**Stanford Pediatric Anesthesia Rotation**

Stanford University Anesthesiology Residency Program  
Curriculum and Syllabus – Pediatric Anesthesia

Directors:

Janice Y. Man

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**Rotation Objectives and Expectations**

The core pediatric anesthesia rotation is offered as an eight-week block during the latter part of the CA1 or in the CA2 year. Stanford anesthesia residents will care for pediatric patients ranging from premature infants to young adults and will provide sedation and anesthesia for varied diagnostic and interventional procedures and surgeries. Residents will work directly with pediatric anesthesia attendings and also with fellows in pediatric anesthesia.

This rotation will provide the core experience for caring for pediatric patients during the Stanford anesthesia residency. **The primary goal of this rotation is to enable the resident to provide routine anesthesia for ASA 1-3 pediatric patients.** A senior rotation in pediatric anesthesia is available to those wishing to build on this foundation and expand their knowledge. Fellowship training in pediatrics is expected for physicians who will care primarily for children, and for complex pediatric patients and cases.

Residents are expected to read about their assigned cases the night before and to call their assigned attendings the night before to discuss the perioperative management. If you are unscheduled the night before, please report to the ARC the next morning by 7 AM (8 AM on Mondays) for a new assignment. The pediatric anesthesiology attending schedule is available on Ether or amion (password @nesthesi0l0gy).

Residents should log all cases/procedures in the ACGME case log and should spend additional time outside clinical work for independent reading. Wednesday Morning Didactic Lectures as well as Journal Clubs will be provided and should serve as a framework for both general knowledge and basis for discussion with your attending.  Feedback will be provided at multiple points throughout the rotation including, immediate direct verbal feedback during cases and a final summative written evaluation in MedHub based on ACGME Core Competencies and Milestone based accomplishments. Residents should ask their attending for additional feedback at the end of each day.

**Sick Leave/Personal Day Policy**

If you cannot work due to illness or family emergency please contact the Chief Residents, your assigned anesthesia attending, and the ARC attending at 19705 (until 18:00) or on-call attending (18:00-22:00). If after 22:00, contact the ARC the next morning after 6:30 (page/call/text).

Please contact Drs. Tammy Wang and Janice Man as well as the chief residents for approval for personal days. Whenever possible, residents should first try to trade shifts and find coverage. Personal days will only be considered in the following circumstances:

* Conference presentations (Day of presentation + travel time)
* Fellowship/job interviews
* Personal illness
* Extenuating family circumstances

**ACGME Goals and Objectives**

**Medical Knowledge (MK)**  
“Residents will demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences, as well as the application of this knowledge to patient care. In particular residents will become adept in applying open minded and analytical approach to acquiring new knowledge, and applying this knowledge in develop critical thinking, problem solving and decision making skills in cases under their care.” **Patient Care (PK)**  
“Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.” **Practice-based Learning and Improvement (PBLI)**  
“Residents 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”

**Interpersonal and Communication Skills (ICS)**  
“Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals. Additionally, residents are expected to work effectively as a member or leader of a health care team or other professional group, act in a consultative role to other physicians and health professionals; and maintain comprehensive, timely, and legible medical records, if applicable.”

**Professionalism (P)**  
“Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. Residents are expected to demonstrate:  
compassion, integrity, and respect for others, responsiveness to patient needs that supersedes self-interest, respect for patient privacy and autonomy, accountability to patients, society and the profession and sensitivity and responsiveness to a diverse patient population.”

**Systems-based Practice (SBP)**  
“Residents 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. Residents are expected to: work effectively in various health care delivery settings and systems relevant to their clinical specialty, coordinate patient care within the health care system relevant to their clinical specialty, incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as appropriate, advocate for quality patient care and optimal patient care systems, work in inter-professional teams to enhance patient safety and improve patient care quality, and participate in identifying system errors and implementing potential systems solutions.

By the end of the rotation residents should be able to:

**Pediatric Anesthesia Junior Rotation**

1. Perform a focused history and physical with attention to the anesthetic implications of pediatric disease and physiology (PK, MK)
2. Formulate and present a safe anesthetic plan to your attending and revise that plan together (PK, ICS, MK, P)
3. Accomplish a safe induction (PK, MK, PBLI)
4. Proficient bag-mask management of patients of all ages and sizes (PK, MK)
5. Safe inhalational induction in hemodynamically stable patients with normal airways (PK)
   * 1. Secure peripheral IV access in children
     2. Safe induction of the hemodynamically unstable patient
     3. Safe induction of the patient with neurologic pathology, especially increased ICP
     4. Recognize signs of a difficult pediatric airway
     5. Manage upper airway obstruction
     6. Manage laryngospasm
     7. Manage bronchospasm
6. Safely secure the airway (PK, MK)
   * 1. Appropriately use mask ventilation, LMA or ETT for case
     2. Intubate patients using appropriate size of blades and tubes
     3. Secure ETT in pediatric patients using benzoin, tape, tegaderm or other equipment appropriately
7. Use adjunctive techniques for analgesia or anesthesia (PK, SBP)
   * 1. Place single shot caudal anesthesia
8. Safe maintenance of anesthesia in neonates and prematures (PK, MK)
   * 1. Use appropriate agents to maintain hemodynamic stability in this age group
     2. Provide appropriate analgesia to allow extubation when appropriate
     3. Demonstrate understanding of differences in MAC, drug volume of distribution, metabolism and excretion in this age group
9. Understand acute perioperative pain management in children (PK, SBP, MK)
   * 1. Recognize methods for pain assessment in different pediatric age groups
     2. Identify and execute a treatment plan for acute postoperative pain in children
     3. Understand the appropriate use of opioids and non-opioid agents in children of varying ages
     4. Understand how to minimize the apnea risk in difficult airway/premature/neonatal patients
     5. Recognize and treat common complications of analgesic therapy in children (e.g. nausea, vomiting, pruritis, respiratory depression)
     6. Identify different regimens for postoperative epidural analgesia and successfully manage changes as necessary in children
     7. Understand the pathophysiology and treatment of common chronic pain conditions in children (sickle cell disease, oncologic disease, complex regional pain syndrome
     8. Successfully order and adjust patient-controlled analgesia (PCA) in a pediatric patient
10. Conduct safe emergence and extubation (PK, P)
    * 1. Demonstrate ability to judge when a nonverbal patient is appropriate for extubation
      2. Manage upper airway obstruction
      3. Manage laryngospasm
      4. Manage bronchospasm
11. Understand and manage fluid and blood product resuscitation in children (PK, MK)
12. Understand age-specific and developmentally appropriate communication with patients (PK, ICS, P)
    * 1. Understand developmental and cognitive differences in patients of different ages
      2. Understand implications of autism, developmental delay and brain injury
      3. Practice techniques to decrease patient and family anxiety
13. Understand the risks of anesthetizing the pediatric patient and obtain appropriate informed consent and assent from families and patients for intraoperative and postoperative care (MK, ICS, SBP)
    * 1. Know relative risks of major morbidities and mortality related to surgeries
14. Appropriately plan and communicate for post-operative care (P, SBP)
    * 1. Understand which patients require admission to PICU, NICU or IICU
      2. Identify the appropriate post-operative location for patients based on their procedure and comorbidities
      3. Understand which neonates meet hospital admission criteria
15. Demonstrate professional courtesy for your colleagues (P)
    1. Attend morning conferences and grand rounds and arrive on time
    2. Assist post-call and vacation colleagues in performing preoperative evaluation and note for inpatients

**Pediatric Anesthesia Senior Rotation**

*In addition to the Goals/Objectives in the Junior Rotation, residents should be able to:*

1. Create a safe anesthetic plan for complex and/or unstable (ASA IV and emergency) patients (PK, MK)
2. Become competent at invasive monitoring (PK)
   * 1. Secure arterial access in children
     2. Secure central venous access in children using standard infection control measures
3. Understand advanced pediatric airway management (MK)
   * 1. Use the FOB scope to intubate spontaneously ventilating sedated/anesthetized patients
     2. Intubate using FOB scope via LMA
     3. Understand the use and limitations of advanced airway equipment (e.g. Glidescope) in the pediatric sized patient
4. Accomplish lung isolation/one lung ventilation in a manner appropriate to patient size and age (MK, PK)
   * 1. Use double lumen tube, bronchial blocker or mainstem ETT as appropriate
5. Manage the unstable neonate or premature (MK, PK)
   * 1. Understand when invasive access is needed
     2. Manage fluids and blood products appropriately
     3. Manage electrolytes appropriately
6. Comprehensive care of the solid organ transplant patient (SBP, PK, MK, PBLI, P)
   * 1. Conduct preoperative assessment and optimize for OR
     2. Place invasive lines
     3. Maintain intraoperative stability
     4. Successfully transition to PICU care
7. Use adjunctive techniques for analgesia, anesthesia (PK, SBP, P)
   * 1. Place epidural or perform regional anesthesia in the anesthetized child

**Educational Activities**

* Intra-operative teaching and modeling by attending anesthesiologist
* Weekly Wednesday AM resident didactic series (6:30-7:00am, G344 Conference Room)
* Monthly Journal Club (6:30-7:00am, G344 Conference Room)
* Monthly Morbidity and Mortality (6:45-8:00am, LPCH West Board room)
* Department Grand Rounds (6:45am-8:00am, LKSC)
* Review Stanford Pediatric Anesthesia Teaching Materials and Protocols pertinent to rotation (can be found on the division website, link provided below)

**Recommended Resources**

* Pediatric Anesthesia Division website: <http://med.stanford.edu/pedsanesthesia/education/teaching-materials.html>
* Smith's Anesthesia for Infants and Children, 9th edition (2017), edited by Peter J Davis, Frankyln P Cladis. Electronic edition available via Lane Library
* A Practice of Anesthesia for Infants and Children, 6th edition (2019), edited by Charles Cote, Jerrold Lerman and Brian J Anderson. Electronic edition available via Lane Library
* Anesthesia for Genetic, Metabolic, and Dysmorphic Syndromes of Childhood, 3rd edition (2015), edited by Victor C. Baum and Jennifer E. O'Flaherty. Electronic edition available via Lane Library
* Anesthesiologist's Manual of Surgical Procedures, 5th edition (2014), edited by Richard A Jaffe. Electronic edition available via Lane Library

We look forward to working with you and hope that you enjoy your time on the pediatric anesthesia rotation! We find it to be a collaborative work environment where all team members work together to provide optimal patient care. We hope you find it to be an educational and fun experience. Please contact us with any questions, concerns or comments regarding the rotation.

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