Resident responsibilities and expectations:

• Read about cases ahead of time
• Call attending to pre-op the night before
  o If you are DAC or returning from vacation please **page 2^{nd} call resident to see your inpatients** and then call you. You will still pre-op with your attending
• Participate in am conferences:
  o 2^{nd} Tuesday of every month = journal club or PBLD OR conference room
  o Every Wednesday 6:30 AM resident lecture OR conference room
• Fill out electronic pre-op notes on every patient
• Check in with the scheduler (1-9705) prior to leaving or if you have a long gap in the schedule

First call resident:

• Sign out with pediatric pain service at 2pm weekdays
• Round with pain team on weekends if not in the OR
• See post-op inpatients on weekends for post-op note
• Parking in A lot on Welch & Quarry is open after 4pm weekdays, but must move car by 6:30am. Open parking all weekend and holidays.

Second call resident:

• Pre-op patients for the DAC resident or residents returning from vacation

**FAQs:**

**Who to call for emergencies or to get help in a room (in order of urgency):**

• Page your attending
• Call the scheduler **1-9705**
• Have the circulator call the **emergency phone 1-9706 (business hours only)**
• Call a code – push wall button for help within the OR or **dial 211** for OR specific-code

**If you can’t work due to illness or family emergency:**

• Before 1800, call the scheduler at 1-9705
• 1800 to 2200 call the on-call attending
• After 2200 wait until 06:30 the next morning and page or call the scheduler

Please note: secure and rotation-specific emails will go to your Stanford.edu email address. You are expected to check this email address.
Orientation to Pediatric Anesthesia

Clinical Duties

All inpatients should be seen and evaluated by the resident staff the day before. After the first case of the day, outpatients will be checked in and evaluated by the anesthesia nurse practitioners. Regardless of which occurs, it is your responsibility to perform an evaluation and obtain consent from a parent/guardian prior to commencing the anesthetic. Medical records, laboratory data and radiology reports can be accessed from Epic. Records from outside institutions can also be found in the Care Everywhere tab.

Notes on Our Clinical Practices

Inductions

Starting at age 6 to 8 months, children begin experiencing separation anxiety. Many children from 6 months to 10 years require some degree of pharmacologic sedation prior to separating from their parents and going to the OR. We make liberal use of midazolam given orally in doses of 0.5-0.7 mg/kg (maximum 20 mg) to obtain preoperative sedation. This dose rarely if ever produces unconsciousness, but usually produces a cooperative child. If the child has an IV in place, then midazolam 0.1 mg/kg can be administered. If an IV induction is anticipated, then please consider using a Synera (lidocaine/tetracaine) patch on the IV site, remembering that at least 20 minutes of application is required for adequate local anesthesia. Inhalations or IV inductions with parental presence are routinely performed for children between 6 months and 12 years of age. In this case, the preop RN will accompany the parent into the OR and escort them out when the child is unconscious.

Intravenous Lines

Please place T-Pieces on all lines. Children under 5 kg should have IV fluid delivered by infusion pump. Over 5 kg children will have microdrip IV bags. Children under 10 years of age may require arm boards on the limb with the IV. IV sites should be dressed with a sterile transparent dressing and tape. Please do not use plastic "eye" tape on immunosuppressed patients.

Glucose containing solutions

are not be routinely used in the OR. Administer D5LR to children less than 6 months of age
or to children who are malnourished by 10 cc of D50W to every 90 cc of LR in the Buretrol. Otherwise, LR is our standard IV solution. Using NS in cases during which large quantities of crystalloid are administered is associated with postoperative hyperchloremic metabolic acidosis. A good alternative to NS is Normosol, which is compatible with blood products as it does not contain calcium. Children with liver failure or metabolic or mitochondrial disease should not receive LR, as they are unable to metabolize the lactate.

**Regional Anesthesia**

Our pediatric surgeons have come to expect certain clinical practices. For example, regional anesthesia is used whenever practical to minimize intraoperative drug requirement and to smooth the postoperative course. In addition to lumbar or caudal epidural blocks with or without catheters, other commonly used techniques include the use of intrathecal opioids for spine fusions, and the use of thoracic epidural anesthesia or paravertebral blocks for thoracotomies and upper abdominal surgery. Brachial plexus anesthesia is commonly used during hand surgery, especially for children with epidermolysis bullosa. Please consult one of the pediatric anesthesiologists as needed for recommendations regarding regional anesthesia, and for assistance in placing blocks. We have a core group of block attendings. The daily block attending can be found on the amion schedule.

**Invasive Vascular Lines**

When central venous catheters are inserted, the placement of the catheter tip must be confirmed by portable chest radiograph in the operating room at the time of line placement or by transesophageal echocardiography in the operating room. CVL catheter tips should not be allowed to remain in the right atrium, but should ideally lie in the SVC or at the SVC-RA junction. Peripheral arterial lines can be secured using benzoin and ¼” Steri-Strips or stat-loc device or by suture, with a sterile transparent occlusive dressing. Femoral lines are secured using suture. All children with invasive lines should be transported to the ICU with the lines attached to pressurized infusion bags, to maintain line patency.

Follow national and hospital standards, all central lines must be placed with full sterile precautions, including a full body drape. You may use a 1020 drape for infants or a thyroid drape for larger patients. Placement of CVLs must be appropriately documented in the electronic anesthesia record.

**Fiberoptic Intubations**

The pediatric fiberoptic/difficult airway cart includes bronchoscopes and a monitor, as well as adjunctive airway equipment such as LMAAs. This equipment is only for the use of the personnel in pediatric anesthesia under the supervision of one of the pediatric anesthesia faculty members or fellows. The cart and Glidescope are kept in the room to the left of the anesthesia tech.
workroom marked “Difficult airway equipment”. The two Olympus bronchoscopes: 3.5mm (smallest ETT size 4.5 mm) and 2.2mm (smallest ETT size 3.0mm) and Storz scopes and cameras are available. After discussion with your attending, you are encouraged to use the fiberoptic equipment to intubate normal children to become facile in its use. If the 3.5mm ‘scope was used, suction a few cc’s of water through the ‘scope to remove blood and secretions from the suction channel. All ‘scopes should be placed in the plastic holders on the cart at all times not in your hands to avoid damage. If you anticipate needing the cart, please call the anesthesia techs at 1-0246 to set it up for you.

PICU/NICU/CVICU Interface

Patients transported from an ICU to the operating room should be accompanied by an anesthesiologist. At the end of the case, the ICUs must receive a printed IPASS form from the anesthesiologist. Make sure they get called again about 10-15 minutes prior to leaving the operating room for a final notice. The circulator can make this final phone call.

When you take a child to the PICU or NICU, keep all invasive lines attached to pressure bags and transducers to maintain line patency.

On arrival in the ICU, formal IPASS format signout to an ICU attending should be performed and documented in the electronic anesthesia record. If you plan to take an intubated patient to the ICU, allow for adequate sedation for handoff or call ahead to make sure the ICU has adequate sedation ready for patient’s arrival.

Speak directly with the ICU attending in unusual circumstances or when you have special concerns about the operating room-PICU transition and the ongoing care of the child.

Pain Service

All children treated with epidurals or peripheral catheters are managed by the pediatric pain management service. At the end of the case, remember to page the pain service nurse (beeper 28521), and tell her about the patient and what ongoing therapy you have planned. Always call the pain attending if you are unsure of protocols or have questions about what is appropriate or effective.

Useful Phone Numbers and Beepers

Anesthesia Scheduler 1-9705
Anesthesia Emergency phone 1-9706 (business hours only)
OR Front Desk 1-2820
Peds Anesthesia Administrative Office 3-5728
Rotation Goals and Objectives

The core pediatric anesthesia rotation is offered as an eight week block during the later 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 graduate a competent and caring provider of routine anesthesia to ASA 1 to 3 pediatric patients. A second rotation in pediatric anesthesia during the CA 3 year is available for those wishing to build on this foundation and expand their knowledge. Fellowship training in pediatrics is expected for practitioners who will care primarily for children, and for complex patients and cases.

GOALS and OBJECTIVES:

Patient Care – junior rotation

- Perform a focused history and physical with attention to the anesthetic implications of pediatric disease and physiology
- Formulate and present a safe anesthetic plan to your attending and revise that plan together
- Accomplish a safe induction

1. Proficient bag-mask management of patients of all ages and sizes
2. Safe inhalational induction in hemodynamically stable patients with normal airways
3. Secure peripheral IV access in children
4. Safe induction of the hemodynamically unstable patient
5. Safe induction of the patient with neurologic pathology, especially increased ICP
6. Recognize signs of a difficult pediatric airway
7. Manage upper airway obstruction
8. Manage laryngospasm
9. Manage bronchospasm
• Safely secure the airway
  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
• Use adjunctive techniques for analgesia or anesthesia
  1. Place single shot caudal anesthesia
• Safe maintenance of anesthesia in neonates and prematures
  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
• Understand acute perioperative pain management in children
  1. Use opioids appropriately
  2. Use non-opioid agents appropriately
  3. Minimize risk of apnea in difficult airway/premature/neonatal patients
• Conduct safe emergence and extubation
  1. Demonstrate ability to judge when a nonverbal patient is appropriate for extubation
  2. Manage upper airway obstruction
  3. Manage laryngospasm
  4. Manage bronchospasm
• Understand and manage fluid and blood product resuscitation in children

**Patient Care – senior rotation**
• Create a safe anesthetic plan for complex and/or unstable (ASA IV and emergency) patients
• Become competent at invasive monitoring
  1. Secure arterial access in children
  2. Secure central venous access in children using standard infection control measures
• Understand advanced pediatric airway management
  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

- Accomplish lung isolation/one lung ventilation in a manner appropriate to patient size and age

1. Use double lumen tube, bronchial blocker or mainstem ETT as appropriate

- Manage the unstable neonate or premature

1. Understand when invasive access is needed
2. Manage fluids and blood products appropriately
3. Manage electrolytes appropriately

- Comprehensive care of the solid organ transplant patient

1. Conduct preoperative assessment and optimize for OR
2. Place invasive lines
3. Maintain intraoperative stability
4. Successfully transition to PICU care

- Use adjunctive techniques for analgesia, anesthesia

1. Place epidural or perform regional anesthesia in the anesthetized child

**Practice Based Learning and Improvement**

- Establish a pattern of self-study and review of progress

1. Keep patient logs current
2. Use self-study guidelines for focused review of medical knowledge
3. Be proactive in requesting cases to advance skills and knowledge
4. Self-study curriculum check-off list (the rotation passport)

- Learn from practice

1. Debrief with attending incidents/procedures/cases that advance your knowledge
2. Case management discussions with attending
3. Volunteer interesting cases for the 3rd Tuesday morning PBLD/case conference

**Interpersonal and Communication Skills**

- Be an outstanding team member

1. Introduce yourself to full team every day and at each time out
2. Facilitate communication with surgical services

• Pre-op each scheduled patient with your attending
  1. All inpatients must be seen and an electronic preop note written in the chart
  2. Communicate with 2nd call resident to see inpatients if you are DAC or vacation
  3. Call or page the day before, preferably before 8pm

• Understand age-specific and developmentally appropriate communication with patients
  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

• Understand the risks of anesthetizing the pediatric patient and obtain informed consent from families
  1. Know relative risks of major morbidities and mortality related to surgeries
  2. Review POCA registry data
  3. Appropriately plan for NICU/PICU/IICU care post-operatively

**Professionalism**

• Be an outstanding team member
  1. Introduce yourself to full team every day and at each time out
  2. Facilitate communication with surgical services and OR staff

• Be a resource to families
  1. Conduct preoperative interview with appropriate language for parent and patient understanding
  2. Understand the implications of informed consent and assent for families and children of different ages
  3. Simulate a preoperative discussing with attending
  4. Direct observation of your preop interview with faculty feedback

• Demonstrate professional courtesy for your colleagues
  1. Attend a.m. conferences and grand rounds
  2. 2nd call resident preops inpatients for DAC and vacation residents

• Be a patient advocate
  1. Champion patient safety in the perioperative setting
Accomplish patient care activities while patient is anesthetized, e.g. lab draws, dressing changes

**Systems Based Practice**

- Use all available patient information to gather preoperative information
  1. Use electronic medical record to review past medical history, consultations and prior anesthesia records
  2. Work with NPs to obtain relevant outside records
  3. Understand when to admit patients, and level of care required (ICU, monitored bed, floor bed, short stay unit)

**Medical Knowledge:**

A comprehensive curriculum for pediatric anesthesia knowledge is available at:

http://www.pedsanesthesia.org/corecurriculum.iphtml

In brief, we would like you to:

1. Understand the basic principles of pediatric anesthesiology
2. Acquire a solid fund of knowledge regarding the various types of pediatric medical and surgical conditions
3. Appreciating the indications and contraindications and appropriate administration of preoperative pediatric medications
4. Distinguish the differences between pediatric and adult physiology and the impact of those differences upon the administration of pediatric anesthesia
5. Understand appropriate NPO guidelines for infants and children undergoing surgery
6. Appreciate proper guidelines for pediatric fluid therapy: preoperative, intra-operative and postoperative
7. Understand the pharmacology of routine and non-routine medications used for the pediatric anesthesia patient
8. Evaluate the child with an upper respiratory tract infection
9. Understand the pathophysiology and treatment of malignant hyperthermia in the pediatric population
10. Appreciate the basic concepts of pediatric and neonatal resuscitation
11. Order appropriate laboratory tests in a conscientious and cost-effective manner
12. Utilize material resources within the operating room in a judicious fashion
13. Manage perioperative pain in children

**Recommended resources:**

- Smith's Anesthesia for Infants and Children, edited by Etsuro Motoyama and Peter Davis (2011).
  o To access these online go to http://www.expertconsult.com and log on using the name hfarkas@stanford.edu and the password anesthes1a (note the number 1!)
• Anesthesia for Genetic, Metabolic, and Dysmorphic Syndromes of Childhood by Victor C. Baum and Jennifer E. O'Flaherty (2006)

**Evaluations:**

Daily verbal feedback/debriefing will be given by attendings. The division will give a summative evaluation to the residency director at the end of each block. You are encouraged to evaluate faculty using MedHub.

**Academic commitment:**

Each resident will participate in a journal club discussion during the rotation.

**Scheduling:**


password: ane$the$ia (for Pain and Regional Team schedules)

A rotation calendar is kept here:

**Epic/IT issues:**

Please contact Dr. Ellen Wang

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**Pediatric Pain Duties and Expectations:**

**Pain Sign-out Weekdays:** Mon – Fri 2pm
Meet in pain office (just outside PICU and L&D/back hall to SHC elevators on 2nd floor).

**Pain Rounds Weekends:** Call/page attending the night before to plan time/place to meet. Saturday and Sunday call residents might consider sitting in on Friday pain rounds to get detailed sign out if desired, otherwise pain inpatient census and written sign out will be available in manila envelope WITH YOUR NAME ON IT in rack outside pain office (if it's not there at the end of your day, that means pain team is still in house/working/rounding so page us).

**Contact info for pain service:**
Consults/referrals during day and first call for weekday pain round planning: \textit{pager 28521} carried by advanced practice nurse Chris Almgren.

Finally, here are the pain attendings and contact info:

<table>
<thead>
<tr>
<th>Attending</th>
<th>First Name</th>
<th>Pager</th>
<th>Home tel:</th>
<th>Mobile Tel:</th>
</tr>
</thead>
<tbody>
<tr>
<td>D'Souza</td>
<td>Genevieve</td>
<td>23376</td>
<td>650-968-4841</td>
<td>408-644-5440</td>
</tr>
<tr>
<td>Golianu</td>
<td>Brenda</td>
<td>13344</td>
<td>650-654-3820</td>
<td>650-497-8000 (operator will connect you)</td>
</tr>
<tr>
<td>Good</td>
<td>Julie</td>
<td>23194</td>
<td>650-323-0196</td>
<td>650-497-8000 (&quot; &quot;)</td>
</tr>
<tr>
<td>Krane</td>
<td>Elliot</td>
<td>13831</td>
<td>650-924-1355</td>
<td>650-924-1355</td>
</tr>
<tr>
<td>Naidu</td>
<td>Srinivas</td>
<td>23073</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Knowledge -
1. Understand methods for recognition and assessment of pain in different pediatric age groups.
3. Understand the age-related differences in use of opioid analgesics in children.
5. Understand the pathophysiology and treatment of common chronic painful conditions in children (e.g., sickle cell disease, oncologic disease, reflex sympathetic dystrophy/CRPS, etc.)

Skills -
1. Demonstrate the ability to develop and carry out a plan to manage and treat postoperative pain in children across all age groups.
2. Demonstrate the ability to treat refractory postoperative pain in children of all ages
3. Be able to evaluate and treat common complications of analgesic therapy in children (e.g., nausea, vomiting, pruritus, and ventilatory depression).
4. Be able to evaluate and manage children with epidural analgesic therapy and break-through pain.
5. Be able to evaluate a child for the use of patient-controlled analgesia (PCA), and demonstrate appropriate ordering of PCA for all age groups.

Teaching will be primarily case based and occur during sign out rounds and on weekends.