomedical,
clinical, epidemiological and social-behavioral knowledge needed by a pediatrician; demonstrate the ability to acquire, critically interpret and apply this knowledge in patient care.

1. Demonstrate a commitment to acquiring the knowledge base expected of general pediatricians caring for seriously ill children under the guidance of an intensivist.

2. Know and/or access medical information efficiently, evaluate it critically, and apply it appropriately to care of patients in the PICU.

C) Competency 3: Interpersonal and Communication Skills. Demonstrate interpersonal and communication skills that result in information exchange and partnering with patients, their families and professional associates.

1. Provide effective and sensitive communication with patients and families in the intensive care setting.

2. Participate effectively as part of an interdisciplinary team in the intensive care unit to create and sustain information exchange, including communication with the primary care physician.

3. Maintain accurate, timely and legally appropriate medical records on complex and critically ill children.

D) Competency 4: Practice-based Learning and Improvement. Demonstrate knowledge, skills and attitudes needed for continuous self-assessment, using scientific methods and evidence to investigate, evaluate, and improve one's patient care practice.

1. Use scientific methods and evidence to investigate, evaluate, and improve one's patient care practice in PICU setting.

2. Identify personal learning needs, systematically organize relevant information resources for future reference, and plan for continuing acquisition of knowledge and skills.

E) Competency 5: Professionalism. Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity.

1. Demonstrate a commitment to carrying out professional responsibilities while providing care in the PICU setting.

2. Adhere to ethical and legal principles, and be sensitive to diversity in the care of critically ill children.

F) Competency 6: Systems-Based Practice. Understand how to practice high quality health care and advocate for patients within the context of the health care system.

1. Identify key aspects of health care systems, cost control, and mechanisms for payment as they relate to the intensive care setting.

2. Recognize the limits of one's knowledge and expertise and take steps to avoid medical errors.
Considerations that Impact the Resident Educational Experience
There is an explosion of new basic knowledge (genomics, proteomics, neuroscience, developmental biology, translational research).

The pattern of pediatric care for sick children is changing, with substantial increase of acuity and complexity of illness in hospitalized children, often requiring clusters of subspecialists and advanced technology to provide quality care. Chronic medical conditions are much larger part of pediatric care. Acuity and demands of care in the community are raised.

There is a shift to a learner-centered, competency-based system of education driven by the desired outcomes of training.

Quality improvement activities must encompass residents and their supervising attending physicians in addition to other professional and staff to be effective at the institutional level.

Medical education must be aligned with the desired health outcomes.

The challenge is to create a vision of medical education that spans the continuum medical school through practice.

The Future of Pediatric Education II advocates for research centers for pediatric medical education to continuously evaluate impact of training on outcomes. *Pediatrics. 2001;105(suppl):163-212*

Educators and professionals are challenged to focus on outcomes, both clinical and educational, that in turn inform the provision of health care and the educational process. Only through the practice of evidence-based education can we positively impact the ultimate outcome of our educational efforts: the quality of health care delivered to our patients.

To evaluate competency, one needs to directly observe and assess learners performing the tasks of real world future practice. This calls for “authentic assessment” - “assessment that looks at performance and practical application of theory”

A criterion-referenced assessment is suggested as opposed to norm-referenced assessment. In Criterion-referenced assessment, the learner’s performance is compared with a predetermined threshold or standard as opposed to the peer comparison of norm-referenced assessment. Competencies must be defined with appropriate benchmarks and performance standards set in terms of thresholds.

Suggested methods of evaluation: record reviews; chart stimulated recall; checklists of observed behaviors, global ratings, standardized patients, OSCEs, simulations and models, 360-degree assessments, portfolios, multiple-choice examinations, procedure logs, patient surveys. ACGME has identified 4 tools used most frequently: direct observations with a checklist; 360-degree evaluations; educational portfolios; cognitive test (only one that has been tested in standardized versions for validity and reliability).

Greatest challenge in the shift to a competency-based system of education is the increased faculty time and resources that will be required to implement competency-based evaluation of trainees.

In order to promote an educational process that focuses on clinical and educational outcomes, with self-directed practice-based learning as the process for achieving desired outcomes, we must have both academic and community-based faculty role models that implement these principles as a habit of practice.

We need to move in the direction of evidence-based education as we study the impact of educational interventions and assessment methods with the same rigor that we use to address clinical and basic science issues.
A first step is to embrace the IOM competencies that we expect of our learners.

Chair of the Pediatric Education Steering Committee of the Federation of Pediatric Organizations (FOPO) looking at a redesign of residency training – looking at the links between educational and clinical outcomes as on of its goals.

Workplace of a residency program is a complex and intense environment that includes long hours of continuous work, responsibilities of caring for sick patients, and increasing complexity and acuity of patient care.

Teams in hospitals are interdisciplinary, less hierachial, and compromised of skilled professionals who share clinical responsibilities and rely on each others’unique skill sets. Communication skills, teamwork and professionalism are as basic to residency training now as technical and clinical skills. Need to work with system to coordinate care for acute and complex patients.

Complexity of patient care, significant responsibility, teams of professionals with specialized knowledge, the challenge to learn independent decision-making in a team environment and new duty hours: context in which issues of work-life balance emerge.

Changes in resident work hours and alternative providers of care such as hospitalists may impact on opportunities for resident learning; their impact should be monitored closely for both improvement in the work environment and possible limitations in learning opportunities.

Faculty workload and satisfaction need to be assessed during this transition period of graduate medical education.

We are challenged to create a community of learners that not only espouses but balances personal and professional life; build a training infrastructure with a foundation that is learner centered and based on the 6 ACGME competencies and a care delivery system that is patient centered and based on the IOM competencies.

The goal is to provide the optimal health and well being of our children.

_The State of Pediatrics residency Training: A Period of Transformation of Graduate Medical Education_  
_Pediatrics 2004;114-832-841_
The Accreditation Council for Graduate Medical Education (ACGME) Work Group on Resident Duty Hours in June 2002 set rules for resident duty hours.

The goal is to simultaneously foster high-quality education and patient care and resident well-being.

The only way residency programs and their sponsoring institutions can achieve a true “education” program as well as provide high quality clinical care, is by attending to the issue of resident duty hours and by placing a higher value on resident education and safe patient care than on meeting service demands.

Duty Hours are defined as all clinical and academic activities related to the residency program, i.e. patient care (inpatient and outpatient), administrative duties related to patient care, the provision for transfer of patient care, time spent in-house during call activities, and scheduled academic activities such as conferences.

Duty hours do not include reading and preparation time spent away from the duty site.

Duty Hours

- 80 hours per week, averaged over 4 weeks, inclusive of all in-house call activities
- One day off out of seven, averaged over 4 weeks, One day is defined as one continuous 24-hour period free from all clinical, educational and administrative activities.
- No in-house call more than once every three nights averaged over 4 weeks. In-house call is defined as those duty hours beyond the normal work day when residents are required to be immediately available in the assigned institution.
- Continuous on-site duty, including in-house call, must not exceed 24 consecutive hours. Residents may remain on duty for up to six additional hours to participate in didactic activities, transfer care of patients, conduct outpatient clinics and maintain continuity of medical and surgical care as defined in Specialty and Subspecialty Program Requirements.
- No new patients may be accepted after the 24 hours of continuous duty.
- 10 hours off between duty periods and after in-house call.
- Probation or accreditation withdrawal for facilities that do not comply

Institutional Oversight

- Monitoring of program’s policies governing resident duty hours by the sponsoring institution.
- Requiring sound educational justification of any increases above the 80 hour limit
- An annual report to the sponsoring institution’s governing body on duty hour compliance
- Institutional policies on patient care activities external to the educational program (moonlighting), prospective approval of these activities, and monitoring their effect on performance in the educational program
- Counting time spent in patient care activities external to the educational program that occur in the primary programs institution toward the weekly duty hour limit
- Requiring programs and their sponsoring institutions to have policies and procedures to monitor and support the physical and emotional well-being of residents
- Requiring sponsoring institutions to monitor the demands home call places on residents in all programs, and making adjustments as necessary to address excessive demands and fatigue
- Patient care support services for IV, phlebotomy, and transport activities to reduce resident time spent on these routine activities
High Quality Education and Safe and Effective Patient Care

- Priority of clinical and didactic education in the allotment of residents’ time and energies
- Schedules of teaching staff structured to provide ready supervision and faculty support/consultation to residents on duty
- Duty hour assignments that recognize that faculty and residents collectively have responsibility for patient safety and welfare
- Monitor residents for the effects of sleep and fatigue by Program director and faculty with appropriate action when it is determined that fatigue might affect safe patient care or learning.
- Education of faculty and residents in recognizing the signs of fatigue and in applying preventive and operational countermeasures
- Appropriate backup support when patient care responsibilities are difficult and prolonged, and if unexpected needs create resident fatigue sufficient to jeopardize patient care.
The Leapfrog Group is an initiative driven by organizations that buy health care who are working to initiate breakthrough improvements in the safety, quality and affordability of healthcare for Americans. It is a voluntary program aimed at mobilizing employer purchasing power to alert America’s health industry that big leaps in health care safety, quality and customer value will be recognized and rewarded.

The Leapfrog Group for Patient Safety focuses on three practices that have tremendous potential to save lives by reducing preventable mistakes in hospitals.

**Computer Physician Order Entry (CPOE)**
Prescriptions in hospitals should be computerized. With computerized prescription systems, doctors enter orders into a computer rather than writing them down on paper, and the prescription can be automatically checked against the patient's current information for potential mistakes or problems. For example, before the doctor can complete the prescription order, the computer would check to see if the new prescription would interact badly with another drug the patient is taking, or if the patient has a known allergy to it. This type of system also reduces mistakes that occur from misreading a doctor's handwriting. Studies show a computerized prescription system can reduce serious medication mistakes by up to 86 percent.

**Evidence-based Hospital Referral (EHR)**
It is important to select hospitals with proven outcomes or extensive experience with specific high-risk conditions or procedures that have a high risk of death or complications. The best way to determine which hospitals are the best at performing certain high-risk treatments or procedures is by knowing the actual results their patients experience. A few states have systems set up in which hospitals report this information publicly, but most do not. The best alternative is to track how many of a certain type of high-risk treatment or procedure a hospital performs each year. Over 100 scientific studies have demonstrated a relationship between a hospital's annual number of certain high-risk treatments and procedures and patient outcomes. Patients who go to hospitals that frequently perform these high-risk treatments or procedures, or to hospitals that have demonstrated a good record for patient outcomes, have the best chance of surviving and successfully recovering.

**ICU Physician Staffing (IPS)**
"Intensivists," physicians specially trained to care for critically ill patients in Intensive Care Units (ICUs), should staff ICUs. More than four million patients are admitted to ICUs each year in the U.S. and more than 500,000 of these patients die. Studies reveal that at least one in ten patients who die every year in ICUs would have an increased chance to live if intensivists were present in the ICU and managing their care for at least eight hours per day. While not every hospital's intensive care unit can assure 8 hours per day of intensivist care,because there is a shortage of intensivists in the United States, this staffing level is an important factor to consider when choosing a hospital if your doctor expects that you are likely to stay in an ICU during your hospitalization.
Safety

- Improving patient safety through reducing medical errors and adverse events in the high-risk PICU environment.

Effectiveness

- Incorporating the best-research evidence, clinical expertise and patient values in order to achieve the best outcomes for the patient

Equity

- Provide impartial care for populations and to individuals that is free from bias related to race, ethnicity, insurance status, income or gender.

Timeliness

- A marker of the adequacy of processes to achieve acceptable outcomes
  - Timely and effective communication
  - Available resources
  - Experience and competency of physician, nursing and technical staff
  - Presence of pediatric intensivists and pediatric critical care fellows
  - Multidisciplinary critical care teams

Patient-Centeredness

- Provision of information, education, emotional support to families
- Attention to the physical comfort of families
- Involvement of family and friends in care

Efficiency

- Health care resources are delivered in a cost-effective and efficient manner while not jeopardizing quality

*Integrating the Institute of Medicine’s six quality aims into pediatric critical care: Relevance and applications*  
*Pediatric Critical Care 2005; 6(3): 264-269*
Ideal
PICU Resident Rotation
Ideal Scenario Integrating PICU Resident Education, Resident Duty Hours, Patient Care

The education and training program should aim to:

- Provide Patient Centered Care
- Work in Interdisciplinary Teams
- Employ Evidence-based practices
- Apply Quality Improvement
- Utilize Informatics

Medical education must be aligned with the desired health outcomes.

The training program should integrate the Institute of Medicine’s Six Quality Aims into the Pediatric Critical Care environment.

- Safety
- Effectiveness
- Equity
- Timeliness
- Patient-Centeredness
- Efficiency

Quality improvement activities must encompass residents and their supervising attending physicians in addition to other professional and staff to be effective at the institutional level.

In addition to being an environment in which excellence in patient care is the foundation for learning to care for the critically ill and injured patient, the critical care environment should be an intensivist-directed, collaborative multiple-professional team model of patient-centered care for all PICU patients.

Computer order entry system should be operational but not interfere with timely care of the PICU patient.

Resident should be included as an integral part of a multidisciplinary team that cares for critically ill and injured children and adolescents.

Residents should receive a comprehensive orientation to the multidisciplinary PICU. Their responsibilities must be explained during orientation to the PICU. Residents will know the medical history and general medical problems of all patients.

Optimize patient safety and quality of care while providing PICU residents with sense of autonomy.

Accurate and timely communication between critical care physician, residents and PICU multidisciplinary team about patient care.

Prioritizes the resident’s educational and clinical experience so that they spend time on activities that don’t detract from the educational experience.

Resident training program must conform to ACGME Resident Duty Hour Guidelines.

Schedule PICU critical care attending staff in such a way that they are:

- Available for supervision of residents day and night in the PICU
- Available for clinical back-up support for residents in the PICU especially at night and during very busy periods if they become overwhelmed or sleep deprived.

Training programs must define the specific knowledge, skills, and attitudes required and provide educational experiences as needed in order for their residents to demonstrate:

- **Patient Care** that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health
• **Medical Knowledge** about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care

• **Practice-Based Learning and Improvement** that involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence, and improvements in patient care

• **Interpersonal and Communication Skills** that result in effective information exchange and teaming with patients, their families, and other health professionals

• **Professionalism**, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population

• **Systems-Based Practice**, as manifested by actions that demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value.

The PICU should comply with ACCM guidelines. The training program director must demonstrate a commitment to and competence in all aspects of critical care medicine.

Residents will receive pediatric critical care information that they will not receive in other rotations during their specific residency programs. Follow the recommendations of the ACGME, SCCM, Thomas Jefferson University Pediatric Residency Program, Christiana Care Emergency Medicine and Medicine-Pediatric programs.

Learning in critical care medicine is optimized when the learner is intimately exposed to and participates in the cognitive and technical aspects of care.

Training should include a structured process that progressively transfers increasing levels of responsibility for decision making, ensures continued training in the practical aspects of care, and provides training and experience in the administrative and management functions of the PICU.

Case based education methodology encouraged

In addition to practical training in procedural skills, the resident must have an understanding of the indications, contraindications, complications, and pitfalls of these interventions.

In order to promote an educational process that focuses on clinical and educational outcomes, with self-directed practice-based learning as the process for achieving desired outcomes, we must have both academic and community-based faculty role models that implement these principles as a habit of practice.

Individualize the pediatric critical care medicine content to be delivered to the individual resident during their PICU rotation. Build on the resident’s past critical care experiences and goals.

Pediatric critical care research projects should be available for resident participation.

The impact of changes in resident work hours and alternative providers of care on opportunities for resident learning should be monitored closely both for improvement in the work environment and possible limitations in learning opportunities.

On completion of an ACGME approved graduate education program in a clinical specialty of medicine (e.g., anesthesiology, internal medicine, pediatrics, or surgery), each resident physician will have

• developed a measurable quantity of knowledge

• learned a set of observable skills

• demonstrated adequate decision making

• shown a caring and compassionate attitude for patients who are critically ill.
Residents at a minimum should be able to recognize, stabilize and begin resuscitation of critically ill patients until a critical care specialist is available.

ACGME competency based outcomes must be observed and documented for each resident. To evaluate competency, one needs to directly observe and assess learners performing the tasks of real world future practice. Critical care physicians should receive training and the resources to carry out this responsibility.

A Criterion-referenced assessment is preferred where the learner’s performance is compared with a predetermined threshold or standard as opposed to the peer comparison of norm-referenced assessment. Competencies must be defined with appropriate benchmarks and performance standards set in terms of thresholds.

Evidence-based education must be used to study the impact of educational interventions and assessment methods with the same rigor that we use to address clinical and basic science issues.

Residents should receive immediate feedback about their performance during the PICU rotation.

A process must be in place that allows evaluation of the PICU experience for residents.

Critical care physicians should have access to the competency-based outcomes of residents who completed the rotation and receive feedback about how to maximize the learning experience for the next group of residents.

Coordination and core curriculum should be developed for residents who wish to pursue electives in PICU such as Transport Medicine, sedation, airway management.

Resources

- Adequate number of critical care physicians to meet the educational and supervision needs of the residents during the PICU rotation.
- Time and financial resources must be made available to critical care physicians in order that they meet the educational objectives outlined by the SCCM for those who continue to be involved in critical care medicine.
- Faculty workload and satisfaction need to be assessed during this transition period of graduate medical education.
- Financial support must be secured for the critical care physicians’ educational activities.
- Financial support must be secured for the multidisciplinary team members involved in PICU resident education.
- Simulators and procedural rooms to complement the clinical experience

Challenges

- to create a community of learners that not only espouses but balances personal and professional life
- to build a training infrastructure with a foundation that is learner centered and based on the 6 ACGME competencies
- to build a care delivery system that is patient centered and based on the Institute of Medicine competencies.

The goal is to provide the optimal health and well being of our children.
PICU

Alfred I duPont Hospital for Children
PICU multidisciplinary team

Pediatric board certified critical care medicine physicians
Pediatric double boarded critical care medicine and anesthesiology trained physicians
Pediatric critical care nurse practitioner
PICU nurse manager
PICU transport nurse manager
PICU nurse educators
PICU charge nurses
PICU nurses
PICU transport nurses
Nursing students, externs
PICU respiratory therapists
PICU transport respiratory therapists
Respiratory therapy students
PICU clinical pharmacists
Clinical pharmacy students
PICU nutrition specialists
PICU social service personnel
PICU clerical staff
PICU Cerner representative
PICU volunteers
Pediatric critical care fellows
Pediatric emergency medicine fellows
Adult trauma surgery fellow
Pediatric, medicine/pediatric, emergency medicine, emergency medicine/internal medicine residents
Fourth year medical students

Multidisciplinary PICU Educators Involved in Resident Education

Clinical pharmacist (John Giamalis)
Nursing staff development (Kim Englert RN, Ruth Lebet RN)
Respiratory therapy clinical instructors (Debbie Marckese RRT, Dawn Slehorst RRT)
Reference Librarian (Lynne Joshi)
Social Service (Andre Bowen)

Critical care physician secretarial support (Ilene Sivikoff, Sherry Carroll)

Secretarial Support for PICU Resident Educational Experience (Ilene Sivikoff)

Coordinate application paperwork for visiting residents and medical students with GME Office, various residency programs, Jeffline and Stentor.
Prepare individual resident and medical student introduction folders.
Assist with PICU Resident Education Data Base.
Prepare and mail a yearly survey to previous PICU rotation residents who are now in their first year of practice or fellowship.
Correspondence.

PICU Cerner representative (Anne Gallagher)
Pediatric Critical Care Physicians

FTE

Pediatric Critical Care Medicine
  Brian Binck MD
  Caroline Boyd MD (begins July 2006)
  Tania Burns MD
  Edward Cullen DO
  James Hertzog MD
  Scott Penfil MD

Pediatric Anesthesiology & Critical Care Medicine
  Andrew Costarino MD

Pediatric Critical Care FTE Physician Responsibilities

Clinical (80%)
  • Patient care

Non-clinical (20%)
  • Administration
  • Education (Fellow, resident, medical student, nurses, PALS, national meetings, etc.)
  • Research

Provide 24 hour/day, 365 days a year accessible, safe, compassionate, quality patient and family centered care.

Primary PICU Patient Care Coverage  (0700-1600 weekdays & 0700-1800 weekends)
  • Cover 22 medical / surgical PICU patients
  • Coordinate Pediatric Transports for Alfred I duPont Hospital for Children
  • PICU patient care rounds
  • PICU family interactions
  • Critical Care Medicine Fellow clinical & procedure supervision and training
  • Resident clinical & procedure supervision and training
  • Medical student clinical & procedure supervision and training
  • On weekends and holidays: additional (1800-0700) back up clinical support for PICU and consultant coverage for pediatric, multi-system trauma patients at Shock Trauma Unit (SSTU), Christiana Care Hospital

Primary PICU Patient Care Coverage  (1600-0700 weekdays & 1800-0700 weekends)
  • Cover 22 bed medical / surgical PICU
  • Coordinate Pediatric Transports for Alfred I duPont Hospital for Children
  • PICU patient care rounds
  • PICU family interactions
  • Critical Care Medicine Fellow clinical & procedure supervision and training
  • Resident clinical & procedure supervision and training
  • Medical student clinical & procedure supervision and training
  • On weekends and holidays: additional (0700-1800) back up daytime clinical care support for PICU and consultant coverage for pediatric, multi-system trauma patients at Shock Trauma Unit (SSTU), Christiana Care Hospital
Secondary PICU Patient Care Coverage (0700-1600 weekdays)
- Consult service for pediatric trauma at Christiana Care Shock Trauma Unit
- Assist with PICU clinical care, procedures
- Coordinate family teaching and home discharge planning for individual children with tracheostomy and chronic ventilator care.
- Assist with sedation for selected children in the EEG lab
- Assist with sedation services outside of the PICU
- Assist with central venous access outside of the PICU
- Mock Codes and Interactive Teaching Sessions for PICU residents

Secondary PICU Patient Care Coverage (1600-0700 weeknights)
- Consult service for pediatric trauma at Christiana Care Shock Trauma Unit
- Assist with PICU clinical care, procedures

Responsibilities for Critical Care Physicians who remain Engaged in the Specialty Practice of Critical Care Medicine  

- Develop an ever increasing measurable quantity of knowledge
- Regularly perform and teach an increasingly broader set of skills
- Continue to demonstrate advanced, ethical decision making
- Serve as role model for a compassionate and caring attitude toward patients who are critically ill.
- Serve as role model for the intensivist-directed multiple-professional team model of patient-centered care for all ICU patients.
- Perform the following:

  Clinical

- Continue to augment his or her knowledge by assimilating appropriate new peer-reviewed published medical literature through self-directed learning.
- Develop and participate in CME activities designed to enhance critical care knowledge.
- Teach others to identify the need for and provide care for all critically ill adult and/or pediatric patients.
- Continue to provide and teach cardiopulmonary and cerebral resuscitation including advanced techniques for all patients sustaining life-threatening events.
- Introduce and teach others new methods and use of devices for management of patients in respiratory failure.
- Develop and evaluate curriculum changes for ICU caregivers, fellows, and residents.
- Diagnose and treat a sufficient number of patients with critical illness using conventional and state-of-the-art approaches to maintain clinical proficiencies.
- Teach others to select, place and use appropriate monitors for titrating therapy in any critically ill patient by demonstrating these skills in daily practice.
- Teach others infection control and monitor infection control practices of the unit.
- Teach medication safety and cost-effectiveness of therapeutic decision making.
- Increase the skills of ICU nurses and ancillary personnel in caring for critically ill patients by acting as the ICU team leader and providing in-service education.
- Model effective communication with patients, families, and members of the health care team about treatment decisions and patient prognosis.
- Support patients, their families and other members of the healthcare team through the trauma of critical illness.
- Develop collaborative and productive relationships with other specialist physicians and model joint clinical planning in managing complex ICU problems.
• Identify ethical issues and lead discussions involving patients, families, and members of the healthcare team in making treatment decisions.

Research

• Advance the clinical practice of CCM using evidence-based medicine techniques and through dissemination of findings by publishing case reports and clinical and basic science research.
• Develop and continue ongoing basic science and clinical studies designed to evaluate and improve care of the critically ill.

Administrative

• Evaluate, modify and approve ICU hospital policies.
• Improve resource utilization and maintain patient care quality by planning for future needs for institutional and regional critical care resources.
• Develop programs and change unit, institution, and regional practice to improve care of critically ill patients.
• Develop programs and document improvement in patient safety monitoring and error production.
• Use existing tool sets to assess patient and family satisfaction and direct the development of new tools when appropriate.
• Develop high-quality relationships with other healthcare providers.
• Teach the business of medicine.
• To achieve these continuing competencies:
  • Commit to professional development and lifelong learning by achieving board certification and re-certification in CCM; regular attendance at CME activities and individual self-studies; produce publications related to education or research studies; attestations from colleagues, peers, patients, nurses, allied health professionals, and hospital administrators that include quality reports, patient lists and outcome statistics.

Specific credentials, cognitive and procedural skills are outlined in the appendix of the published guidelines. Crit Care Med 2004; 32 (1): 267

### Average Monthly Hours for Individual Pediatric Critical Care FTE Hospital Responsibilities

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
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<tbody>
<tr>
<td>Primary PICU Hours</td>
<td>175</td>
<td>161</td>
<td>159</td>
<td>140</td>
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<tr>
<td>Secondary PICU Hours</td>
<td>158</td>
<td>155</td>
<td>166</td>
<td>142</td>
<td>162</td>
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<tr>
<td>Non-clinical Hours</td>
<td>73</td>
<td>74</td>
<td>97</td>
<td>96</td>
<td>88</td>
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<tr>
<td>Total Hours</td>
<td>406</td>
<td>390</td>
<td>422</td>
<td>378</td>
<td>406</td>
<td>375</td>
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PICU

Resident Rotation Participants
### Participants in PICU Educational Experience

<table>
<thead>
<tr>
<th>Program</th>
<th>Number</th>
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<tbody>
<tr>
<td>Thomas Jefferson University Pediatrics PGY2</td>
<td>234</td>
</tr>
<tr>
<td>Christiana Care Emergency Medicine</td>
<td>169</td>
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<tr>
<td>Thomas Jefferson University Emergency Medicine</td>
<td>143</td>
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<tr>
<td>Christiana Care Medicine Pediatrics</td>
<td>39</td>
</tr>
<tr>
<td>Medical Student</td>
<td>45</td>
</tr>
<tr>
<td>Alfred I duPont Hospital for Children ER Fellow</td>
<td>5</td>
</tr>
<tr>
<td>Pediatric Critical Care Nurse Practitioner Student</td>
<td>4</td>
</tr>
<tr>
<td>Thomas Jefferson University Pediatrics PGY3</td>
<td>3</td>
</tr>
<tr>
<td>Christiana Care Trauma Fellow</td>
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</tr>
<tr>
<td>Thomas Jefferson University Anesthesia</td>
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</tr>
<tr>
<td>Philadelphia College of Osteopathic Medicine PGY1</td>
<td>1</td>
</tr>
<tr>
<td>St Luke's Hospital ER Resident</td>
<td>1</td>
</tr>
<tr>
<td>Thomas Jefferson PGY6</td>
<td>1</td>
</tr>
<tr>
<td>Tod Children's Hospital Resident</td>
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</tbody>
</table>

### PICU residents’ ICU experiences before starting PICU rotation

![Graph showing ICU experiences before starting PICU rotation]
Residents’ Intubation Experience before starting PICU rotation

![Bar graph showing intubation experience by age category and location.]

Residents’ Experience with Central Venous Line Placement in Children before starting PICU Rotation

![Bar graph showing CVP placement by location and site.]

U/Ecullen/Word/Educatio/Resident/Reports/PICUresidentreviewapril2006
Residents’ Experience with Central Venous Line Placement in Adults before starting PICU rotation

![Bar chart showing experience with central venous line placement]

- TJU Pediatrics
- Medicine - Pediatrics
- TJU ER
- Christiana ER

% Placement:
- Int Jugular
- Subclavian
- Femoral
Residents’ Experience with Chest Tubes in Children and Adults before starting PICU rotation

Residents’ Experience as Pediatric Code Leader and with Pediatric Code Procedures before starting PICU rotation
Residents’ Experience with Adult Code Procedures before starting PICU rotation

Residents’ Self reported Comfort Level with Evaluating and Stabilizing a Critically Ill Child Before Starting PICU Rotation

( 0= no comfort…10 =independent )
### Residents’ Goals Prior to PICU Resident Rotation at Alfred I duPont Hospital for Children

<table>
<thead>
<tr>
<th></th>
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<tr>
<td>Procedures</td>
<td>4</td>
<td>5</td>
<td>11</td>
<td>16</td>
<td>22</td>
<td>25</td>
<td>30</td>
<td>26</td>
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<tr>
<td>Run a Code</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>17</td>
<td>15</td>
<td>14</td>
<td>20</td>
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<tr>
<td>Recognize and stabilize critically ill child</td>
<td>4</td>
<td>4</td>
<td>10</td>
<td>10</td>
<td>13</td>
<td>25</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td>Manage pediatric critical care patients (critical care support)</td>
<td>6</td>
<td>5</td>
<td>13</td>
<td>18</td>
<td>9</td>
<td>18</td>
<td>23</td>
<td>25</td>
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<tr>
<td>Pediatric critical care drug familiarity</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>9</td>
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<tr>
<td>Learn Ventilators</td>
<td>2</td>
<td>1</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>8</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Familiarity with specific critical care topics: Respiratory failure, Sepsis, DKA, Ingestion, Trauma, Seizure, Head Injury</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Gain Comfort with Critically Ill Child</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handle problems that may see in an ER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post op complications</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Critical care physiology in children</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Be able to discuss PICU sequelae with families in my practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Deliver Bad News to families</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Learn Arrythmias</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Difficult airway</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Stabilize for Transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Invasive cardiopulmonary monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Ventilator support for chronic vent dependent children</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Familiarity with children with chronic medical issues</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
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<tr>
<td>Organizational skills in PICU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
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<tr>
<td>Determine if pediatric critical care a career possibility</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td>1</td>
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<tr>
<td>Critical eval of article</td>
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</tbody>
</table>
Residents’ Learning Preferences Prior To PICU Rotation

- Ask attending questions
- Direct patient care
- Daily rounds with attending
- Mock drill scenarios
- Check a medical textbook
- Formal Lectures
- Do a medline search
- Give a talk
- Formal Reading Program

Graphs showing the distribution of different learning preferences among residents at various institutions prior to their PICU rotation.

1. TJU Pediatrics
2. Medicine - Pediatrics
3. TJU ER
4. Christiana ER
5. Medical student

Data includes preferences such as asking attending questions, participating in daily rounds, and using mock drill scenarios.
Mock drill scenarios

- TJU Pediatrics
- Medicine - Pediatrics
- TJU ER
- Christiana ER
- Medical student

Check a medical textbook

- TJU Pediatrics
- Medicine - Pediatrics
- TJU ER
- Christiana ER
- Medical student
PICU Rotation

Curriculum

July 2005 to June 2006


Access to Nemours Desktop: internet resource for medical literature search engines, medical journals, evidence based clinical medicine information, PICU article collection, Lexicomp, Micromedex, Society of Critical Care Medicine powerpoint presentations on PICU topics specifically directed towards residents in the PICU, additional educational activities.

Textbooks available in PICU
Pediatric Critical Care
Third Edition
Fuhrman/Zimmerman

Pediatric Critical Care Medicine
Slonim / Pollock

Pediatric Intensive Care, Third Edition
Mark C. Rogers

The Difficult Pediatric Airway
Anesthesiology Clinics of North America
Jalil Riazi, MD, Editor
1999

Management of Pediatric Trauma
Buntain

Critical Heart Disease in Infants and Children
Nichols, Cameron, Greeley, Lappe, Ungerleider, Wetzel

Pediatric Cardiac Intensive Care
Chang, Hanley, Wernovsky, Wessel

Illustrated Textbook of Pediatric Emergency and Critical Care Procedures
Dieckmann, Fiser, Selbst

Supportive Care of Children with Cancer
Current Therapy and Guidelines from the Children's Cancer Group
Edited by Arthur R. Ablin MD

Textbook of Pediatric Emergency Medicine
Ludwig Fleisher

Toxicologic Emergencies
Lewis R. Goldfrank

Toxicology
Frord/Delaney/Ling Erickson

The Pharmacologic Approach to Critically Ill Patients
Chernow, Third Edition
Principles and Practice of Intensive Care Monitoring
Tobin
Visiting residents receive Cerner and Novell computer training on day 1.

Interactive teaching rounds T 0730. Case based discussions during morning multidisciplinary patient-care rounds.

Critical care attending is available for resident supervision during the day and night.

Critical care mentor is assigned to each PICU resident

Radiology XRAY reviews in PICU daily Monday-Friday at 1030.

Society of Critical Care Medicine powerpoint presentations on PICU topics are specifically directed towards residents in the PICU. These are available on the internet. Residents are asked to review these presentations at their own pace during the month.

http://www.sccm.org/specialties/pediatric/picu_course/course_index.asp

PICU Mock Code each Friday at 1100. Critical care physician directs the Mock Code; PICU nurse educators supply equipment and coordinate nursing and respiratory availability.

Respiratory therapy provides a session on ventilators.

The Alfred I duPont Hospital for Children medical librarian attends PICU patient care rounds each Friday.

Evidence-based Journal Club monthly.

Residents are asked to pick a PICU problem, ask a focused clinical question, search the medical literature and evaluate the validity, results and applicability of the findings to their patient. Copies of the resident’s critically appraised topic are forwarded to their residency program.

PICU residents present a PICU patient to hospital morning report on the second Tuesday and the third Thursday of each 4-week rotation block.

Residents participate in on-line Society of Critical Care Medicine national test after the completion of their PICU rotation. Their scores are sent to their respective residency programs.

Residents are asked to complete an evaluation of their PICU rotation.

Residents are asked to return their procedure logs, patient logs and duty hour logs.

Critical care physicians complete individual resident specific program evaluations forms. These are collected and sent to the appropriate residency programs. Copies of the evaluations from visiting residents are also sent to the Alfred I duPont Hospital for Children GME office.
Orientation To PICU Resident Rotation  
Nemours Alfred I duPont Hospital for Children

Principle Clinical Responsibility
Examine your primary patient before morning and afternoon patient care rounds and frequently throughout the day and night if the child is unstable.

Keep critical care physician updated with any changes in your primary patient’s condition.

Know the general clinical course and plan of all PICU patients.

Principle Educational Objective
At the end of your PICU rotation, be able to recognize and stabilize a critically ill child or adolescent who presents with
Acute Respiratory Failure
Hemodynamic Instability
Sepsis
Acute Neurologic insults
Acute electrolyte and endocrine disorders
Acute renal failure
Coagulation disorders
Overdoses & Poisonings

Patient Care: Resident Responsibilities
• PICU morning rounds begin at 0730 on week-days and 0800 on Sat/Sun and Holidays.
• It is expected that residents will examine their primary patients & collect necessary data before rounds.
• Residents will write a daily SOAP note on their primary patients. Name must be printed as well as signed at end of all notes and orders.
• Please do not pre-date transfer summaries
• Residents will put their names next to the critical care attendings’ names on the PICU room board for those primary patients that they are following.
• In the interest of patient continuity of care, before leaving for clinic, seminar or home, residents must check out in detail the updated clinical course of their primary patients with the resident who is designated on-call and the critical care attending.
• On Sat/Sun and Holidays, the on-coming resident and the resident from night call are each responsible for examining and collecting data on half the PICU patients before rounds and completing the daily patient notes..

During your first two days in the PICU, it is expected that you will review the following information about the PICU Resident Rotation: http://www.nemours.org/internet?url=no/aidhc/picu/index.html (username:picu /password:resident) in this order:

Administrative Issues
  General Information
  Patient Responsibilities
  Order Entry (If write orders, need to place your Beeper number under your name)
  Transfer Out of PICU Algorithm
  Surgical NICU Coverage by PICU Rotation Resident

Code Blue
Difficult Airway Cart
Presenting Patients on PICU Rounds
Goals
Curriculum
PICU Resident Education

The primary PICU educational process focuses on interactive teaching during patient care rounds and ongoing bedside discussions with the critical care attending regarding on-going patient care. Additional educational resources include Mock Codes, monthly journal club, internet access to Society of Critical Care Medicine power point presentations geared toward residents in the PICU (http://www.sccm.org/specialties/pediatric/picu_course/course_index.asp), an individual pediatric critical care text for self-reading, access to a mentor.

Residents are encouraged to ask focused clinical questions during PICU rounds, find literature that addresses the question, evaluate the literature for validity, results & applicability to their patient using evidence based clinical practice principles and bring the information back to the PICU team. To facilitate this process, residents have access to the Nemours UGI Desktop. Residents will complete one Critically Appraised Topic and hand in to Dr Cullen. (A copy will be sent to their program director).

A medical Librarian will attend PICU rounds once a week and is available for assistance via email at other times. (ljoshi@nemours.org)

Mentor

One of the critical care physicians is assigned to a resident as a mentor. This is an informal process that provides the resident with an additional contact during the PICU rotation.

Passwords

Nemours Users Guides Interactive (UGI) Desktop
Username: Password:

Jeffline, Thomas Jefferson University on-line Medical Library
Campus Key: Password:

Cerner
Username Password:

ISite PACS (Radiology intranet site): (http://172.25.100.152/default.asp)
Username: Password:

SCCM post-PICU rotation Password:

Nemours Users Guides Interactive (UGI) Desktop
This is an internet resource that allows access to evidence based clinical practice resources, search engines, medical journals, textbooks, PICU Evidence Based Journal Club, LexiComp hospital formulary, Micromedix and other educational activities. In the PICU, Nemours UGI Desktop can be accessed via desktop computers through the icon Nemours UGI Desktop or via the bedside wireless computers and WYSE terminals through the icon Vividesk. Residents can download this internet resource on their office, home or laptop computers by going to the URL http://www.cche.net/nemours and follow directions for downloading. Those who do not have a password can also go to the above URL and Register.

Browser Tab
• Double Click the Bell on the desk for a Tour describing the basic Vividesk technology and an introduction to the on-line Users’ Guides To The Medical Literature

Activities Tab
• Under Interactivities, complete NFEIP Pre-study questionnaire
Resource Tab
- Search Engines: PubMed, Ovid, ACP Journal Club, Cochrane Library.
- MD Consult (includes access to Nelson’s Pediatrics, Harriet Lane).
- Practice Guidelines
- Journals (Connection to Journals via Jeffline).
- Article and Search Requests from Delaware Academy of Medicine Library (http://www.delamed.org) which is located in the Library icon. The FAX number for the PICU is 302-651-5460.
- LexiComp (Alfred I duPont Hospital for Children Formulary)
- Micromedex.
- PedsCCM (http://www.PedsCCM.org), Pediatric Critical Care educational resources

Guides Tab
- Users’ Guides To The Medical Literature textbook.
- Learning Modules: Review Asking Questions, Acquiring Evidence, Appraising Therapy
- Search Engine instructions
- Calculators for evidence-based clinical practice
- Personal Evidence Project (Help with doing a Critically Appraised Topic on-line)

Practice Tab
- PICU Rotation PICU Article Collection Resource
- Pediatric Lectures
- Radiology Review
- PedsCCM web site
- Epic Web connection

Monitoring Activities
During their first week, residents are asked to complete Pre-PICU Rotation questionnaire on the PICU Resident Rotation web site.

PICU Residents are to document their primary patients’ diagnoses and age, procedures performed with supervision and their hospital work-hours on forms provided. Please return to Ilene Sivikoff, Pediatric Critical Care Secretary (extension 5159) at the end of the last week of rotation.

Resident will complete an evaluation form describing their PICU experience.

During the last week of the rotation, residents participate in the Pediatric Section of the Society of Critical Care Medicine (SCCM) Pediatric Resident Education Committee post-PICU on-line test. Their scores will be forwarded to their respective program directors.

Questions? Contact Edward J.Cullen Jr., D.O. Phone: 302-651-5159 / email: ecullen@nemours.org

Revised 10/3/05
Expectations for PICU Residents regarding Safe, Quality Patient Care

Residents are members of our multidisciplinary team caring for critically ill or injured children and adolescents during their PICU rotation. They also are responsible for the provision of safe and effective patient care. Residents are supervised by Critical Care Physicians (Day & Night) during their training period in the PICU.

- It is expected that residents will interact professionally with the nurses, respiratory therapists, unit clerks, consultants and families in the ongoing care of the children in the PICU.
- It is expected that residents will know the history and main clinical issues for each patient in the PICU.
- It is expected that residents will examine assigned patients before formal rounds.
- It is expected that residents will examine their patients frequently throughout their hours in the PICU and that they will interact with the critical care physician with any changes in the patients’ clinical course.
  - It is expected that residents will learn and use our process for presenting patients on formal rounds
- It is expected that residents will be prepared for and fully participate in patient care rounds.
- It is expected that residents will have a basic knowledge of the medical issues affecting the patient they are presenting on rounds
- It is expected that residents will exchange up-to-date patient information with on-coming day or night resident(s)
- It is expected that residents will not give verbal orders.
- It is expected that residents will learn and utilize the PICU Order Entry Algorithm
- It is expected that residents will complete and document H&Ps on patients admitted to the PICU from the ER, Transport, home or Acceptance Notes for children transferred from OR, PACU or general hospital area.
- It is expected that residents will review indications, landmarks, procedure and complication risk for all procedures before they undertake procedures under the supervised of critical care physicians.
- It is expected that residents will learn and utilize the PICU Transfer Algorithm
- It is expected that residents will complete a daily progress note and if appropriate procedure notes on assigned patients
- It is expected that residents will assist with discharge of patients to other facilities or home
- It is expected that residents will assist in communicating patient updates to referring physicians.
- It is expected that residents will be acquainted with hospital Code responsibilities and review PALS algorithms for pulseless arrest, bradycardia, tachycardia with poor & adequate perfusion.
- It is expected that residents will be acquainted with the PICU Difficult Airway Cart
Process for Patient Transfer Out of PICU

Unit Clerk/Aide, Department of Anesthesiology and Critical Care
• Each morning, Monday through Friday, checks a PICU patient printout from the power chart organizer. On Mondays, a check is also done for PICU patients present on the preceding Saturday and Sunday.
• Notes on a Physician Assignment –Tracking of PICU Patients Form when the child was admitted and where they were admitted from
• Reviews each patient's hospital face sheet for the name and contact information of that patient’s private physician
• If there is a private physician, the name and contact information is entered onto the individual patient’s PICU demographic and billing sheet
• Checks to see if private physician has privileges here at Alfred I duPont Hospital for Children
• Calls the private physician, tells them that a child they follow is in the PICU, gives them the name of the critical care attending and the PICU phone number if they wish further information about the patient.

PICU attending and PICU resident will decide:
• Is this patient to be transferred to a Medical or Surgical service?
• If the child is to be transferred to a Surgical Service -
  • Does the Surgical Service wish to have a General Pediatric Consult
• If this patient is to be transferred to a Medical Service -
  • Is the patient being transferred to -
    • General pediatrics
    • Private pediatrician
      • If available, this name will be on PICU demographic and billing sheet
    • Pediatric medical subspecialty

PICU Resident will follow the designated transfer process:

Transfer to a Surgical Service without a General Pediatric Consult:
• PICU resident will directly contact the resident covering the surgical service and tell them that the child will be leaving the PICU.
• PICU Resident writes a Transfer Note in the patient's chart.
• PICU Resident removes any specific PICU orders that not longer pertain to the patient’s care
• The PICU Resident will give a pre-printed order form to unit clerk:
  (Signature/Date/Time)
  • Accept and Transfer Medical Service Order
  • Transfer Medical Services to (                                    )
  • Transfer to Service of (                             )
  • Contact accepting team resident when patient arrives on accepting unit
Transfer to a Surgical Service with a General Pediatric Consult:

- PICU resident will directly contact the resident covering the surgical service to tell them that the child is now leaving the PICU.
- PICU resident will call the Pediatric Admitting Resident at 426-4800
  - Pediatric Admitting Resident will relay the information about the patient to the general pediatric consult attending and resident team involved.
- PICU Resident removes any specific PICU orders that not longer pertain to the patient’s care
- PICU Resident writes a Transfer Note in the patient's chart
- PICU Resident will give a pre-printed order form to unit clerk: (Signature/Date/Time)
  - Accept and Transfer Medical Service Order
    - Transfer Medical Services to (              )
    - Transfer to Service of (                    )
    - Accepting Physician (                       )
    - Contact accepting team resident when patient arrives on accepting unit..
- PICU Resident will again speak to Admitting Resident about the clinical status of the patient when the child actually leaves PICU.
- Admitting Resident will update the appropriate interns / residents on the general pediatrics accepting service.

Transfer to the General Pediatric Service:

- PICU resident will directly contact the Pediatric Admitting Resident at 426-4800.
- PICU resident gives the Pediatric Admitting Resident the information about the patient.
- Pediatric Admitting Resident will tell the PICU resident the name of the accepting service and the accepting physician.
- Pediatric Admitting Resident relays the information about the patient to the new team.
  - Interns and residents on accepting service will discuss the patient’s status and care with the designated accepting attending.
- Pediatric Admitting Resident may direct the PICU Resident to also contact the senior resident of the accepting team for more detailed interactions before patient transfer out of PICU
  - PICU Resident will contact the senior resident of the accepting team if so instructed.
- PICU Resident writes a Transfer Note in the patient's chart
- If there is a delay between the initial contact with the Pediatric Admitting Resident and the actual transfer of the child out of the PICU, the PICU Resident will update the Transfer Note
- PICU Resident removes any specific PICU orders that not longer pertain to the patient’s care
- PICU Resident will give pre-printed order form to unit clerk (Signature/Date/Time)
  - Accept and Transfer Medical Service Order
    - Transfer Medical Services to (              )
    - Transfer to Service of (                    )
    - Accepting Physician (                       )
    - Contact accepting team resident when patient arrives on accepting unit..
- PICU Resident will again speak to Admitting Resident about the clinical status of the patient when the child actually leaves PICU.
- Admitting Resident will update the appropriate interns / residents on the general pediatrics accepting service.
Transfer to a Private Pediatrician or Pediatric Subspecialty Service

- PICU Resident will notify the Private Pediatrician or Pediatric Subspecialty Physician that the child is leaving the PICU
- PICU resident will directly contact the Pediatric Admitting Resident at 426-4800 with the following information.
  - Service and name of Private Pediatrician or Pediatric Subspecialist
  - Patient’s clinical course
    - The Pediatric Admitting Resident will tell the PICU Resident which resident is covering the private pediatrician or pediatric subspecialty physician
- PICU Resident reviews the patient’s clinical course with the residents who will cover the patient on the private pediatrician or pediatric subspecialty service.
- PICU Resident writes a Transfer Note in the patient’s chart
  - If there is a delay between the initial contact with the Pediatric Admitting Resident and the actual transfer of the child out of the PICU, the PICU Resident will update the Transfer Note
- PICU Resident removes any specific PICU orders that no longer pertain to the patient’s care
- PICU Resident will give a pre-printed order form to unit clerk (Signature/Date/Time)
  - Accept and Transfer Medical Service Order
    - Transfer Medical Services to (                                    )
    - Transfer to Service of (                             )
    - Accepting Physician (                            )
    - Contact accepting team resident when patient arrives on accepting unit.
- PICU resident will again speak to the Admitting Resident just before the child leaves the PICU.
  - The Admitting Resident will discuss any patient clinical updates with the interns / residents on the accepting private pediatric or pediatric subspecialty team.

PICU Charge Nurse will
- obtain new patient room assignment from the Hospital Nursing Supervisor

PICU Unit Clerk will:
- Enter the resident written accept and transfer order into Cerner under the appropriate sections.
- Place a Transfer Checklist on the front cover of the patient’s chart
- When the child is actually leaving the PICU.
  - Contact the Admitting Resident (426-4800)
    - Confirm with Admitting Resident that Service and Accepting Physician are still the same Service and Accepting Physician as originally reported.
    - If the Service or Accepting Physician has changed, the unit Clerk is to make the appropriate changes in Cerner.
    - Have the Admitting Resident speak directly with the PICU Resident

The individual patient’s PICU Nurse will
- Complete and sign the designated transfer sheet located on the patients chart.
The Hospital Nursing Supervisor will:
  • Contact the PICU Charge Nurse when the accepting room is ready.

PICU Charge Nurse will:
  • Review the patient transfer sheet for completeness and countersign the patient transfer sheet before the patient leaves the PICU.
  • Remove completed transfer sheet from patient’s chart and place in PICU Nurse Manager office

PICU Nurse Manager will:
  • Store the completed patient transfer sheets
  • Present the completed patient transfer sheets for quality review at the weekly PICU Leadership Meetings.

The nurse who receives the patient upon transfer from the PICU will:
  • Contact the accepting team resident when the patient arrives on the accepting unit.

The resident on the accepting service will:
  • Examine patient, review and adjust patient orders as well as discuss patient with the child’s attending physician.
Pre-Printed Form
Accept And Transfer Medical Service

Accept and Transfer Medical Service Order

Transfer Medical Service to ( )
Transfer to Service of ( )
Accepting Physician ( )

Contact accepting team resident when patient arrives on accepting unit.

Signature/Date/Time:
Transfer Checklist

Transfer to

___ Surgical service
  Accepting physician name______________________________

___ Surgical service with pediatric consult
  Accepting physician name______________________________

___ General Pediatric service
  Accepting physician name______________________________

___ Private Pediatric service
  Accepting physician name______________________________

___ Pediatric medical subspecialty service
  Accepting physician name______________________________

___ Admitting resident notified

___ General surgery, neurosurgery, orthopedic, urology, ENT or Plastics resident notified

___ Nursing Supervisor notified

___ Accept and Transfer Medical Service order has been entered into Cerner

___ Specific PICU orders that no longer pertain to patient care have been removed from order set

___ Resident Transfer Note completed and updated if there is a long delay between planned and actual transfer

___ Chart Complete with Blue Plate

___ Data Base Completed

___ Standard of Care Completed

___ Old Records Packed

___ All Medications Packed

___ Refrigerated Medications Packed

___ Breast milk packed

___ All Belongings Packed

___ Respiratory Therapist Notified / Treatments Coordinated

___ Nurse to Nurse clinical report completed

___ Admitting Resident re-notified at time of actual transfer out of PICU

PICU Resident_______________________ PICU Unit Clerk____________________________
PICU Nurse________________________
Transfer Date ______________ Transfer Time ______
PICU Charge Nurse____________________________
PICU Resident Rotation

Monthly Maintenance Plans

Week  Things to do

I

Monday

0700: Meet with Ilene Sivikoff
Ilene or DR Cullen will give residents their Beeper, Proxy Cards, Parking Permits, Meal
tickets, Cerner class information and have residents sign AIDI GME agreement. Instruct
visiting residents to Personnel office to get a Nemours badge. Request resident’s email
address
   AIDI GME Agreement will be sent to GME office / copy to residents folder.
   Resident’s email address needed to get a password for SCCM post-test

Dr Cullen will orient residents before or after morning PICU patient rounds; show residents call
room.

Visiting residents have Cerner class 1-3PM

New PICU Core Curriculum placed on PICU workstation desk

Tuesday, Wednesday, Thursday

Ilene enters data into PICU resident data base
   New resident
   Resident ID
   Prerotation Questionnaire
   PICU Profiles

Exiting resident
   PICU Evaluations
   Resident Evaluations
   SCCM Post Test
   Primary Patient Data
   Hours

Friday

Dr Cullen completes and sends in Specific Program Evaluation Forms / copy to resident folder
and copy to Alfred I duPont Hospital for Children GME office

Dr Cullen enters the following into the PICU resident data base as they are done
   Mock Codes
   Interactive PICU Teaching Rounds
   Additional educational activity performed by critical care physicians
Week  

**Things to do**

2

**Monday**

Ilene Sivikoff prepares initial draft of the PICU resident rotation curriculum for next month rotation. After the draft is reviewed and approved by Dr Cullen, Ilene sends the next month’s curriculum to PICU Curriculum Distribution List

Ilene Sivikoff enters attending clinical teaching days for present rotation period in data base

Ilene Sivikoff enters scheduled lectures for the new month rotation in data base

Dr Cullen enters the following in the PICU resident data base as they are done

Mock Codes
Interactive PICU Teaching Rounds
Additional educational activity performed by critical care physicians
Week | Things to do
--- | ---

**Monday, Tuesday, Wednesday**

Ilene Sivikoff
- Obtains Cerner training date / password for new residents as needed
- Notifies Stentor that resident will need access during time frame provided
- Obtains Jeffline password for visiting resident if needed

Ilene Sivikoff prepares folder for new resident(s)
- Place Check-Off sheet on cover
- Contents of folder
  - PICU Curriculum
  - 2-page introduction of essentials for PICU rotation
  - Primary patient / Procedure flow sheet
  - Hours sheet
  - Order Entry Protocol
  - Transferring Patients Protocol
  - Infection control that includes RSV and Rotovirus isolation handout
  - Meal tickets
  - Beeper for visiting residents
  - Proxy Card to enter locked doors

Dr Cullen assigns
- ID number
- SCCM post-test password
- Nemours UGI Desktop password as needed

**Thursday**

Ilene Sivikoff will send hard copy forms of Specific Program Evaluation Forms for each resident to each critical care attending. Critical care attendings will also receive a form to fill out on each resident that asks about attending comfort levels with resident as regards ARDS, sepsis, etc.

Ilene Sivikoff will coordinate with the Pediatric Residency Office to make sure the appropriate PICU personnel receive the 360° resident evaluation forms

Dr Cullen enters the following as they are done
- Mock Codes
- Interactive PICU Teaching Rounds
- Additional educational activity performed by critical care physicians
Week

4

Things to do

Monday

Dr Cullen will remind residents to complete
SCCM post-test on-line before Friday
Evaluation of PICU
Primary patient / Procedure form
Hours log

Ilene Sivikoff will remind critical care physicians to complete program evaluations and our check-off comfort level score form and return both to Dr Cullen by Thursday.

Ask those doing the 360° evaluations to return their completed evaluations to Dr Cullen by Thursday

Friday

Ilene to Enter SCCM post-test scores in our data base

Residents will see Ilene Sivikoff before 4PM and
Return beeper, proxy card, primary patient/procedure form, hours log.

Ilene Sivikoff will

Give Dr Cullen new Resident Folders (residents who start Monday)

Send 360° evaluations to Pediatric Residency Office

Dr Cullen will enter the following as they are done
Mock Codes
Interactive PICU Teaching Rounds
Additional educational activity performed by critical care physicians
## Additional PICU Resident Rotation Support

### July, August, September, October

Dr Cullen will update PICU Resident Rotation Nemours site

http://www.nemours.org/no/aidhc/picu/index.html

### November

Ilene Sivikoff prepares mailing list of residents who have been in PICU recently and are now out in practice.

### December

Ilene Sivikoff mails surveys to residents. Self addressed mailing envelope also included in order to send back survey

Dr Cullen completes bi-annual GME data requests

### January, February, March

Dr Cullen enters survey data into PICU resident data base

### April, May, June

Dr Cullen and Ilene Sivikoff prepare a Review of PICU Resident Rotation and Preparation of Goals / Curriculum for next academic year

Dr Cullen and Ilene Sivikoff update PICU Resident Rotation Nemours site

http://www.nemours.org/no/aidhc/picu/index.html

Dr Cullen completes bi-annual GME data requests

### Additional

Purchasing

Ilene Sivikoff assists in purchasing textbooks as needed for the PICU rotation.
Pediatric ICU Rotation  
Pre-Rotation Questionnaire

Name
PGY2  ____  PGY3  ____

TJU Pediatric Residency Program

MCD ER  ____
TJU ER  ____
Other  ____

1. Have you had any previous ICU experience?
   Pediatric:  ____________________________
   Neonatal:  ____________________________
   Adult:  MICU____  CCU____  SICU____  Trauma ICU____

2. Which of the following procedures have you had experience with? If experience with infants and children, mark (P). If experience with adults, mark (A).
   ____ Intubation of infant <1 year
   ____ Intubation of children > 1 year and adolescents
   ____ Intubation of adults
   ____ Use of muscle relaxants for intubation
   Central Line Placement
   ______ Internal Jugular
   ______ Subclavian
   ______ Femoral Vein
   ______ Arterial Catheter Placement
   ______ Radial
   ______ Femoral
   ______ Posterior tibial
   ______ Dorsalis pedis
   ____ Chest tube placement
   ____ Pigtail chest tube placement
   ____ Emergency defibrillation
   ____ Elective cardioversion
   ____ External pacemaker

3. Have you ever been in charge of an actual pediatric resuscitation?
   a. yes
   b. no

4. In an actual infant or pediatric resuscitation, have you EVER personally provided:
   (Circle all that apply)
   a. Chest compressions
   b. Any form of ventilation (i.e. Mouth to mouth, mouth to mask, BVM, ET)
   c. Specifically Mouth to Mouth (or Mouth to Barrier Device) ventilation
   d. None of the above

5. WITHIN THE PAST 2 YEARS, in an actual infant or pediatric resuscitation, have you personally
provided:
(Circle all that apply)
   a. Chest compressions
   b. Any form of ventilation (i.e. Mouth to mouth, mouth to mask, BVM, ET)
   c. Specifically Mouth to Mouth (or Mouth to Barrier Device) ventilation
   d. None of the above

6. At duPont hospital for Children, what is the number you call to activate a code blue?

7. What do you anticipate learning from this PICU rotation that will prepare you for your pediatric or emergency medicine career goals?

8. You learn a new medical topic best by:
   ______ Participating in daily unit rounds with an attending physician
   ______ Formal lectures
   ______ Asking attending physicians direct questions about present patients care
   ______ Formal reading program that covers basic topics in the field of study
   ______ Looking up the answers to your questions in a recent medical textbook
   ______ Reviewing critically recent literature on pertinent patient problems as they arise during your rotation (medline searches)
   ______ Participating in mock drills regarding patient care scenarios
   ______ Direct patient care with as many patients as possible
   ______ Give a talk about what you are trying to learn
9. How comfortable do you feel evaluating and stabilizing a critically ill child.

   Scale:     0 = No exposure to base a decision on.
              10 = Full independence

   0    1    2    3    4    5    6    7    8    9    10

10. How comfortable do you feel recognizing and initially managing critically ill children with the following problems?

   Scale:     0 = No exposure to base a decision on.
              10 = Full independence

   Acute respiratory Failure
   0    1    2    3    4    5    6    7    8    9    10

   Hemodynamic instability
   0    1    2    3    4    5    6    7    8    9    10

   Sepsis
   0    1    2    3    4    5    6    7    8    9    10

   Acute Neurologic Insults
   0    1    2    3    4    5    6    7    8    9    10

   Acute electrolyte and endocrine disorders
   0    1    2    3    4    5    6    7    8    9    10

   Acute renal failure
   0    1    2    3    4    5    6    7    8    9    10

   Coagulation disorders
   0    1    2    3    4    5    6    7    8    9    10

   Overdoses and Poisonings
   0    1    2    3    4    5    6    7    8    9    10
11. Please carefully look over all the nine profiles below, which describe your ideal pediatric critical care experience regarding resident clinical supervision, resident procedural supervision, the teaching format and the resident evaluation process. Then rank all the profiles from 9 (best) to 1 (worst).

<table>
<thead>
<tr>
<th>Profile</th>
<th>Clinical</th>
<th>Procedural</th>
<th>Teaching Style</th>
<th>Resident Evaluation</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Independent after demonstrating ability</td>
<td>Tightly structured with close supervision</td>
<td>Scheduled formal lectures with prep reading</td>
<td>Oral interview with attending</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Tightly structured with close supervision</td>
<td>Flexible with supervision</td>
<td>Independent study program</td>
<td>Oral interview with attending</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Tightly structured with close supervision</td>
<td>Tightly structured with close supervision</td>
<td>Interactive patient rounds with attending</td>
<td>Essay response to case scenarios</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Flexible with supervision</td>
<td>Independent after demonstrating ability</td>
<td>Interactive patient rounds with attending</td>
<td>Oral interview with critical care attending</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Flexible with supervision</td>
<td>Tightly structured with close supervision</td>
<td>Independent study program</td>
<td>Presentation</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Flexible with supervision</td>
<td>Flexible with supervision</td>
<td>Scheduled lectures, reading preparation</td>
<td>Essay response to case scenarios</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Independent after demonstrating ability</td>
<td>Independent after demonstrating ability</td>
<td>Independent study program</td>
<td>Essay response to case scenarios</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Tightly structured with close supervision</td>
<td>Independent after demonstrating ability</td>
<td>Scheduled lectures, reading preparation</td>
<td>Presentation</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Tightly structured with close supervision</td>
<td>Flexible with supervision</td>
<td>Interactive patient rounds with attending</td>
<td>Presentation</td>
<td></td>
</tr>
</tbody>
</table>
Critical Care Practice Pattern Survey for Previous Alfred I. duPont Hospital for Children PICU Rotation Residents

1. How long have you been in practice?
   ---< 1 yr        ---1-3 yr

2. Have you achieved board certification in your specialty?
   ---YES
   ---NO

3. Type of present practice setting
   ---Private pediatric practice
   ---Private combined pediatric and adult practice
   ---Group pediatric practice
   ---Group, combined pediatric and adult practice
   ---Multispecialty pediatric practice
   ---Multispecialty practice (adult and children)
   ---Hospital based pediatric practice
   ---Hospital based adult and pediatric practice
   ---Emergency Room Practice
     ---Community Hospital (adult and children)
     ---University Hospital (adult and children)
     ---Children’s Hospital ER
   ---Fellowship
     Type ____________
   ---Basic Science Research
   ---Other ___________________

4. Population base of present practice location
   ---<20,000
   ---21,000-50,000
   ---51,000 - 100,000
   ---101,000- 500,000
   ---501,000- 1,000,000
   --->1,000,000

5. WHICH of the following did you formally attend during your residency program?
   ---BLS for Healthcare Provider
   ---PALS
   ---APLS
   ---ATLS
   ---ACLS
6. How confident do you feel that you will be able to recognize and initially stabilize any acutely ill or injured child or adolescent who presents to you in your present clinical setting?

Circle your confidence level on a scale from 1 to 10 (10 being the most confident.).

1  2  3  4  5  6  7  8  9  10

7. In your present clinical setting, how often do you find that you are the primary physician who must deal with children and adolescents who initially present with the following acute, life threatening problems?

Please circle the appropriate letter next to each problem below.  
D=Daily, W=Weekly, M=Monthly, Y=Yearly, N=Never

<table>
<thead>
<tr>
<th>Problem</th>
<th>D</th>
<th>W</th>
<th>M</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiopulmonary Arrest</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Multiple Trauma</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Preoperative and postoperative management of pediatric surgical patients in the PICU</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Acute respiratory failure requiring intubation and mechanical ventilation</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Upper airway obstruction from foreign bodies and infection</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Septic shock</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Hemodynamic instability requiring various inotropes, pressors and vasodilators</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Coma</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Intracranial hemorrhage</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Increased intracranial pressure monitoring and management</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Status epilepticus requiring multiple IV anticonvulsants</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Overdoses and poisonings requiring intensive respiratory, cardiovascular and neurologic support</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Acute electrolyte and endocrine disorders</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Coagulation disorders such as DIC or thrombosis</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Child with Multiple Organ System Dysfunction</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Provide Sedation, Analgesia, and Neuromuscular Blockade to the Critically Ill child</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Talk with parents about a child who is dying or suddenly dies from a serious illness or injury</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Withhold or withdraw life support from a child or adolescent</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Discuss DNAR for a seriously ill or injured child or adolescent</td>
<td>D</td>
<td>W</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>
8. In your present clinical setting, are **you** the primary physician who manages children and adolescents with the following acute, life threatening problems until they are ready from discharge from the hospital?

**Please circle for each problem below.**

**Y=YES  N=NO**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Y</th>
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<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Upper airway obstruction from foreign bodies and infection</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Septic shock</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Hemodynamic instability requiring various inotropes, pressors and vasodilators</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Coma</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Intracranial hemorrhage</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Increased intracranial pressure monitoring and management</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Status epilepticus requiring multiple IV anticonvulsants</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Overdoses and poisonings requiring intensive respiratory, cardiovascular and neurologic support</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Acute electrolyte and endocrine disorders</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Coagulation disorders such as DIC or thrombosis</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Child with Multiple Organ System Dysfunction</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Provide Sedation, Analgesia, and Neuromuscular Blockade to the Critically Ill Child</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Child or adolescent requiring central hyperalimentation</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>
9. In your present clinical setting, how often do you find yourself having to perform the following procedures on children and adolescents?

**Please circle the appropriate letter next to each procedure below.**

**D=Daily, W=Weekly, M=Monthly, Y=Yearly, N=Never**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>D</th>
<th>W</th>
<th>M</th>
<th>Y</th>
<th>N</th>
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</thead>
<tbody>
<tr>
<td>Maintenance of an open airway in the nonintubated patient</td>
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<tr>
<td>Ventilation by bag-mask systems</td>
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<tr>
<td>Tracheal intubation</td>
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<tr>
<td>Acutely change a tracheostomy tube</td>
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<tr>
<td>Removal of upper airway foreign bodies</td>
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<tr>
<td>Temporary surgical airway</td>
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<tr>
<td>Management of pneumothorax</td>
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<tr>
<td>Insertion of central venous catheters</td>
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<tr>
<td>Insertion of pulmonary artery catheter and interpretation of hemodynamic data</td>
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<tr>
<td>Insertion of arterial catheters</td>
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<tr>
<td>Pericardiocentesis for acute tamponade</td>
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<tr>
<td>Dynamic electrocardiogram interpretation</td>
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<td>Transcutaneous pacing</td>
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<td>Elective Cardioversion</td>
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<tr>
<td>Defibrillation</td>
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</tbody>
</table>
10. After seeing what is expected from you in your present clinical situation, what would you request from the critical care attendings if you could do the one month second year resident PICU rotation at Alfred I. duPont Hospital for Children over again?

11. What additional course work or practicums have you taken that address pediatric critical care competencies?
PICU
Resident Rotation
Activity
Procedures performed among 215 residents during their PICU rotation

Percent residents who performed intubations in the PICU

![Bar chart showing the number of intubations performed by residents during their PICU rotation. The chart includes data for TJU Pediatrics (86), Medicine - Pediatrics (16), TJU ER (54), and Christiana ER (59).]
Percent residents who placed femoral venous catheters in the PICU

Number of femoral venous lines

- TJU Pediatrics (86)
- Medicine - Pediatrics (16)
- TJU ER (54)
- Christiana ER (59)

Percent residents who placed internal jugular venous lines in PICU

Number of internal jugular venous lines

- TJU Pediatrics (86)
- Medicine - Pediatrics (16)
- TJU ER (54)
- Christiana ER (59)
Percent residents who placed subclavian venous lines in the PICU

![Bar Chart]

<table>
<thead>
<tr>
<th>Number of subclavian venous lines</th>
<th>TJU Pediatrics (86)</th>
<th>Medicine -Pediatrics (16)</th>
<th>TJU ER (54)</th>
<th>Christiana ER (59)</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

U/Ecullen/Word/Education/Resident/Reports/PICUresidentreviewapril2006 86
Percent residents who placed chest tubes during the PICU rotation

Number of chest tubes placed

TJU Pediatrics (86)  Medicine -Pediatrics (16)  TJU ER (54)  Christiana ER (59)

Percent residents who performed defibrillations during the PICU

Number of defibrillations

TJU Pediatrics (86)  Medicine -Pediatrics (16)  TJU ER (54)  Christiana ER (59)
Percent residents (n=215) who performed cardioversion during PICU rotation

0%

Percent residents who performed external pacing during the PICU rotation

![Bar chart showing the number of external pacing among different departments: TJU Pediatrics (86), Medicine - Pediatrics (16), TJU ER (54), Christiana ER (59).]
Percent residents who participated in a pediatric code during the PICU rotation

Number of pediatric code participation

<table>
<thead>
<tr>
<th>Number</th>
<th>TJU Pediatrics (86)</th>
<th>Medicine -Pediatrics (16)</th>
<th>TJU ER (54)</th>
<th>Christiana ER (59)</th>
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</table>

Percent residents who ran a pediatric code during the PICU rotation

Number ran a pediatric code

<table>
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<tr>
<th>Number</th>
<th>TJU Pediatrics (86)</th>
<th>Medicine -Pediatrics (16)</th>
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<th>Christiana ER (59)</th>
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</table>
Average scores on the SCCM post-PICU test for 189 Residents
Self reported comfort level after the PICU rotation regarding initial recognition and stabilization of a critically ill child

10= independence … 1=no confidence
From PICU Data Base –
Voluntary self reported data from residents at the end of their PICU rotation

Resident overall evaluations of PICU Rotation – Average scores on Likert Scale

4. Exceeds Expectations
3. Meets expectations
2. Needs Improvement
1. Major area of deficiency

<table>
<thead>
<tr>
<th></th>
<th>Thomas Jefferson Pediatrics</th>
<th>Christiana Care MedPeds</th>
<th>Thomas Jefferson Emergency Medicine</th>
<th>Christiana Care Emergency Medicine</th>
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</tbody>
</table>

Combined 2004, 2005, 2006 Data from Pediatric Residency Program Forms –
Evaluation of PICU Rotation:

Overall score given to rotation
(1) weak- (5) average rotation - 10( great rotation)

Average score = 7.94 (Range 4 – 10)

Rotation Quality
(1) Poor    (2)(3) Average    (4)(5) Excellent

<table>
<thead>
<tr>
<th>Goals of rotation defined and clear</th>
<th>3.83</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to complete goals and objectives</td>
<td>3.58</td>
</tr>
<tr>
<td>Balance of service and education</td>
<td>3.08</td>
</tr>
<tr>
<td>Overall organization of the rotation</td>
<td>3.54</td>
</tr>
</tbody>
</table>
Residents’ comments about PICU Rotation

1997

Thomas Jefferson Pediatrics
I feel I learned a great deal and gained clinical confidence. I would like to do more. Great learning. Attending good
I am very happy with the rotation and would recommend increasing the number of blocks scheduled here vs NICU. I am confident all other residents concur with the idea.
Very little teaching this month-formally or informally. had expected a rotation strong in experience and teaching/learning.
Wish I could do additional time instead of so much NICU.
I'm much more comfortable with certain types of patients now (eg DKA, Septic shock)

Thomas Jefferson Emergency Medicine
I feel that I've learned a lot in my 5 weeks and that the teaching was excellent. Highly recommend. Wonderful experience
Excellent overall rotation. Excellent teaching and involvement with attendings.
Thank you for all your help and teaching. I really enjoyed and learned much from my month here.
Except for the computer, I had a great time

Christiana Care Emergency Medicine
I had a very diverse and nice experience - thank you
Feel more comfortable with sick kids and determining if kid is sick
The PICU was interesting and all the attendings were friendly,willing to teach, and clinically excellent.
Good nursing staff and clerical staff

Christiana Care Medicine Pediatrics

1998

Thomas Jefferson Pediatrics
Wished more time here. Need longer time for broader exposure
I only did 4 weeks. Six to 8 weeks would probably be better.
Very minimal teaching during morning rounds. Not enough teaching. Attendings did procedures that should be done by residents. Not able to attend grand rounds or morning report. Not being involved in decision making- many times nurses would just talk to attending about patients without involving residents. Needs less residents / more patients for proper experience.

Thomas Jefferson Emergency Medicine
It was just a slow month for me.
Need more opportunities for procedures.
It's nobody's fault that this month was slow and I'm a "white cloud" during my calls.

Christiana Care Emergency Medicine
However, I feel that there were too many residents on service, making it difficult to see/have an adequate number of patients. I also feel that some admissions to the PICU were not warranted and took away from true PICU learning experience.
I don't feel that the level of acuity or the volume of patients was adequate to give me the level of confidence I need to manage critically ill children.
The textbook (Peds Intensive Care) was surprisingly not too helpful. Too much irrelevent discussion, not enough useful information.
Rotation was great. I just am not sure that I would comfortable running a pediatric code yet.
Christiana Care Medicine Pediatrics
The rotation would be more solid an experience if there were discussions in either topics or complicated patients. There seemed to be minimal education in rounds; most of the day was spent trying to find things to do, with 6 residents on service.

1999

Thomas Jefferson Pediatrics
Excellent lectures by attending! Dr Cullen, shock and Dr Hertzog on rounds. Complicated patients with wide variety of diagnosis, interesting and challenging. Adds depth to understanding how to manage patients in general. I feel I've should have been exposed to it during our intern year with some resident supervision. Good rotation. Wish I had seen more acute problems and less chronic problems.

Christiana Care Emergency Medicine
Overall a good experience.

2000

Thomas Jefferson Pediatrics
Not a bad rotation overall-good teaching, interesting patients, a few procedures. BUT weren't we supposed to be doing critical care? The attendings are universally wonderful. They provide a good amount of teaching on rounds. I wish when attendings went to the bedside to evaluate a patient and change management, I wish I could be present so I could understand the reasoning behind the changes and what patient findings led to the changes. This happened 25% or so. I am not sure if this is.

Thomas Jefferson Emergency Medicine
I must also say how incredible the nurses are, especially Mary Beth, JillSyteph and Sandy who taught me so much. Residents need independence.

Christiana Care Emergency Medicine
Enjoyable time and educational. Good month. I learned a lot of relevant things without being bogged down with information that I will never use again. We had a few very sick kids and a lot of kids for "observation". Learned a lot from a few-wish there had been more sick kids.

Christiana Care Medicine Pediatrics
I enjoyed the exposure to ill patients, though I found much of the structure of PICU frustrating.
2001

_Thomas Jefferson Pediatrics_
Need more time! 4 weeks out of 36 months is unreasonable.

_Thomas Jefferson Emergency Medicine_
Except lack of procedures. There should be a better efficiency in resident staffing, call schedules.

_Christiana Care Emergency Medicine_
Need more independent thought. Less order entry. More procedures.

2002

_Thomas Jefferson Pediatrics_
Encouraged about a career in critical care. I felt that the continuity of attendings is an area that needs improvement. Great rotation, interesting cases. Great attendings. Got procedures (central line, intubation).

_Christiana Care Emergency Medicine_

_Christiana Care Medicine Pediatrics_

2003

_Thomas Jefferson Pediatrics_
I had a great rotation, learned a lot and gained confidence in caring for seriously ill children.

_Christiana Care Emergency Medicine_
Excellent EBM emphasis during this month. Many opportunities for literature research. This month was good in all the ways I have said already. The one thing that wasn't so useful was following the kids who had chronic problems or were just waiting for teaching. Maybe there should be kids that are made “non-teaching” so that our time isn't spent getting numbers and repeating notes on kids that we're very unlikely to learn anything from.

_Christiana Care Medicine Pediatrics_
Residents comments - Strongest assets of PICU rotation

The acuity.

The attendings.

Teaching by attending during rounds.

Great teaching. Variety of patients.

The amount and quality of clinical exposure.

The attendings were superb as well as the exposure.

Number of patients.

I learned a great deal every day about critical care medicine.

Ability to have appropriate independence regarding ICU care.

Variety of patients seen; independence given.

Teaching by Dr Penfil. Level of involvement with your patient.

Teaching by attendings.

Teaching during rounds; daily teaching by Fellow, willingness of attendings for residents to participate in family meetings, especially when giving bad news.

PICU teaching

Learning how to assess and take are of a critically ill patient; excellent teaching from the attendings. The ability to spend more time with patients.

Great teaching – attendings very interested in education. Nurses, RTs teach too.

Type of patients – great variety. Intensity of care. Great nursing staff.

Exposure to acute critically ill children as well as exposure to post-op complications and dilemmas. Excellent teaching by attendings and positive interaction with nursing staff.

Had lots of potential;

Teaching by attendings.

Wonderful teachers.

Interesting patients.

Teaching on rounds. Ability to do procedures.

Opportunity to learn procedures; deal with emergent situations.

Excellent teaching by attendings.
PICU Resident overall evaluations of critical care attendings – average scores on Likert Scale

4. Exceeds expectations  
3. Meets expectations  
2. Needs improvement  
1. Major area of deficiency

Costarino

<table>
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<tr>
<th>Year</th>
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Cullen

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**Effective Teacher – 2004**

Ranking: 1 2 3 4 5 (best)

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**Overall rating of attending – 2004**

(1) weak (5) average (10) great

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**Evaluation of attending PICU physician – 2005**

(1) Poor (2)(3) Average (4)(5) Excellent

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**Amount of teaching done by attendings** (1) is not enough (2) just right (3) too much

Average score = 1.83
Self Reported Pediatric Critical Care Experiences of Previous PICU Residents during Their First Year in Practice
PICU participating residents (n=196) self reported need to perform cardiopulmonary resuscitation on a child during their first year of practice

N=never  D=daily  W=weekly  M=Monthly  Y=yearly

PICU participating residents (n=194) self reported need to intubate and ventilate a child for respiratory failure during their first year of practice

N=never  D=daily  W=weekly  M=Monthly  Y=yearly
PICU participating residents (n=196) self reported need to treat a child with septic shock during their first year of practice

N=never  D=daily  W=weekly  M=Monthly  Y=yearly

![Bar chart showing the self-reported need to treat a child with septic shock during the first year of practice by PICU residents from different institutions.](chart.png)
PICU participating residents (n=194) self reported need to manage a child with increased intracranial pressure monitoring during their first year of practice

N=never  D=daily  W=weekly  M=Monthly  Y=yearly
PICU participating residents (n=195) self reported need to manage a child with multiple organ system dysfunction during their first year of practice

N=never  D=daily  W=weekly  M=Monthly  Y=yearly

PICU participating residents (n=192) self reported need to place a central venous catheter in a child during their first year of practice

N=never  D=daily  W=weekly  M=Monthly  Y=yearly
PICU participating residents (n=192) self reported need to place a chest tube in a child during their first year of practice

N=never    D=daily    W=weekly    M=Monthly    Y=yearly

---

TJU Pediatrics  Medicine -Pediatrics  TJU ER  Christiana ER
PICU participating residents (n=192) self reported need to defibrillate a child during their first year of practice

N=never  D=daily  W=weekly  M=Monthly  Y=yearly
Comments on improving PICU Resident Rotation from residents (n=205) who are in their first year of practice

Thomas Jefferson University Pediatric Residents

More time with practicing intubation (in the OR if necessary) - in particular while maintaining in line traction. Management of multiple trauma in the first few hours in ER setting.

Going with transport for initial assessment and stabilization. Working more on IV access.

More hands on line placement, intubation and running codes.

We should have more PICU experience required in our training. (As chief resident we have very little clinical duties).

More case presentations when census is low, where residents work through the management of example patients.

More practice codes

I felt this was an excellent experience. Although I do not use these skills on a regular basis, my experience in the PICU provides confidence that I would be able to provide critical care until more intensive care became available.

Yes, to update and maintain certain skills that although will not be used often, are very important when the need arises

Nothing additional.

Have an anesthesia day to practice/learn intubation of older children with teeth. We rarely had opportunities to intubate larger children and adolescents during the whole residency.

In my setting, the only thing we should rarely encounter would be respiratory distress or seizures. More attempts at extubations would be helpful.

Continued mock code scenarios

More mock code practices, since fortunately the real ones don't happen that often in peds. More Mock code experiences in stabilizing patients. Get good at handling emergency equipment and what to do on transports.

Acute management of neurologic emergencies (status epilepticus, increased ICP, etc.)

Additional time to perhaps spend with a trauma service (I.e., MCD). Practice with intubation of the older child (perhaps with cadaver if available).

No change. Continue with weekly mock codes

More procedures.

Initial evaluation, stabilization of acutely ill child. Evaluation of floor patients for appropriate ICU transfer.

Maximize opportunities to perform invasive procedures.
I felt very prepared although I am in an office setting. Recognize very sick children who may present to my office. It was a great rotation.

I would have had more time in the ICU altogether. I don't think that one month is enough to appreciate and feel comfortable with anything.

Perhaps 2 to 3 days in OR practicing ET intubation and airway management in non-urgent situations.

More bedside teaching. Longer or additional PICU rotation (I month is not enough exposure). Attendings should encourage more independent thought by residents.

Would have liked more time in the PICU.

Emphasis on early recognition of acute disorders when possible. Do > 1 month in PICU.

The rotation was more than adequate.

Perhaps more autonomy / experience when performing procedures. (e.g. lines, intubation)

More mock codes addressing endocrine, cardiac arrest, brain injury monitoring and management. More Procedures—even if not in real patients, arterial lines, central access (not umbilical), pericardiocentesis.

Nothing from the attending. But I had very few seriously/critically ill children during my 1 1/2 months in the PICU. More bad luck than anything.

Lectures on different types of shock/ anaphylaxis

No suggested changes.

Fortunately and unfortunately there are not many children requiring aggressive resuscitation or procedures. The ability to do more procedures would have been helpful.

As a primary pediatrician, I feel my one month in the PICU was very educational. Possibly doing more mock codes

I would have liked more experience in initially stabilizing patients (mock codes, etc.). I am in a strictly outpatient setting and have had little need to do more than the initial stabilization.

More lectures and discussions regarding disease process seen in PICU, the course of these diseases prior to presenting to the PICU and post-PICU care / follow up. Practice of initial stabilization / code situations.

Nothing. I felt very prepared for my fellowship in PICU.

Nothing really different. Although I am not as clinically involved this year, I feel like I had an excellent education in the PICU and that I am well prepared for emergencies. It really was one of my favorite rotations of residency. Excellent teaching.

More "hands on" training - procedures, etc. Frequent "drills" on acute management / stabilization. HAND WRITTEN ORDERS!

Nothing. Although I am not providing critical care now, the experience was very helpful and enjoyable.

Allow residents to perform procedures including intubations, CVL placement. Guidance in placing PICU lines.
Even though I don't use the skills I learned in the PICU, I think it is very important to have learned them. It's important to be able to recognize a critically ill patient and to understand how they are treated. As a general pediatrician we educate parents about PICU care even if we don't perform it.

Review EKGs more often. Discuss the basics of monitoring similar to discussion we had with respiratory therapy and ventilators. Part of one day spend going over the monitors, etc.

Allow residents to do more procedures.

Great rotation. Well organized, lots of teaching. Good amount of patients and pathology.

More mock codes.

Nothing additional, especially when considering my current specialty situation.

Now I have exposed to other PICU, I thought at duPont our PICU patient were more respiratory / general peds patient such as DM, asthma, RSV. At UCLA, there are more end stage multiorgan failure patients and more procedures to do. The only thing I thought I wasn't very comfortable with procedures, I didn't do that many.

How to best manage a critically ill child and stabilize the child with limited resources, i.e.: in rural office setting.

More hands on management of patients.

More hand on experience. More of attending explaining why/how to manage various situations instead of telling you what to do. Mock codes very helpful-try to have these more frequently.

More mock codes- the PICU and/or ER rotations are two best settings to practice this. No other rotations give consistent practice with this. I scored will above the national average for critical care section of pediatric boards (my highest section). Thanks for the prep.

The knowledge is helpful. In the current setting I have hospitalists and intensivists within easy reach.

I was very happy with my PICU rotation.

More office based interventions in critically ill patients.

More basic sepsis, airway with intubation, DKA, asthma, and less post-op transplant, spinal fusion, ex-NICU management.

I don't see many critically injured patients at my present position, however we have a crash cart in our office just in case. The PICU rotation was very valuable as a 3rd year resident being in charge at Christiana or Jefferson. I believe residents should do 8 weeks of PICU. One month is not enough! The exposure is limited in a 1 month time span. If you have many

More opportunities to do procedures. More mock codes, More exposure to very ill patients and a wider range of problems (not really something the attendings can change).

The only limitation to the rotation was low patient volume and generally lower acuity than may be seen elsewhere. Both are a function of patient population base not rotational setup.

Yes, mainly because there were multiple chronic patients (> 1/2 of census) when I did my PICU therefore did not see much acute pediatric intensive care. I realize that this changes on a regular basis. I did not intubate one child in PICU or place any femoral lines or manage an OD/Poisoning, cardiac abnormalities or arrhythmias.
More intubations in older kids.

Very pleased with PICU / ER training.

More exposure to mock codes/codes, acute problems and less exposure to chronically sick kids with tracheostomy management.

Since my needs will be for office stabilization, more exposure or code drills (mock) to better prepare for patients who "go bad" in the office setting.

Management of airway, recognizing impending airway obstruction. Management of DKA. No Endocrinologist; have to deal with new onset DKA. Electrolyte, fluid management.

Since I am only clinical 1 day a week in my fellowship, I have not encountered critical care although I did have to rule out malignant hyperthermia once.

**Christiana Care Medicine-Pediatric Residents**

More experience treating trauma patients (if possible).

More emphasis on conscious sedation guidelines for procedures, i.e. lumbar punctures, etc.


Given present situation, nothing. However, would have liked more procedures in the PICU. I felt like I did not do any procedures.

Less post op surgical patients.

More procedures if possible would be useful. Mock codes without pediatric equipment or labs available might be useful for preparation in some outpatient settings.

More mock situations or practice scenarios; more lectures. I had almost none since it was around holiday time.

**Thomas Jefferson University Emergency Medicine Residents**

Excellent overall month. Could probably have used more procedures.

Excellent rotation. Continue Mock Codes.

More procedures would be good. Acute (ED) diagnosis and management of infants/neonates with metabolic abnormalities and/or congenital cardiovascular disorders.

For me as a ED attending, time spent in the ED is more akin to the kind of treatment I do. An intense Ped ED month in addition to PICU would be better.

More procedures including central lines and chest tubes, etc. More exposure to acutely ill children in an ED setting.

More experience intubating children. Review surgical airway in pediatrics. Mock Codes were helpful.
I would not change anything about the rotation. The critical care attendings were great and I learned a tremendous amount which I use in practice on a daily basis.

A longer rotation! I loved the AI experience.

It was a great rotation. I learned a lot in 1 month.

More mock codes! Great tool. It was a great experience. I had a great time at A.I.

Pediatric ventilator management. Procedure lab.

Adequate training provided in the 4 week block - no suggestions.

More teaching about the basic acute care of "normal" children as opposed to care of chronic problems with chronically ill children. More procedures to be done by by residents and fellows instead of attendings while residents and fellows round.

More acutely ill children from the ED as opposed to post-operative patients.

Designated time in OR for intubations. More practice with IV access including central lines. More time in NICU.

More protocols for meeting common critical illnesses in pediatrics such as DKA, Asthma, Croup, etc. rather than each attending doing their own potpourri of treatments.

More pediatric sedation / anesthesia.

How to deal with parents of both very ill children and children that are relatively ill but whose parents believe they are near death. In other words, parents can be unreasonable with respect to their children's care.

More procedures.

Emphasis on initial resuscitation of the critically ill child (as ED physician). Mock codes helped a lot!

No request. Excellent rotation.

I would spend "down time" in the OR with the anesthesiologists practicing intubations or reviewing meds

More Mock Codes

More intubations.

More mock codes. Emphasis on PALS and APLS classes.

Adequate training for my private care setting.

More procedures.

Sepsis management. Procedural skills (intubation/lines, etc.). The mock codes gave me a great learning tool that continues to serve me well.

Status epilepticus. More intubations / more lines. More pediatric sedation.
Peds anesthesia for more intubations.


Mock codes were great, but 1-2 x were cancelled; would like to have these mock codes at least 2x a week.

More intubations. More critical procedures (central lines, chest tubes)

More procedures and independent thinking.

I think that the only thing to enhance the educational experience would be to spend more time in the PICU at duPont.

More mock codes but not in such a formal setting.

More airway management. Overall, great rotation.

More Mock Codes

More intubations - if not in PICU, in OR with anesthesia supervision.

Continue Mock Codes or increase their frequency. Give residents the opportunity to have more input into critical care decisions with patients

Christiana Care Emergency Medicine Residents

More hands on experience

Patient volume limits procedure experience. Good mix of pathology.

More central lines.

ICU rotation at AIDI is excellent. Not having fellows is a huge advantage. I would expand ventilator management and go through pediatric procedures. Otherwise, don't change a thing!

More Mock Clinical Scenarios

More teaching on acute stabilization of pediatric patients.

It was an educational rotation

Less post op. Patients & feeders/growers. I would like more training in acutely medically ill children, but with the numbers of patients, I know this is difficult in the one-month period.

The biggest problem with the PICU rotation was that the majority of procedure opportunities were performed by the critical care attending without the resident being allowed to attempt the procedure-the patients were deemed "too irritable".

More intubations in the OR.

Less time on the topic of ventilator management-too much detail for the ER doctor. Overall, it was a great month- the one on one with the attending is unmatched by any other inpatient month I have done.
I don't know that I would change anything. My present clinical situation may change but at least I've had a solid education.

I felt like I needed more intubation experience, but I'm not sure how to increase that.

More intubation, more ventilator management. Overall, my experience was excellent with you guys. More chest tubes, arterial lines. Spend a few days in the OR with McCloskey learning oral elective intubations

More practice scenarios-clinical situations.

Nothing. I feel it was an excellent experience.

Few times per week, intensive discussion on critical care issues: DKA, increased ICP. Going through the cases in books provided for PICU rotation (they were excellent books). More PALS didactics.

Don't turn us into clerks and just have us input orders. If you don't trust us, stay in house and work with us but let us be active in patient care and decision making.

Perhaps ore didactic teaching since many pediatric critical illness situations occur so infrequently that they cannot be learned from experience alone.

More experience with initial management of life threatening illnesses or at least discussion and case scenarios

Need more practical procedural experiences.

The rotation was well organized. Some of the learning was based on the clinical experience based on how sick the patients were - cannot be controlled.

More procedure practice, including intubations.

More procedures

More independence in caring for the critically ill. Less time siting at the computer putting in orders for the attending.

For ER resident, there are too many chronic children there.

Encourage independent thinking and autonomy.

More hands on procedures. Mock codes

More PALS simulations.

More didactic and skill sessions on procedures. Simulation.

Airway experience in OR setting since few ICU intubations.

More procedures! More intubations (I didn't get any).

More specific focus on the more common acute emergencies, such as status epilepticus, anaphylaxis, status asthmaticus, multiple trauma, and sepsis in the infant.

I am at a setting which does not see pediatric patients - which is unfortunate because I do not want to loose the skills which I've learned. I would jave liked the opportunity for more procedures in the PICU.

Transtracheal jet ventilation (set up and procedure); insertion central venous catheters. One to two days of anesthesia practicing child intubation. Thanks for a great rotation.

Intubate children with ventilator management. Central line and arterial line placement.

No changes.

More didactics about critical care, reviewing risks, benefits and indications of procedures not often performed.

More didactics since the clinical experience is very unpredictable, for example, most of your patients are chronic non-ill patients and / or postop non-ill patients.

Need to have a larger role on managing very sick children, I.e be the team leader. The fellow has usurped this role from residents.

Good rotation. No specific recommendations. Good learning experience.
PICU Resident Rotation

Publications

Awards
**PICU Publications regarding PICU resident education**


**PICU Abstracts regarding PICU resident education**


Cullen EJ, Lawless ST, Nadkarni VM, McCloskey JJ, Corddry DH, Kettrick RG (sponsored by Alan Spitzer) Department of Anesthesia/Critical Care, Alfred I. duPont Hospital for Children, Wilmington, DE: Assessing resident (RES) desired education delivery styles in pediatric intensive care (PICU). *Abstract of Pediatric Research* 1996;39:777A

Cullen EJ, Lawless ST, Corddry DH (sponsored by John Stefano) Pediatric Anesthesiology/Critical Care, Alfred I. duPont Hospital for Children, Wilmington, DE: The mismatch between attending (Attnld) and Resident (Res) desired education delivery styles in pediatric intensive care (PICU). *Abstract of Pediatric Research* 1997; 41:1774A


Cullen EJ, Lawless ST, Nadkarni VM, McCloskey J, Corddry DH: Pediatric Anesthesia and Critical Care, Alfred I. duPont Hospital for Children, Wilmington, DE (sponsored by John L. Stefano): Adjusting to resident learner (RL) needs during pediatric (PICU) rotation. *Abstract of Pediatric Research* 1999; 42:76A

Cullen EJ, Lawless ST, Nadkarni VM, McCloskey J, Corddry DH: Pediatric Anesthesiology and Critical Care Medicine, Alfred I. du Pont Hospital for Children, Wilmington, DE (sponsored by John L. Stefano): PICU resident learner (RL), resident educator (RE) and utility scores. *Abstract of Pediatric Research* 1999; 42:76A


**PICU Poster Presentations regarding PICU resident education**


Cullen EJ, Lawless ST, Corddry DH: Pediatric Anesthesiology/Critical Care, Alfred I. duPont Hospital for Children, Wilmington, DE: The mismatch between attending and resident desired education delivery styles in pediatric intensive care. Tenth Annual Pediatric Critical Care Colloquium, Hot Springs, AK, September, 1997


**PICU Teaching Award**

Critical Care Medicine received the Alfred I. duPont Division Teaching Award by the 2002-2003 Pediatric House Staff for excellence and commitment to resident education.
Financial Resources
Financial Sources for Resident Teaching

Physicians

**Nemours Foundation**

10% of Nemours Physician salaried hours are expected to be spent in educational activity.

Nemours Foundation provides a separate educational fund. Nemours practice site CEOs and department chairpersons distribute these funds to further support Nemours physicians’ educational activities. It is not known how much is actually available for PICU resident education.

There is no specific RVU equivalent for educational activity.

**Graduate Medical Education Payment Program**

Centers for Medicare and Medicaid Services, Health Resources and Services Administration, Children’s Hospitals Graduate Education Payment Program provides GME funds divided between Indirect Medical Education (IME) funds to the teaching hospital and Direct Medical Education (DME) funds directed towards resident salaries, physician teacher compensation and educational material.

Historically, Alfred I duPont Hospital for Children receives no IME allotment for residents rotating in our PICU from non-pediatric programs.

Historically, the DME allotment for PICU physicians to teach PICU residents at Alfred I duPont Hospital for Children is not available after you subtract resident salaries from the available DME.

*Pediatric 2003;112(1):40-48*

**Multidisciplinary Team**

PICU Pharmacists, PICU Nurses and Nursing Staff Development, PICU Respiratory Therapists and Medical Reference Librarian participation in PICU resident teaching is covered by their respective cost centers.

**Educational Materials**

The Department of Anesthesiology & Critical Care, Alfred I duPont Hospital for Children provides funds for critical care textbooks and other educational material as needed.

**Secretarial Support for PICU Resident Educational Program**

The Department of Anesthesiology & Critical Care, Alfred I duPont Hospital for Children provides secretarial financial support.
Future
**Strengths of the PICU Resident Training Program**

- 22-bed Medical & Surgical family oriented PICU unit
- Board certified pediatric critical care physicians
- Multidisciplinary patient care approach
- Pediatric critical care physician as role models and as supervisors of residents during the day and most of the night.
- PICU rotation meets ACGME work hours
- PICU Resident Rotation Coordinator
- PICU resident rotation maintenance program for monthly rotations
- Structured introduction material for new residents on first day of PICU rotation.
- Monitoring system maintained in an Access Data Base (pre-rotation questionnaire, patient log, procedure log, work hour log, evaluation of and suggestion for improved PICU rotation, survey of residents in practice)
- Nemours internet web site for PICU Resident Rotation
- Critical care attending mentor identified for each individual PICU resident
- Nemours Desktop internet resources (search engines, medical library journal availability, evidence based medicine resources, PICU article collection).
- Internet access to SCCM lecture series for PICU residents.
- Internet access to national SCCM post-PICU rotation test.
- Critical care textbooks on-site in the PICU
- Evidence-based journal club
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Weaknesses of the PICU Resident Training Program

Present GME payments do not fund pediatric critical care physician compensation for resident supervision and educational efforts.
Funding for PICU nursing and respiratory therapy support is voluntary.
There is lack of sufficient time to introduce residents to the PICU rotation.
Large part of first PICU day for visiting residents is spent in computer training labs.
Residents spend too much time entering orders through the Cerner computer entry system.
Resident autonomy.
Lacking a procedural lab for residents.
Case based learning opportunities for residents not very formalized.
Mentor system lacks concrete objectives for the individual resident and individual critical care physician.
All residents don’t voluntarily fill out pre and post-rotation questionnaires and tests.
We don’t document completion of PICU resident powerpoint presentations by residents
Very few residents voluntarily complete the SCCM post-PICU test.
There is minimal time during the PICU day for residents to do a critically appraised topic.
There is a lack of a structured objective process to show competency acquisition by residents
There is a non-existent exit interview with residents to review evaluations
Lack of Access Data Base technical support.

Opportunities for the PICU Resident Training Program

As number of critical care physicians increases, strive to maximize formal resident educational experiences and mentoring concept.

Participate in a Patient Simulation Lab being developed at Alfred I duPont Hospital for Children.

The Nemours Foundation initiative with the Centre for Health Evidence is establishing a clinical Nemours Desktop that will be able to track clinical activity and the pursuit of education around that activity. There is the potential for linking education and patient outcomes.

Become more active with SCCM pediatric critical care resident educational committee.

Coordinate PICU educational activity and resources with the proposed Nemours Children’s Hospital in Orlando, Florida.

Become a national leader in providing PICU resident education.

Threats to the PICU Resident Training Program

Educational activities do not produce RVU revenue.

If the PICU resident educational experience was fully funded, funding could be lost if one could not show that residents who complete a 1 or 2 month PICU rotation are proficient in the ACGME competencies specific for PICU residents and that this eventually leads to improved patient outcomes.
Challenges

How do we align PICU resident medical education with desired PICU health outcomes?

How do we optimize patient safety and patient quality of care while providing PICU residents with a sense of autonomy?

How do we best directly observe and document that PICU residents have met the desired ACGME competencies during their PICU rotation?

What minimum specific pediatric critical care information and skills do pediatric and emergency medicine residents really need to document competency in during their 4 or 6 week PICU rotation in order that they are prepared for their future practice settings?

How do we best present information & skills to residents during their PICU rotation?

How do we know that the information we are teaching is correct and up to date?

How do we evaluate if the PICU rotation provides residents with the skills to recognize and stabilize a critically ill child or adolescent in their future practices?

How do we finance our PICU resident educational system?

How do we show that a fully funded PICU resident educational system will improve patient outcomes?
PICU Resident Rotation

Curriculum

July 2006 to June 2007
PICU Rotation Curriculum July 2006 – June 2007

Suggestions for PICU Resident Rotation Curriculum for July 2006-June 2007

Pediatric resident PICU rotation is now 8 weeks during the PL2 year.

The PICU rotation for Thomas Jefferson ER, Christiana ER, Christiana EMIM, Christiana Medicine-Pediatrics residents remains at 4 weeks.

Residents and medical students from visiting programs will be considered for PICU rotations as long as there are not too many residents so that patient contact is not diluted for the scheduled residents.


Resident complete an on-line pre-PICU rotation questionnaire.

Residents are given access to the Nemours Desktop. This is an internet resource for medical literature search engines, medical journals, evidence based clinical medicine information, PICU article collection, Lexicomp, Micromedex, Society of Critical Care Medicine powerpoint presentations on PICU topics specifically directed towards residents in the PICU and additional educational activities.

Textbooks available in PICU
Pediatric Critical Care
Third Edition
Fuhrman/Zimmerman

Pediatric Critical Care Medicine
Slonim / Pollock

Pediatric Intensive Care, Third Edition
Mark C. Rogers

The Difficult Pediatric Airway
Anesthesiology Clinics of North America
Jalil Riazi, MD, Editor
1999

Management of Pediatric Trauma
Buntain

Critical Heart Disease in Infants and Children
Nichols, Cameron, Greeley, Lappe, Ungerleider, Wetzel

Pediatric Cardiac Intensive Care
Chang, Hanley, Wernovsky, Wessel

Illustrated Textbook of Pediatric Emergency and Critical Care Procedures
Dieckmann, Fiser, Selbst

Supportive Care of Children with Cancer
Current Therapy and Guidelines from the Children's Cancer Group
Edited by Arthur R. Ablin MD
Residents are given a short introduction to PICU on day 1. Residents are asked to complete a pre-PICU rotation questionnaire on-line. They are given handouts which describe the PICU educational format and responsibilities. They receive their Logs for primary patients, procedures, duty hours, check off sheet for completion of SCCM power-point presentations and their password for the SCCM post-test.

Visiting residents receive Cerner and Novell computer training on day 1.

Although all orders ideally should be placed in Cerner by the ordering physician, residents spend too much time at the computer entering orders when they should be interacting with patients. Residents can write orders. Residents are given our protocol for writing orders in the PICU.

There are no verbal orders in the PICU.

Residents are given our protocol for transferring PICU patients to various medical and surgical services in the general hospital areas.

Stentor is notified so that residents can view Xrays on the Stentor system.

A critical care attending is available for resident supervision during the day and night.

A critical care mentor is assigned to each PICU resident

Before patient care rounds, the resident is expected to examine their primary patients and begin the Daily Progress Note.

Although residents follow certain primary patients, they are expected to know the diagnosis and care plan for all patients.

Residents are encouraged to use patient care rounds as check-out rounds such that when rounds are over the off-going resident will have conveyed the important info to the residents who will be staying, especially the person who is on call that night (however, sometimes the night call person has seminars in the morning and doesn't attend rounds).

Daily interactive teaching rounds (beginning 0730 or 0800 on Saturdays., Sundays and holidays) occur as part of patient care rounds.

Case based discussions are encouraged during morning multidisciplinary patient-care rounds as time permits.
Residents are encouraged to ask focused clinical questions about patient care issues that arise during patient care rounds. They are encouraged to use the available resources to search the most recent medical literature and evaluate the validity, results and applicability to their patients. This information can be shared during or after patient care rounds. If a resident does a formal critically appraised topic on a specific focused clinical question, consideration will be given to sending this to the pediatric residency program. The pediatric residency program in collaboration with the Centre for Health Evidence is starting a collection of pediatric critically appraised topics.

Radiologist reviews PICU radiology studies in the PICU daily Monday-Friday at 1030.

Night call residents are expected to be in the PICU no more than 30 hours from the time they arrived the day before.

Residents are asked to review the Society of Critical Care Medicine powerpoint presentations on PICU topics at their own pace. These power-point presentations are specifically directed towards residents in the PICU. These are available on the internet: http://www.sccm.org/specialties/pediatric/picu_course/course_index.asp

Residents will document what topics they have reviewed. (Handout with topics and a check box with room for comments.)

PICU Mock Code each Friday at 1100. A designated critical care physician who is different from the PICU service physician directs the Mock Code; PICU nurse educators supply equipment and coordinate nursing and respiratory availability. All Mock Codes are documented in our PICU Resident Rotation Data Base.

Respiratory therapy provides a session on ventilators.

The Alfred I duPont Hospital for Children medical librarian attends PICU patient care rounds each Friday. Evidence-based literature reviews are emphasized.

Evidence-based Journal Club is held monthly. This is prepared by the critical care attendings and fellows. Journal clubs are documented in the PICU Resident Rotation Data Base.

PICU residents present a PICU patient to hospital morning report on the second Tuesday and the third Thursday of each 4-week rotation block. It is the responsibility of the PICU residents to designate which resident will present the chosen patient.

Pediatric critical care attendings and fellows are encouraged to give any formal lectures they wish to the residents. Documentation of this extra educational activity should be emailed to DR Cullen who will enter the information into our PICU Resident Rotation Data Base.

PICU residents, fellows, medical students, nurses and attending physicians can suggest the addition of pertinent articles to our PICU Article Collection. Request can be made to Dr Cullen who maintains this site at present.

Residents participate in on-line Society of Critical Care Medicine national test after the completion of their PICU rotation. Their scores are sent to their respective residency programs.

Two copies of the second version of the post-test are being prepared by the SCCM PICU resident rotation education committee. A third version is being prepared. The first test will be administered to first time rotators in the ICU. If the resident identifies himself or herself as a second-time rotator in the ICU, s/he will be directed to the second post-test.

Residents are asked to complete an evaluation of their PICU rotation.
Residents are asked to return their procedure logs, patient logs, duty hour logs and list of SCCM power-points reviewed. Visiting residents are asked to return their beepers, proxy card (and parking permit) to the critical care office.

Critical care physicians complete individual resident specific program evaluations forms. Residents are evaluated as to the six ACGME competencies. These evaluations are collected and sent to the appropriate residency programs. Copies of the evaluations from visiting residents are also sent to the Alfred I duPont Hospital for Children GME office.

Resident pre-rotation questionnaires, SCCM test results, and information from logs and evaluations of the PICU are entered in the PICU Resident Rotation Data Base.

Each December-January, surveys are sent to residents who have completed their PICU rotation here and are in their first year of practice or fellowship. The survey reviews their need to practice critical care in their practice settings and asks how we can better prepare them.

PICU Resident Rotation web site is updated annually in June.

**Suggested 4 week PICU Elective for Pediatric Residents who have already completed their scheduled 8 weeks of PICU rotation here at Alfred I duPont Hospital for Children:**

**Morning**
- Examine all PICU patient
- Know clinical course of all PICU patients
- Attend morning patient care rounds

**Afternoon**
- Time is used to prepare an evidence-based review of a therapy or therapies suggested for a specific PICU problem that is of interest to the resident. Topics include ARDS, Septic shock, DIC, Closed Head Injury, Renal failure support, multi organ system support, nutrition of critically ill patient.

Presentation of evidence-based review to PICU group at end of the elective.

Night call only if required by residency program needs for resident night coverage.

**Combined Transport Medicine and Anesthesia Elective**

- Approval from Drs. Arai / Brislin for the Anesthesia component and Dr. Hertzog for the Transport Medicine component of the elective.

- Only one resident may take the elective at a given time and availability of the elective may be restricted by the number of other individuals present in the operating room for educational experiences.

- Residents must be at least a PGY 3 and have completed their rotations through the PICU.

- Elective available for 2 week blocks.

- Residents should be available Monday through Friday from 7:30 AM through 4:30 PM. The residents will also be encouraged to arrange to be available for 2-3 evenings during the rotation to participate in additional transports. There is no formal night call responsibility.
Considerations for Future Plans

Continue to integrate SCCM Pediatric ICU Resident Education Committee recommendations into the Resident PICU curriculum.

Continue to investigate the use of MedRite, Cerner and Epic in order to produce a computerized PICU patient care progress note that can be shared by residents, attendings, nurses, respiratory therapy, consultants and medical students.

Continue to support the development of a simulation lab in order to practice pediatric critical care scenarios, PICU mock codes, and selective critical care procedures.

Develop mentor system into a program where individual needs of PICU residents are recognized and learning experience is optimized. This would require additional critical care physicians in order to meet the educational demands.

Have each critical care attending attend a Fundamental Critical Care Support course. Accommodate the information to the pediatric ICU. Over the first 3 days of the PICU rotation, offer this course to the PICU resident group as part of their PICU rotation. (This will require additional critical care physicians to cover the daytime PICU and spend time preparing and giving the course.)

Consider transition PICU Resident Rotation Data Base to the Alfred I duPont Hospital for Children GME office.

Continue to integrate any resident Observed evaluation tools developed by the ACGME.

- ACGME competency based outcomes must be observed and documented for each resident. To evaluate competency, one needs to directly observe and assess learners performing the tasks of real world future practice. Critical care physicians should receive training and the resources to carry out this responsibility.
- A Criterion-referenced assessment is preferred where the learner’s performance is compared with a predetermined threshold or standard as opposed to the peer comparison of norm-referenced assessment. Competencies must be defined with appropriate benchmarks and performance standards set in terms of thresholds.
Orientation To PICU Resident Rotation
Nemours Alfred I duPont Hospital for Children

Principle Clinical Responsibility

Examine your primary patient before morning and afternoon patient care rounds and frequently throughout the day and night if the child is unstable.

Keep critical care physician updated with any changes in your primary patient’s condition.

Know the general clinical course and plan of all PICU patients.

Principle Educational Objective

At the end of your PICU rotation, you should be able to recognize and initially stabilize a critically ill child or adolescent who presents with
- Acute Respiratory Failure
- Hemodynamic Instability
- Cardiopulmonary arrest
- Sepsis
- Acute Neurologic insults
- Acute electrolyte and endocrine disorders
- Acute renal failure
- Coagulation disorders
- Overdoses & Poisonings

Expectations for PICU Residents to ensure Safe, Quality Patient Care

It is expected that residents will:

- Interact professionally with the nurses, respiratory therapists, unit clerks, consultants and families in the ongoing care of the children in the PICU.
- Know the history and main clinical issues for each patient in the PICU.
- Examine assigned patients before formal rounds.
- Examine their patients frequently throughout their hours in the PICU and that they will interact with the critical care physician with any changes in the patients’ clinical course.
- Learn and use our process for presenting patients on formal rounds.
- Be prepared for and fully participate in patient care rounds.
- Have a basic knowledge of the medical issues affecting the patient they are presenting on rounds.
- Exchange up-to-date patient information with on-coming day or night resident(s).
- Will not give verbal orders.
- Will learn and utilize the PICU Order Entry Algorithm.
- Complete and document H&Ps on patients admitted to the PICU from the ER, Transport, home or Acceptance Notes for children transferred from OR, PACU or general hospital area.
- Complete a daily progress note and if appropriate procedure notes on assigned patients.
- Review indications, landmarks, procedure and complication risk for all procedures before they undertake procedures under the supervised of critical care physicians.
- Learn and utilize the PICU Transfer Algorithm.
- Assist with discharge of patients to other facilities or home.
- Assist in communicating patient updates to referring physicians.
- Be acquainted with hospital Code responsibilities and review PALS algorithms for pulseless arrest, bradycardia, tachycardia with poor & adequate perfusion.
- Be acquainted with the PICU Difficult Airway Cart.
Housekeeping Issues

- PICU morning rounds begin at 0730 on week-days and 0800 on Sat/Sun and Holidays.
- It is expected that you will examine their primary patients & collect necessary data before rounds.
- Please do not pre-date transfer summaries
- Residents will put their names next to the critical care attendings’ names on the PICU room board for those primary patients that they are following.
- In the interest of patient continuity of care, before leaving for clinic, seminar or home, residents must check out in detail the updated clinical course of their primary patients with the resident who is designated on-call and the critical care attending.
- On Sat/Sun and Holidays, the on-coming resident and the resident from night call are each responsible for examining and collecting data on half the PICU patients before rounds and completing the daily patient notes.
- ER physicians are expected to return to the PICU after their weekly morning seminars
- PICU on-call resident carries a code beeper. You are the procedure resident for codes.
- PICU residents are asked to cover for emergencies in the surgical NICU (SNICU) at night and on weekends. The neonatal nurse practitioner has to go on transport runs at times. She will update you if there are any immediate issues to check. You will be interacting with the Neonatologist when you are in the SNICU. If you are spending a lot of time in the SNICU, please tell the PICU attending that you cannot be in two places at the same time.
- Communicate any new patient changes or concerns immediately with the PICU physician in order to better attend to the child’s needs.
- Night call residents must leave the PICU no later than 30 hours after arriving in the PICU. (Night call residents are not to take new patients after 24 hours of continuous call).
- Introduce yourself to the Unit Clerks and give them your beeper numbers.
- When you page someone please let the PICU clerks know that you are expecting a call.
- Be sure to date and time all written physician orders and notes. Print your name and beeper number below your signature on notes and written orders.
- Please no eating at PICU desks.
- Please no email checking during rounds.

More details about the PICU Resident Rotation are outlined in these sections of the PICU Resident Rotation Web Site:

Administrative Issues
- General Information
- Patient Responsibilities
- Order Entry (If write orders, need to place your Beeper number under your name)
- Transfer Out of PICU Algorithm
- Surgical NICU Coverage by PICU Rotation Resident

Code Blue
- Difficult Airway Cart
- Presenting Patients on PICU Rounds
- Goals
- Curriculum

The PICU Resident Rotation Web Site can be accessed at:
PICU Resident Education

The primary PICU educational process focuses on interactive case-based teaching during patient care rounds and ongoing bedside discussions with the critical care attending regarding on-going patient care.

Additional educational resources include Mock Codes, monthly journal club, internet access to Society of Critical Care Medicine power point presentations geared toward residents in the PICU (http://www.sccm.org/specialties/pediatric/picu_course/course_index.asp)

Residents are encouraged to ask focused clinical questions during PICU rounds, find literature that addresses the question, evaluate the literature for validity, results & applicability to their patient using evidence based clinical practice principles and bring the information back to the PICU team. To facilitate this process, residents have access to the Nemours Desktop (see below).

A medical Librarian will attend PICU rounds once a week and is available for assistance via email at other times. (ljoshi@nemours.org )

Mentor

One of the critical care physicians is assigned to a resident as a mentor. This is an informal process that provides the resident with an additional contact during the PICU rotation.

Passwords

Nemours Users Guides Interactive (UGI) Desktop
Username:                                   Password:  
Jeffline, Thomas Jefferson University on-line Medical Library
Campus Key:                               Password:  

Cerner
Username                                   Password:  

ISite PACS (Radiology intranet site): (http://172.25.100.152/default.asp or http://stentor)
Username:             Password:  

SCCM post-PICU rotation Password:  

Nemours Users Guides Interactive (UGI) Desktop

This is an internet resource that allows access to evidence based clinical practice resources, search engines, medical journals, textbooks, PICU Evidence Based Journal Club, LexiComp hospital formulary, Micromedix and other educational activities.

In the PICU, Nemours UGI Desktop can be accessed via desktop computers through the icon Nemours UGI Desktop or via the bedside wireless computers and WYSE terminals through the icon Vividesk.

Residents can download this internet resource on their office, home or laptop computers by going to the URL http://www.cche.net/nemours and follow directions for downloading. Pediatric residents who have a Nemours email address can receive a password through this site under Registration.
**Nemours Desktop Resources**

**Browser Tab**
- Double Click the Bell on the desk for a Tour describing the basic Vividesk technology and an introduction to the on-line Users’ Guides To The Medical Literature

**Activities Tab**
- PICU Resident Rotation web site
- PICU Article Collection
- PICU Lectures
- Pediatric lectures
- Stentor access to radiology studies (in hospital only)

**Resource Tab**
- Practice Guidelines
- Search Engines: PubMed, Ovid, ACP Journal Club, Cochrane Library.
- MD Consult (includes access to Nelson’s Pediatrics, Harriet Lane).
- Journals (Connection to Journals via Nemours Jeffline).
- PedsCCM Pediatric Critical Care educational resources

**Guides Tab**
- Users’ Guides To The Medical Literature textbook.
- Learning Modules: learn evidence based clinical practice at your own pace.
- Instructions on searching various medical search engines.
- Calculators for evidence-based clinical practice
- Personal Evidence Project (Help with doing a Critically Appraised Topic on-line)

**Practice Tab**
- LexiComp (Alfred I duPont Hospital for Children Formulary)
- Micromedex.
- Epic Web connection

**Textbooks available in PICU**

Pediatric Critical Care
Third Edition
Fuhrman/Zimmerman

Pediatric Critical Care Medicine
Slonim / Pollock

Pediatric Intensive Care, Third Edition
Mark C. Rogers

The Difficult Pediatric Airway
Anesthesiology Clinics of North America
Jalil Riazi, MD, Editor
1999

Management of Pediatric Trauma
Buntain
Critical Heart Disease in Infants and Children
Nichols, Cameron, Greeley, Lappe, Ungerleider, Wetzel

Pediatric Cardiac Intensive Care
Chang, Hanley, Wernovsky, Wessel

Illustrated Textbook of Pediatric Emergency and Critical Care Procedures
Dieckmann, Fiser, Selbst

Supportive Care of Children with Cancer
Current Therapy and Guidelines from the Children's Cancer Group
Edited by Arthur R. Ablin MD

Textbook of Pediatric Emergency Medicine
Ludwig Fleisher

Toxicologic Emergencies
Lewis R. Goldfrank

The Pharmacologic Approach to Critically Ill Patients
Chernow, Third Edition
Principles and Practice of Intensive Care Monitoring
Tobin

Smith's Recognizable Patterns of Human Malformation
5th edition, 1997

**Monitoring Activities**

During their first week, residents are asked to complete Pre-PICU Rotation questionnaire located on the PICU Resident Rotation web site.

PICU Residents are to document their primary patients’ diagnoses and age, procedures performed with supervision, their hospital work-hours, SCCM power-points reviewed on forms provided. Please return to Ilene Sivikoff, Pediatric Critical Care Secretary (extension 5159) at the end of the last week of rotation.

Resident will complete an evaluation form describing their PICU experience at the end of the rotation. Please return to Ilene Sivikoff, Pediatric Critical Care Secretary (extension 5159.)

During the last week of the rotation, residents complete the Pediatric Section of the Society of Critical Care Medicine (SCCM) Pediatric Resident Education Committee post-PICU test. Their scores will be forwarded to their respective program directors.

Critical care physicians evaluate residents using their respective program forms.

**Questions?**
Contact Edward J.Cullen Jr., D.O., Pediatric Critical Care Medicine
Phone: 302-651-5159
email: ecullen@nemours.org

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