

Educational Goals & Objectives

Fellowship in Pediatric Anesthesiology at Penn State Hershey Medical Center

The twelve-month Fellowship in Pediatric Anesthesiology is designed to provide a comprehensive experience that allows trainees to acquire and maintain cognitive knowledge, psychomotor skills, and attitudes that are necessary to provide excellent care of pediatric patients in the peri-operative, ICU, or pain arenas. These attributes are a fundamental component developing into an independently practicing consultant-level pediatric anesthesiologist.

The fellowship curriculum encompasses the educational objectives of the ACGME Core Curriculum in its academic and clinical activities. Pediatric anesthesiology fellow evaluations will include assessments of the core competencies, as listed below:

- 1. Patient Care**
- 2. Medical Knowledge**
- 3. Practice-Based Learning and Improvement**
- 4. Interpersonal and Communication Skills**
- 5. Professionalism**
- 6. Systems-Based Practice**

The curriculum and objectives of the Fellowship in Pediatric Anesthesiology are designed to provide a broad exposure to the perioperative management of all elements of anesthesiology relating to the care of neonatal and pediatric patients, including but not limited to: Pre-operative evaluation and assessment, Intra-operative management of simple and complex patients and cases, Post-operative management, Pain management (intra-operative, post-operative, pain consults, and procedures), and Neonatal and Pediatric critical care.

Structured didactic lectures, self-directed learning (e.g. reading), grand round conferences, teaching opportunities, and an Academic Project will supplement the clinical experience. However, intra-operative teaching in the OR is the mainstay of all didactics and performance assessment of the pediatric anesthesiology fellow.

Patient Care:

The fellow must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.

Cognitive Objectives:

The fellow will become proficient in:

1. Pre-operative assessment:
 - a. Performing a complete and focused history and physical exam on routine, complex, and emergency pediatric patients.
 - b. Eliciting pertinent information regarding perinatal health issues, birth history, postnatal course, prior anesthetic history, family anesthetic history, and recent health status of each patient.
 - c. Formulating a reasonable and safe anesthetic plan with the supervision and guidance of the attending anesthesiologist.
 - d. Discussing the indications, advantages, and disadvantages of inhalational versus intravenous induction.
 - e. Discussing the perioperative risks and benefits of all anesthetic plans preoperatively with each patient's parents/guardians.
 - f. Determining and discussing the proper NPO orders for pediatric patients.
 - g. Discussing and managing maintenance fluid requirements of infants and children.
 - h. Evaluation of the hydration status of infants and children using proper assessment of physical findings
 - i. Preoperative evaluation and development an appropriate anesthetic plan for healthy term neonates, former premature infants, infants and children with congenital defects and chromosomal abnormalities, and CP/MR pediatric patients.
 - j. Assessment of the pediatric patient for the need of a preoperative sedative and appropriately select and dose such as needed.
 - k. Assessment of the need for postoperative monitoring for the former premature infant at risk for apnea.
 - l. Identification of patients at risk for latex reactions and appropriate premedication of those patients that require prophylaxis.
 - m. Assessment of the relative risks/benefits of intravenous, intramuscular, and inhalational inductions in pediatric patients.
2. Anesthetic management
 - a. Creating and defending at least two anesthetic management plans for each of the following surgical procedures:

Inguinal herniorrhaphy	Umbilical hernia repair	Malrotation procedures
Pyloromyotomy	Hypospadias repair	Pheochromocytoma
Small bowel resection	Appendectomy	BMTs
Tonsillectomy/adenoids	Bleeding tonsil	Bronchoscopy
Foreign body aspiration	Epiglottitis	Laryngotracheoplasty
Open globe repair	Strabismus repair	Cleft palate repair
Cleft lip repair	Laryng. papilloma excision	Posterior spinal fusion
Open fracture fixations	Club foot repair	MRI / CT / PET
Radiation therapy	EGD / Colonoscopy	Cardiac surgeries (with CPB)
Cardiac catheterization	Myelomeningocele closure	Cardiac surgeries (no CPB)
VP shunt plcmnt/revision	Craniotomy	Craniofacial reconstruction
Cong. diaphragm. Hernia	NEC	TEF repair
Omphalocele repair	Lung resection	Kidney transplant
Gastroschisis repair	Heart transplant	Liver transplant
Kidney resection		
(and others...)		

- b. Recognizing, preventing, and managing intra-operative complications including but not limited to acute blood loss, respiratory impairment or failure, circulatory impairment or failure, equipment failure, metabolic derangements, hematologic issues

Psychomotor Objectives:

The fellow will be able to proficiently with healthy or complex neonatal and pediatric patients:

1. Set up an efficient, comprehensive anesthetic work station including appropriate drugs, intravenous lines, ventilating circuit, laryngoscopes, airway adjuncts, and endotracheal tubes.
2. Perform a safe inhalational induction using proper mask ventilation technique.
3. Perform laryngoscopy and proper ETT placement with confirmation
4. Establish and assess appropriate mechanical ventilatory settings.
5. Establish and protect adequate IV access.
6. Use the various modalities of heat preservation and restoration available in the OR and off-site anesthesia locations appropriately.
7. Properly place arterial catheters in the radial, femoral, posterior tibial, and/or dorsalis pedis arteries.
8. Properly establish central venous access via the internal jugular, subclavian, and/or femoral veins.
9. Properly place and maintain a laryngeal mask airway.
10. Properly select and manage pediatric patients for deliberate hypotension technique.
11. Use jet ventilation systems properly.
12. Correctly place, test, and dose caudal, lumbar, and thoracic epidural catheters.
13. Correctly perform single shot caudals for analgesia.
14. Properly place peripheral nerve blocks including but not limited to brachial plexus, femoral, and sciatic nerve blocks

Affective Objectives:

The fellow will appreciate that pediatric patients are not just "small adults" and there is a higher level of attention-to-detail required in providing a safe, successful anesthetic. The fellow will appreciate that peri-operative physiological changes can occur much more precipitously in pediatric patients as compared to adults. The fellow will be able to appreciate and discuss the management of neonatal and pediatric patient and the role of the pediatric anesthesiologist as both a provider of care and as a consultant for other care providers.

Medical Knowledge:

The fellow must demonstrate knowledge about established and evolving biomedical, clinical, and cognitive sciences and the application of this knowledge to patient care.

Cognitive Objectives:

The fellow will become proficient in understanding and discussing the following topics:

1. Fetal development including critical gestational periods
2. Fetal circulation
3. Physiologic changes necessary to successfully transition from fetal to neonatal life
4. Pharmacologic and physiologic principles of anesthesia as they apply to neonatal and pediatric anesthesiology
5. Interpretation of pediatric laboratory results
6. Advantages and disadvantages of various pediatric anesthesia circuits
7. Pediatric fluid requirements, volume status monitoring, and fluid replacement in peri-operative and critical care settings
8. Pharmacology including the dosage, uptake, and distribution of various anesthetic agents by various routes of administration (PO, PR, SL, IN, IM, IV and inhalational) in pediatric vs. adult patients
9. Differences between adult, pediatric, and neonatal renal, hepatic, pulmonary, neural, and cardiovascular physiology
10. Intra-operative temperature regulation and maintenance
11. Clinical features and relevance of major genetic syndromes and anomalies
12. Clinical features and relevance of congenital heart disease and the palliated heart on the induction and maintenance of anesthesia
13. Impact of pulmonary hypertension on anesthetic management
14. Anatomic differences between adult, pediatric, and neonatal airways
15. Solid organ transplant issues in pediatrics
16. Principles of ventilation in pediatric and neonatal patients, including alternate methods of ventilation (jet ventilation, oscillation, etc.)
17. Fluid, electrolyte, and nutritional therapy in neonates and children
18. Impact of bronchopulmonary dysplasia and other pulmonary diseases in the peri-operative or critical care settings
19. Transfusion therapy in the critically ill pediatric patient
20. Managing acute intra-operative blood loss
21. Basics of ECMO
22. Pharmacology of opioid and non-opioid analgesics in the pediatric and neonatal patient
23. Pharmacological support of circulation
24. Features and management of acute and chronic pain conditions
25. Advanced life support for pediatric patients
26. Risks, clinical signs, prevention, and management of malignant hyperthermia
27. Considerations for anesthesia management during diagnostic/therapeutic procedures outside the operating room complex
28. Indications for regional anesthesia techniques for inpatient and ambulatory surgery in children

Practice-Based Learning and Improvement:

The fellow must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning.

Cognitive Objectives:

The fellow will be able to:

1. Identify at least three sources of information where current options and practice parameters can be located.
2. Discuss various pediatric disease conditions and how consideration of these diseases may alter peri-operative anesthetic or critical care management.

Psychomotor Objectives:

The fellow will:

1. Actively seek faculty feedback on expectations and performance and make self-assessments on a regular basis.
2. Identify areas of strength and weakness and formulate an active plan of study to implement improvement.
3. Provide at least two lectures on pediatric anesthesiology topics for residents.
4. Display the ability to critically assess anesthesiology literature and determine its applicability for their patients.

Affective Objectives:

The fellow will accept critique professionally and integrate this information to improve their clinical, academic, and professional skills.

Interpersonal and Communication Skills:

The fellow must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.

Cognitive Objectives:

The fellow will be able to:

1. Define the elements needed for accurate informed consent from parents/guardians of pediatric patients as well as informed assent from appropriate pediatric patients.

2. Define the information needed for a complete history of pediatric patients.
3. Discuss nonverbal communication cues and their implication (both positive and negative) to effective communication.

Psychomotor Objectives:

The fellow will be able to:

1. Communicate effectively with patients and their families to ensure:
 - a. Complete understanding of the indications, risks, and benefits of the anesthetic options.
 - b. An accurate, complete informed consent is obtained from parents/guardians as well as informed assent from appropriate pediatric patients.
 - c. That the family is confident that their child will be receiving the best possible care.
 - d. That cultural, religious, and personal preferences of the family are acknowledged, respected, and incorporated into the patient's care.
 - e. If appropriate, that the child feels that they are an active participant in planning and directing their care.
2. Communicate effectively with the operative care team to ensure:
 - a. All members of the team share the same understanding of the patient's needs and the anesthetic plan.
 - b. That all required preparations are in place prior to the patient's arrival in the OR.
 - c. That a plan for postoperative care and pain management is established
3. Provide concise, accurate documentation of patients' evaluation, diagnosis, and anesthetic options and verbal discussions with patients and families.
4. Communicate effectively with colleagues from different specialties.

Affective Objectives:

The fellow will:

1. Maintain patient confidentiality in all aspects of patient care.
2. Work as a team with the operating room personnel to ensure effective communication.
3. Maintain awareness of their own non-verbal communication cues (stance, posture, position, tone, facial expressions...) and their effect on successful communication.

Professionalism:

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

The fellow will:

1. Discuss the attributes of professionalism when dealing with the sensitive patient issues.
2. Be able to define the expectations regarding patient confidentiality, HIPPA regulations, and how they apply in the perioperative environment.
3. Conduct himself/herself in a professional manner as outlined in this Fellow's Manual and Anesthesiology Resident's Manual.
4. Identify and seek faculty council when faced with moral or ethical questions regarding patient interactions or management.
5. Display professional attributes when interacting with operating room staff and patient information.
6. Prove to be responsible, reliable, and conscientious to all members of the care team.
7. Be able to discuss the unique moral, ethical, and social issues inherent to the multifactorial nature of managing complex pediatric patients and their families.

Systems-based Practice:

The fellow must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.

Cognitive Objectives:

The fellow will be able to:

1. Utilize the subspecialty of pediatric anesthesiology and critical care to develop a comprehensive anesthetic plan.
2. Describe and discuss the role of the pediatric anesthesiologist in the context of the overall management of patient care.
3. Describe patient flow through the Hershey Medical Center / Penn State Children's Hospital System including but not limited to:
 - a. How a pediatric patient is evaluated for surgery.
 - b. Usual course of care from pre-op clinic, pre-op holding areas, to the OR, through PACU or the ICUs, to discharge and rehabilitation.
 - c. Barriers to progress through the perioperative process.

Psychomotor Objectives:

1. The fellow will seek to facilitate excellence in patient care and optimal flow through the system by effective communication and resource management.
2. The fellow will ensure that patient's travel through the perioperative period is safe, effective and ensures:
 - a. Minimal time separated from parents
 - b. Appropriate NPO guidelines
 - c. An environment supportive of the patient's unique needs

- d. Integration with the patient's care team
3. When identifying a barrier to care, the fellow will seek a means of removing or mitigating the barrier and where appropriate will help to establish protocols that optimize patient experience.

Affective Objective:

The fellow will fully appreciate the complex nature of the medical system and the role of the pediatric anesthesiologist in that system, the fellow will be cognizant of barriers to excellence in patient care and seek to identify means of improving patient care, outcomes and patient satisfaction.