



LOMA LINDA UNIVERSITY  

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CHILDREN'S HEALTH

PEDIATRIC ANESTHESIOLOGY FELLOWSHIP  
GOALS & OBJECTIVES  
PROGRAM POLICIES  
ORIENTATION MANUAL  
2021-2022

# **Loma Linda University Children’s Health Department of Anesthesiology Pediatric Anesthesiology Fellowship Manual**

Welcome to the Pediatric Anesthesiology Fellowship at Loma Linda University Children’s Hospital. We sincerely hope that this year will be enjoyable, educational and the beginning of a successful career in the practice of anesthesia for children of all ages. The entire staff is committed to providing you with the knowledge base, clinical skills and judgment necessary to ensure optimal perioperative patient care.

Name a Top Children’s Hospital in 2017 and 2108 by the Leapfrog Group, Loma Linda University Children’s Hospital (LLUCH) has been a source of hope and healing to children and their families for more than 20 years. It has blossomed into health care center with more than 300 beds just for children. Each year more than 13,000 children stay at the hospital, over 75,000 children visit for outpatient care and 1,200 critically ill children are transported to LLUCH from neighboring hospitals to receive care. As part of Loma Linda University’s Vision 2020 campaign, we broke ground on the construction of our new Children’s Hospital in May of 2016. When completed this new nine-story building will help to increase the services we can offer. As a multidisciplinary pediatric referral center with an 84-bed neonatal ICU we have a diverse range of patients and performed almost 11,000 anesthetics in 2018 on pediatric patients. Our team of 16 board certified pediatric anesthesiologists are committed to making diagnostic and surgical procedures safe and less painful for children.

The fellowship year consists of the following rotations:

- Main OR 3 months
- Cardiac Service/OR 2 months
- Critical Care (NICU/PICU) 1.5 months
- OR/ Chiefing Rotation 2 weeks
- Neuro Service/OR 1 month
- Acute pain/Regional 1 month
- Ambulatory/Regional 1 month
- PACU/NORA 1 month
- Research 1 month

Should you have any questions, concerns, critiques, and challenges or just want a “listening ear”, please do not hesitate to contact us. Providing pediatric care is both a wonderful opportunity and an awesome responsibility. The best way to fulfill this responsibility is to treat every child and family with the grace, consideration and the respect with which you would want your child and family to be treated.

We look forward to working with you and hope that you will enjoy the practice of pediatric anesthesiology.

**Linda J. Mason, MD**  
Program Director

**Elizabeth A. Ghazal, MD**  
Associate Program Director

**Loma Linda University Children’s Hospital  
Department of Anesthesiology  
Pediatric Anesthesiology Fellowship Manual**

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# **General Information**

## **Door Access**

The doors to the main Anesthesiology Department Office and the Leffingwell Library are accessible by a keypad/badge reader and will be programmed with your badge information.

## **Lockers**

You will be assigned a locker in the OR locker room at LLUCH. Holly Perez ([holperez@llu.edu](mailto:holperez@llu.edu)), our administrative assistant will help you in obtaining a locker. This locker will be shared with another resident/fellow so do not leave any valuables in the locker.

## **Mailboxes**

All fellows are assigned mailboxes in the Department Office (room 2532). These mailboxes should be checked regularly. In addition, the department bulletin boards along the hallway in the department) should be reviewed for announcements and information on a regular basis as well as the department website [lomalindaanesthesiology.pbworks.com](http://lomalindaanesthesiology.pbworks.com) (WIKI).

## **Fellow Office**

Room 2587 on the second floor at LLUMC is the fellow office and is accessible by a badge reader.

## **E-mail Accounts**

Each fellow is assigned a LLU e-mail account, which will be the fellow's official e-mail account for all departmental communication and information. The Program Director and Fellowship Coordinator will use this e-mail account to communicate with the fellows about departmental notices & memos, scheduling issues and other various informational items of importance. All fellows should check their e-mail on a regular basis.

## **House Staff Office**

It is the function of the House Staff Office (HSO) to ensure that all residencies/fellowships are functioning appropriately and that all training programs have ACGME accreditation. Dr. Daniel Giang is the Vice President for Graduate Medical Education. The House Staff Office can be reached at (909) 558-6131 or ext. 66131 in-house. The HSO coordinates all resident/fellow payroll activities. The HSO also oversees the House Staff Association, which assists residents/fellows in any negotiations with the hospital and in planning social and other activities. Resident/fellow representatives to this association are elected annually.

## Scrubs

Each fellow will be given badge access to a total of 5 pieces of scrubs. Please see Jhunclaire (x44191) or Holly Perez (x41688) if you have any problems with access.

## Moonlighting

If the fellow desires to moonlight, approval to do so must first be granted by the Program Director. Any clinical duty hours dedicated to moonlighting are included in the 80-hour work week totals; thus, a schedule of the fellow's outside work duties must be given to the Program Director in order to comply with the 80 hours per week limit.

## Leffingwell Library

The Anesthesiology Department has one of the most comfortable libraries on campus. It contains pertinent, up-to-date reference sources – textbooks, journals, and audio-visual materials. **This is a reference library only.** The library is available for use 24 hours a day as long as it is not being used for a scheduled meeting. Current *Audio Digest* tapes and an assortment of videotapes/DVDs are also located in the library. The fellow may ask for assistance in checking out these audiovisual resources. Please remember that **books, journals, and audio-visual materials are not to be removed from the library.**

## Ethics and Professional Behavior

The Department recruits and selects individuals of high moral and ethical character for fellowship training. Therefore, the expectation is that all fellows will conduct themselves in a very appropriate and honest manner at all times. If a pattern of behavior is demonstrated that is inconsistent with the department's values, the fellow will be reprimanded and possibly terminated from the program. In particular, honesty is expected at all times during fellowship. The ACGME feels that professionalism and ethical behavior are core characteristics of all physicians and the lack of demonstration of such behavior is grounds for dismissal. In addition, a pattern of dishonesty towards any department member, fellow or resident is grounds for termination from the program. Remember to treat all individuals within the workplace with respect and courteous behavior is expected of a professional, particularly a physician. This applies to interactions with ancillary medical personnel (nursing staff, OR techs, etc.) Any reports from hospital nurses, therapists, and ancillary staff regarding disrespectful behavior or conduct will first be reviewed with the fellow and then placed into the fellow's record.

## **Call Duties**

Each fellow will cover one weekend of at-home or pager call with a 30-minute response time, except on the following rotations:

- NICU
- PICU

Please schedule the weekend you desire to cover with Debbie Whitaker prior to the start of each month. Debbie can be reached at ext. 42257, [dwhitaker@llu.edu](mailto:dwhitaker@llu.edu). Only one fellow should be on home-call on any given day. The attending on call will contact the fellow to cover index cases or routine cases that have a valuable learning opportunity.

When a fellow is called into the hospital from home, the hours spent in-house are counted towards the 80-hour limit.

## **Vacation**

In order to maximize the educational experience, vacation is not allowed during PICU rotations. All vacation requests forms are submitted to Holly Perez ([hperez@llu.edu](mailto:hperez@llu.edu)) in the department of anesthesiology, ext. 41688.

## **Administrative Days**

The fellows may be allocated non-clinical days during OR rotations for scholarly activity depending on satisfactory clinical performance. Only one fellow will have scheduled non-clinical time on any given day. Any planned administrative days should be scheduled with Holly and approved by Dr. Ghazal. You will be notified if the request is approved by the Program Director or Associate Program Director. Any subsequent change also needs to be approved.

Rotations that allow non-clinical days are main OR, neuro, and cardiac.

If an Index case such (e.g. TEF, diaphragmatic hernia, heart or kidney transplant and any other complex neonatal case) is scheduled in the OR on a fellow's non-clinical day then the fellow is expected to reschedule the administrative day.

# Reporting, Case Logs and Evaluations

## Medical Records

It is imperative that the fellow complete all medical record charts promptly. The Children's Hospital bylaws state that a physician with charts incomplete for longer than two weeks will be suspended from the staff until his/her charts are completed. The House Staff Office will withhold pay for the duration of the suspension. The Medical Records Department is very faithful with notification of any delinquency in this area. They are also very cooperative in assisting with "cleaning up" a fellow's patient list. Most of the time, all that is required is a signature or a post-anesthesia note. A fellow may electronically sign charts at most computers throughout the hospital or remotely once access is obtained through the IT department. Failure to complete medical records is viewed negatively and is considered "unprofessional" behavior. A pattern of not completing charts on time is subject to disciplinary action.

## MedHub

The Department of Anesthesiology uses MedHub for many resident-related activities and processes. The GME Office uses these websites for on-boarding requirements and will set up an account for each fellow. Information available through this includes: memos, announcements, evaluations, duty hour logs, and educational materials (lectures, handouts, etc).

## ACGME Case Logs

The Accreditation Council for Graduate Medical Education (ACGME) is the governing body for all residency and fellowship programs. The ACGME requires that the fellow document a minimum number of required clinical cases and procedures during fellowship. It is imperative for each fellow to keep an accurate record of his/her anesthesiology experience. The ACGME's web-based Resident Case Log system ([www.acgme.org](http://www.acgme.org), <Resident Case Log System>) is the mechanism whereby the fellow enters his/her cases during training. Cases should be entered on a regular basis. The case logs MUST be kept current at all times. Failure to keep accurate records may result in disciplinary action.

**ACGME Case/Procedure Minimums – Pediatric Anesthesiology**

<b>Category</b>	<b>Minimum number effective July 1, 2014</b>
<b>Total number of patients</b>	240
<b>Age of Patient</b>	
neonates	15
1-11 months	40
1-2 years	40
3-11 years	75
12-17 years	30
<b>American Society of Anesthesiologists (ASA) level</b>	
ASA 1	25
ASA 2	42
ASA 3	50
ASA 4	20
ASA 5	0
ASA 6	0
<b>Procedures</b>	
epidural/caudal	10
general	200
intrathecal	0
peripheral nerve block	11
arterial cannulation	30
Central venous cannulation (CVC)	12
fiberoptic intubation	4
<b>Type of surgery</b>	
airway (except tonsillectomy and adenoidectomy)	7
cardiac-with bypass	15
cardiac-without bypass	5
craniofacial - without cleft	3
intra-abdominal/intracavitary	12
intracranial neurosurgery	9
intrathoracic non-cardiac	5
major orthopedic	5
total neonate emergency	3
total solid organ transplant	0
other operative	55
other non-operative	10
<b>Pain Management</b>	
consultations and Patient-Controlled Analgesia (PCA)	17

## Physician Wellness

The stressful, high-stakes work of taking care of pediatric patients combined with intense medical training requirements can compromise fellows' wellness. In addition to promoting clinical competency and knowledge, we also prioritize educating our fellows on how to better care for themselves. Numerous resources are available at Loma Linda University Health to maintain wellness. These resources are described in detail on MedHub.

Loma Linda University Health offers easy access to a primary care physician in family medicine and general internal medicine with an appointment hotline at (909) 558-6812. Please see flyer below.

### **EXCLUSIVELY FOR RESIDENTS AND THEIR FAMILIES**

Easy Access to a Primary Care Physician in  
Family Medicine & General Internal Medicine

Appointments are available on MyChart\*  
or call our Appointment Hotline at

**909-558-6812**

Monday – Thursday: 8 A.M. – 6:30 P.M.

Friday: 8 A.M. – 4 P.M.

New and established (physicals, sports physicals, procedures, pre-ops, same day sick visits, etc.) appointments are available until 6:40 p.m. in some locations with select providers. E-Visits available only on MyChart.

*\*When completing the reason for your visit, please add, "Resident or Resident family", to ensure that you are properly identified.*



LOMA LINDA UNIVERSITY HEALTH

## **Department Website & WIKI**

The Department of Anesthesiology's website is located at [www.lluanesthesia.com](http://www.lluanesthesia.com) and is a valuable resource for departmental information. Additional information is available on the WIKI which can be accessed via <http://lomalindaanesthesiology.pbworks.com/>. The WIKI has additional department information for fellows. Such information includes: daily OR case assignments, call schedules, rotation-specific information, journal articles, didactic lecture-related handouts/PowerPoints, notices, pictures, and social media-related information. The site is constantly updated with new and changing information, so it is encouraged that fellows check this site routinely.

In addition, a series of lectures based on the content outline for the Pediatric Subspecialty Board Exam is available for self-study on the department WIKI. Each topic also includes a set of pre- and post- lecture questions for self-assessment purposes. The lectures may be accessed on WIKI under Fellowship → Pediatric → Self-study lecture material.

## **Department Website**



HOME

ABOUT US

RESIDENCY/FELLOWSHIP

RESEARCH

EDUCATION

CONTACT

# **LOMA LINDA UNIVERSITY**

## **DEPARTMENT OF ANESTHESIOLOGY**

Welcome to the homepage of the Loma Linda University Department of Anesthesiology. We are glad you have chosen to visit our site! Here you can find information about our department, including our residency and fellowship programs, research department, staff, and many other items of interest. Take a look around and [let us know](#) if you would like further information.

# Department WIKI

## Department of Anesthesiology Loma Linda University

Read this [Product Safety Report](#) related to EMG endotracheal tubes

[Narcotic Discrepancy Video](#)

**DON'T FORGET TO LOG OUT IF YOU ARE USING A PUBLIC COMPUTER!**

- There is no automatic logoff.

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**Do you want Microsoft OFFICE 365 for free???? Do not illegally download it.** You can install on up to 5 computers, Mac or Windows, and also will be able to install iOS and android apps for free as well. Also get 1 TB of free online storage! All of this is available for you free with your .edu email account. Follow [this link](#) and away you go!

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**Remember** to log CONSTRUCTIVE NORA issues into the NORA reporting database.

To get started, click one of the links below, or the *Pages and Files* tab above, or use the *Navigator* to the right.



Attendings



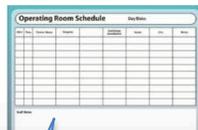
Residents



CRNAs



Fellows



Daily OR  
Assignments

# Educational Curriculum

The Pediatric Anesthesiology Fellowship will ensure that the trainee acquires the cognitive and procedural skills required for the practice of pediatric anesthesia. The educational curriculum will provide substantial access to diverse clinical material, as well as didactic lectures, journal club sessions, educational conferences, meetings, and knowledge assessment. Monthly evaluation of the fellow's progress will occur by the rotation director. The curriculum is outlined in detail.

## Pediatric Anesthesiology Rotation Schedule

<b>Rotation</b>	<b>Length (months)</b>
1. Cardiac Anesthesiology	2
2. Neuroanesthesia	1
3. Ambulatory/Regional Anesthesiology	1
4. Pain Management/Regional	1
5. OR/AC Neonatal Anesthesiology	3
6. Non-OR Anesthesiology (NORA)	0.75
7. Pediatric PACU	0.25
8. Neonatal Intensive Care Unit (NICU)	0.5
9. Pediatric Intensive Care Unit (PICU)	1
10. OR Chiefing Rotation	0.5
11. Research	1

## Educational Conferences

### Pediatric Anesthesiology Fellow Conference

Protected time is set aside to allow fellows to attend didactic lectures. The pediatric anesthesiology fellow conference is held weekly on Wednesdays in the fellow conference room (MC 2587) from 8:00 to 8:30 am, except for the first Wednesday of each month. The topics discussed will cover a variety of topics vital to the practice of pediatric anesthesiology. Attendance is mandatory unless on PICU or NICU rotations.

Please see attached conference schedule. Please note that fellows will lead the discussion for some of these conferences.

### Grand Rounds

The Department of Anesthesiology holds Grand Rounds weekly on Wednesdays in the Lobby Level Amphitheater from 7:00 to 8:00 am. The program committee selects the topics in anesthesiology or related areas of general interest. Speakers from grand rounds session include anesthesiology attendings, guest speakers, fellows and senior residents. Once a month, a morbidity & mortality/quality assurance meeting is held. Cases of particular interest or teaching value are presented for discussion. Attendance is encouraged when the topic is relevant to pediatric anesthesia.

**Each fellow is responsible for one Grand Rounds presentation during their fellowship year.** The date will be during the latter part of the year to allow presentation of a research project. Alternatively, the topic may be related to an area that interests you in this field.

## **Pediatric Surgery Subspecialty Grand Rounds**

This conference is held on the first Wednesday of each month in the Neonatology conference room in Coleman Pavilion, room 11121Y from 7:00 to 8:00 am. Attendance is highly encouraged unless on a rotation that would make attendance difficult, such as the NICU or PICU rotations.

## **Pediatric Anesthesia Lecture Series**

A series of lectures based on the content outline for the Pediatric Subspecialty Board Exam is available for self-study on the department WIKI. Each topic also includes a set of pre- and post-lecture questions for self-assessment purposes. The lectures may be accessed on WIKI under Fellowship → Pediatric → Self-study lecture material.

## **Pediatric Cardiology Conference**

A multi-disciplinary pediatric cardiology conference is held every Wednesday at 4:30 pm in Room 2423 to discuss challenging cases. Your attendance is highly encouraged especially while on the cardiac anesthesia rotation.

## **Journal Club**

The Journal Club presentations have been incorporated in the Pediatric Anesthesiology Fellow Conferences.

## **Research**

The Department of Anesthesiology, under the direction of Dr. John Lenart, has a very active research division with projects that have led to presentations at national meetings and subsequent publications. Each fellow will have the opportunity to meet with Dr. Patrick Leiter who is the Director of Pediatric Anesthesiology Research to become involved in a project to fulfill the academic project requirement.

## **Simulation**

Loma Linda University Medical Simulation Center located on the 4<sup>th</sup> floor of the Centennial Complex will be available to fellows while on the Research rotation every Monday from 0800-1100 to enhance education and clinical practice. A fellow may also participate in the development of a simulation scenario.

## **Quality Improvement (QI)**

Fellows are expected to participate in a QI project during training. Dr. Harmony Carter and Dr. Jason Gatling are in charge of the departmental QI concerns and will be able to assist in identifying projects.

## **Preoperative Planning & Calling Attendings**

Fellows are expected to text, call, email or 2-way the attending they are scheduled to work with the following day to discuss the cases. This is an important part of the educational process and gives the fellow an opportunity to discuss educational topics for the next day with their attending.

The room assignments are posted on WIKI between 2 and 5 each afternoon. If unable to access WIKI, please call the main OR X44410 or CHOR x44442 for assignments.

## **Pediatric Critical Events Checklist**

The Society for Pediatric Anesthesia website has created a link to “Diagnosis and Treatment of Critical Events” at [pedsanesthesia.org](http://pedsanesthesia.org)

A free mobile App is available “pedi crisis” and is also a good study tool.

## **Department of Anesthesiology Policies** *(see attached)*

1. Fellow Supervision Policy
2. Selection of Fellows Policy
3. Fellow Evaluation Policy
4. Fellow Duty Hours Policy
5. Protocol for Fellows Remaining on Duty Beyond Scheduled Hours
6. Disciplinary Actions and Termination Policy
7. Faculty Involvement in Patient Care Protocol
8. NPO Guidelines
9. Criteria for Discharge of Ex-premature Infants
10. Monitoring for Patients with Central Sleep Apnea
11. Pre-operative Sedation
12. Handover/Transfer Policy & Handoff Tool
13. Tranexamic Acid Dosing for Pediatric Spine Surgery
14. OR-NICU Process Improvement Initiative

# **OVERALL PROGRAM GOALS & OBJECTIVES**

## **OVERALL PROGRAM**

### **Introduction**

Pediatric Anesthesia is the subspecialty of anesthesia that addresses the unique physiological, pharmacological, and psychological needs of infants and children, and the technical skills required for the anesthetic care of these patients. The primary goal of the ACGME approved Pediatric Anesthesia Fellowship Program at Loma Linda University Medical Center and Children's Hospital is to provide the trainee with the necessary skills and experience to safely deliver anesthesia to the full spectrum of pediatric patients.

### **Prerequisites and History**

Candidates for this program must have successfully completed an anesthesia residency.

The program offers a one-year clinical track.

The year aims to fulfill the clinical requirements of the fellowship. The Pediatric Anesthesia Fellowship Program at Loma Linda University Medical Center and Children's Hospital has all of the necessary ingredients to insure that an individual completing the training program will be proficient in providing anesthesia care for neonates, infants, children, and adolescents undergoing all types of surgical, diagnostic, and therapeutic procedures, pain management and follow up care.

Specific goals and objectives are outlined below. These goals and objectives are discussed and modified on an annual basis by both faculty and trainees at the annual fellowship review conference. The trainees receive this information during the application and interviewing process, and during orientation.

### **Rotations**

The Pediatric Anesthesia Fellowship curriculum at LLUCH includes the following rotations:

- Cardiac anesthesia – 2 months
- Neuroanesthesia – 1 month
- Ambulatory anesthesia – 1 month
- Pain management and Regional anesthesia – 1 month
- General Pediatric Anesthesia/Advanced Clinical Pediatric Anesthesia – 3 months
  - Major orthopedic surgery (e.g., spine surgery)
  - Craniofacial surgery
  - Intra-thoracic surgery
  - Solid organ transplantation
  - Airway surgery
  - Neonatal surgical emergencies
    - Tracheoesophageal fistula (TEE) repair
    - Congenital diaphragmatic hernia (CDH) repair
    - Necrotizing enterocolitis
    - Gastroschisis/Omphalocele repair
- Non-OR Anesthesia (NORA) – 3 weeks
  - Radiology
  - Radiation medicine
  - Cardiovascular lab
  - Hematology/Oncology
  - Gastroenterology
  - Pulmonology
- Pediatric Post Anesthesia Care Unit (PACU) – 1 week
- NICU – 2 weeks
- PICU – 1 month
- Research – 1 month
- OR Chiefing rotation – 2 weeks

## **Clinical Goals**

By the end of the one-year fellowship the fellows will:

- Be proficient and certified in Pediatric Advanced Life Support
- Have superior skills in the preoperative assessment, preoperative preparation and medication, intra-operative management, and postoperative care of pediatric patients
- Be proficient in all regional and general techniques for inpatient and ambulatory surgery in children of all ages
- Become proficient in advanced anesthesia skills for the pediatric patient and techniques including use of complex external and invasive monitoring systems
- Become proficient in the management and leadership skills required of an independently practicing pediatric anesthesiologist

## **Education Objectives**

At the end of their fellowship the fellows will be able to demonstrate competency in all 6 of the ACGME core competencies:

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

## **Patient Care**

Fellows must be able to provide care that is compassionate, appropriate and effective for children undergoing anesthesia, for children with postoperative pain and for children in the critical care units. Fellows will be expected to:

- Gather essential and accurate pre-operative information about their patients, especially more complicated children
- Develop and carry out appropriate anesthetic management plans
- Understand the appropriate use of various monitoring modalities
- Pay close attention to the intra-operative care of children undergoing anesthesia for complex procedures
- Manage complex intra-operative events relevant to the particular subspecialty area
- Demonstrate superior multi-tasking skills, team working, situational awareness and decision making
- Develop a range of advanced technical skills necessary to provide optimal patient
- Maintain a safe environment for caring for children
- Develop advanced problem solving techniques
- Perform adequate documentation of all aspects of care provided
- Evaluate children post operatively
- Develop increasing independence in the course of the year

## **Medical Knowledge**

Fellows must demonstrate knowledge about established and evolving biomedical, clinical and social-behavioral sciences as they apply to the practice of anesthesiology. During their fellowship they are expected to develop an in-depth knowledge of:

- All the pediatric anesthesia subspecialties – these are defined in the individual rotation goals and objectives

## **Practice Based Learning**

Fellows must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. Fellows will be expected to:

- Recognize and correct gaps in their knowledge and expertise

- Use the various modalities available for practiced based learning including self-directed reading, didactic lectures, conferences & grand rounds, morbidity & mortality/quality improvement (QI) conferences, journal clubs, local, national & international meetings, journals
- Obtain and use information technology to manage information, access on-line medical information
- Locate, appraise and assimilate evidence from scientific studies related to the practice of anesthesiology, critical care and pain medicine
- Apply knowledge of study designs and statistical methods to the appraisal of clinical studies
- Use “real time” simulation in anesthesia education
- Facilitate the learning of students and other health care professionals who are attached to the anesthesiology department

### **Interpersonal and Communication Skills**

Fellows must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their families, and professional associates. Fellows will be expected to:

- Create and sustain a therapeutic and ethically sound relationship with patients and their families
- Consider cultural and language differences in interpersonal interactions
- Use effective listening skills
- Elicit and provide information using effective nonverbal, explanatory questioning and writing skills
- Maintain clear and concise preoperative, intra-operative & postoperative records
- Work effectively with others as a member or leader of a healthcare team or other professional group
- Maintain composure in stressful situations
- Project competence and confidence
- Provide therapeutic direction and leadership as appropriate to the clinical situation

### **Professionalism**

Fellows must demonstrate a commitment to carrying out professional responsibilities, adhere to ethical principles and show sensitivity to a diverse patient population. Fellows will be expected to:

- Demonstrate understanding and adherence to the domains of medical professional behavior including: altruism, honor and respect, caring and compassion, respect, responsibility and accountability, excellence and scholarship
- Understand and demonstrate the ethical principles of informed consent, patient confidentiality, surrogate decision making, do not resuscitate orders and business practices
- Demonstrate sensitivity and responsiveness to patients’ culture, age, gender and disabilities
- Interact with nursing and other staff in a polite and respectful way
- Arrive for work on time
- Answer pagers in a timely way
- Comply with hospital and departmental policies and procedures

### **Systems Based Practice**

Fellows must 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. Fellows will be expected to:

- Demonstrate effective operating room management and facilitate case turn over
- Practice cost-effective and resource allocation that does not compromise quality of care
- Demonstrate anesthetic practices that include systems issues such as reducing costs and working as a member of an interdisciplinary team member (PACU, pre-anesthesia clinic, pain service, CICU)
- Understand the broader aspects of the health care system and how the care they offer patients influences, and is influenced by other parts of the health care system
- Learn about and participate in quality improvement programs, control of health care costs, practice management, effective patient flow through the operating room system including the pre-anesthesia clinic and post-anesthesia care unit

- Understand the importance of working as part of a team
- Become advocates for improving the health care system

### **Evaluation Process**

The supervising faculty member completes an electronic evaluation form on the fellows after completion of each rotation. Fellows are evaluated on their ability to successfully meet the goals and objectives of each rotation based on the six core competencies.

- Patient Care
  - Demonstrates caring behavior toward patients and families
  - Demonstrates consistent preparation for the safe delivery of patient care
  - Synthesizes clinical data resulting in diagnoses that reflect the patient's condition
  - Develops appropriate patient management plans and follows through on identified problems
  - Performs procedures proficiently and safely
- Medical Knowledge
  - Locates and assimilates medical knowledge from the medical literature related to the patient's health problems
  - Seeks and incorporates feedback to improve clinical skills
  - Facilitates the learning of residents, students and colleagues
- Interpersonal and Communications Skills
  - Listens and communicates effectively to build therapeutic and collaborative patient relationships
  - Works as an effective member of the health care team
- Professionalism
  - Available, punctual, and willingly accepts patient responsibilities
  - Demonstrates respectful, ethical, and culturally sensitive clinical practices
- Systems-Based Practice
  - Practices cost-effective health care in coordination with other health care providers
  - Provides quality care in a timely and efficient manner
  - Effectively uses systematic approaches to reduce error and improve patient care

Nurses also complete 360 evaluation forms on the fellows based on the six core competencies. All evaluations are reviewed with the program director during the fellows' semi-annual face-to-face evaluation meeting, as well as by the Clinical Competence Committee.

Fellows will have the opportunity to evaluate the attending staff and rotations through new innovations.

# **CARDIAC ANESTHESIA ROTATION GOALS & OBJECTIVES**

## **CARDIAC ANESTHESIA ROTATION**

### **Goals**

The cardiac anesthesia rotation is a 2-month clinical activity designed to provide an experience regarding the physiology and anesthetic management of children with congenital heart malformations. At the completion of this rotation the trainee

- Should be able to analyze the physiologic implications of common cardiac malformations and understand their implications for anesthetic planning and perioperative management.
- Be well-rounded in the perioperative care of pediatric patients with cardiac disease undergoing routine cardiac as well as non-cardiac diagnostic and therapeutic procedures
- Be able to independently provide anesthesia, including appropriate invasive monitoring, for infants and children with less complicated cardiac lesions like atrial septal defects, ventricular septal defects and atrioventricular canal defects.
- Be able to assess patients with more complicated lesions like transposition of the great arteries, pulmonary atresia with intact ventricular septum and hypoplastic left heart syndrome, and provide a sound anesthetic plan for their management

### **Objectives**

#### **Patient Care and Technical Skills**

- Gain exposure and understand essential principles of the medical and surgical management of pediatric cardiac lesions, including acute post-operative management.
- Gain exposure and familiarity with the anesthetic management for surgical repair of cyanotic and acyanotic congenital heart lesions
- Gain familiarity of essential principles of pediatric cardiopulmonary bypass and hypothermic arrest
- Institution and monitoring of effective anticoagulation
- Institution and monitoring of regional organ tissue oxygenation
- Institution and monitoring of hypothermia
- Ordering of blood and blood products for use during bypass cases
- Gain exposure and familiarity with anesthetic management of pediatric cardiac catheterization and electrophysiological procedures; diagnostic and therapeutic.
- Participating in diagnostic and therapeutic cardiac cases and hybrid cases in the cath lab
- Demonstrate proper performance of cardiopulmonary resuscitation in children
- Resident is to be certified in Pediatric Advanced Life Support
- Demonstrate ability to initiate proper fluid resuscitation
- Demonstrate ability to utilize pharmacologic agents in support of the circulation
- Demonstrate ability to utilize electrical therapy for malignant dysrhythmias
- Demonstrate proficiency in the placement of venous and arterial catheters, including central venous catheters
- Use of ultrasound for line placement
- Understand the basic principles of transesophageal echocardiography
- Transport of the critically ill infant to and from the critical care unit
- Effective transfer of information and care with the critical care unit
- Evaluation of patients with significant cardiovascular and/or pulmonary disease undergoing non-cardiothoracic surgery and providing advice regarding peri-operative management of such patients to other anesthesia providers, in conjunction with the supervising attending
- Exposure to cardiac anesthesia including management of children undergoing cardiopulmonary bypass will be provided during the cardiac anesthesia rotation.

## **Medical Knowledge**

- Understand the anatomy and pathophysiology of different physiologic categories of CHD
- Understand fetal and transitional circulation
- Understand the physiology of cardiopulmonary bypass and differences between pediatric and adult cardiac bypass
- Understand the physiology of deep hypothermic circulatory arrest
- Understand the principles and application of single-lung ventilation in pediatric patients
- Understand the principles of transfusion, management of anti-coagulation for cardiopulmonary bypass, and management of postoperative hemorrhage
- Understand the principles of mechanical support of the circulation (extracorporeal membrane oxygenation and ventricular assist device)
- Understand the pathophysiology and treatment of pulmonary hypertension

## **Practice-Based Learning**

- Attend and participate in lectures, case conferences, journal club meetings, and other scheduled didactic activities
- Demonstrate evidence of outside study. The fellow should seek additional information about congenital or acquired heart disease, cardiac surgical procedures, cardiopulmonary bypass and pediatric cardiovascular critical care
- Demonstrate an investigatory approach to and analysis of clinical situations
- Apply basic and clinical supportive sciences to anesthetic management
- Critically review and discuss current publications on topics pertaining in to the practice of pediatric cardiothoracic anesthesia as well as anesthesiology and medicine in general
- Assimilate into clinical practice new advances upheld by current peer-reviewed literature
- Demonstrate an understanding of how to use various technological resources, such as computerized medical databases, to obtain current information

## **Interpersonal and Communication Skills**

- Effective communication with patients and families to create and sustain professional and therapeutic relationships
- Effective communication with physicians, other health professionals and organizations
- Effective participation as a member or leader of a health care team or organization
- Consultative role with physicians and health professionals
- Comprehensive, timely, and legible medical records
- Counseling patients and families
  - Measures needed to enhance or maintain health and function and prevent disease and injury
  - Active participation in care
  - Information that fosters increased independence and compliance
  - Assistance to patients and families to understand the illness and treatment, share in decisions, and give informed consent
  - Compassionate provision of “bad news”, allowing families time to grieve and adjust
  - Identification and effective utilization of other resources, e.g., case managers, pastoral care
- Care that is sensitive to each patient’s cultural, economic, and social circumstances
  - Sensitivity to age, gender, culture, and ethnicity
  - Appreciation of economic factors influencing decision making and their impact on families
- Competence in meeting the unique needs of pediatric patients and their families
  - Psychological needs
  - Multiple family structures
  - Special needs of children with complex congenital abnormalities

## **Professionalism**

- Prove to be responsible, reliable, and conscientious to all members of the care team
- Demonstrate a willingness to accept constructive feedback and change practice when indicated
- Demonstrate initiative by preparing for cases and asking appropriate questions
- Respect of all patients and families as well as colleagues who are different with respect to age, culture, disabilities, ethnicity, gender, and/or sexual orientation
- Acceptance of responsibility for patient care, including continuity of care
- Ethics knowledge and consistent demonstrate of ethically sound practice
- Professional behaviors
  - Integrity
  - Honesty
  - Compassion
  - Empathy
  - Dependability
  - Commitment

## **Systems-Based Practice**

- Advocacy for patients and families
- Effective participation in health care teams and alternative health care settings
- Awareness of cost of diagnostic tests, procedures and medications
- Advocacy for quality patient care, optimal patient care systems, and reduction in medical errors
- Health promotion and prevention of disease and injury
- Knowledge of basic principles of practice management
  - Interaction between practices and larger health care system
  - Models of practice and delivery systems
  - Basic principles of health care reimbursement and billing and coding

## **Evaluation**

Fellows are evaluated on care of patients undergoing cardiothoracic and vascular procedures. An electronic evaluation is completed by the supervising faculty member, which focuses on the fellow's ability to successfully meet the goals and objectives stated above based on the six core competencies.

# Pediatric Cardiac Anesthesiology Rotation

## ABA Pediatric Anesthesiology Exam Content Outline: Cardiovascular System

1. Anatomy and Physiology:
  - a. Prenatal and postnatal development
  - b. Fetal, transitional, and adult circulation
2. Clinical Science:
  - a. General considerations
    - i. cardiovascular effects on anesthetic uptake and delivery
    - ii. anesthetic effects on the cardiovascular system
    - iii. vasoactive medications
  - b. Disease states
    - i. acyanotic lesions
    - ii. cyanotic lesions
    - iii. palliative procedures
    - iv. pulmonary hypertension
    - v. infectious diseases
    - vi. cardiomyopathies
    - vii. pericardial disease
    - viii. intracardiac masses
    - ix. arrhythmic lesions
    - x. heart transplantation
  - c. Anesthesia for cardiac procedures
    - i. complete anatomic and physiological repairs
    - ii. single ventricle procedures
    - iii. palliation surgery
    - iv. management and consequences of cardiopulmonary bypass
    - v. deep hypothermic circulatory arrest
    - vi. anesthesia for pacemaker / implantable cardiac defibrillator insertion and replacement
    - vii. anesthesia for diagnostic, interventional and electrophysical procedures
  - d. Anesthesia for the adult with congenital heart disease
  - e. Cardiopulmonary resuscitation

## Pre-op evaluation

Thoroughly review preop labs, vitals, H&P documents, echo, cath reports, etc.

*Must know key facts essential to managing and inducing patient with CHD:*

- Right heart versus left heart lesion
- Ventricular function
  - RV and LV function
- Cardiac anatomy
  - Single ventricle
  - Abnormal coronaries
  - Severe regurgitation
  - RVOT/LVOT obstruction
- Presence of shunts
  - R→L versus L→R
  - Intracardiac (ASD or VSD)
  - PDA (+/-)
  - How does the blood flow to the *lung* versus *systemic*?
- O2 saturation
  - Pre & post ductal baseline SpO2
  - Pre-existing lung disease
  - Pulmonary HTN
- Starting Hct
- Dosing weight (for all induction medication, infusion and emergency medication)

## Pre-op questions to cover in addition to standard questions/exam

- Prior cardiac surgeries/procedures
- Baseline O2 saturation
- Need for supplemental O2
- Last illness/URI
- Activity/feeding tolerance, recent changes

## Premedication

- OK to order in children without significant OSA
- Verify no active URI or concerns for case cancellation prior to ordering
- Wait at least 10 minutes after administering before separating child from parent
- Dose:
  - **Midazolam 0.5 mg/kg PO/Gtube, max dose 20 mg** (up to 0.75 mg/kg IBW in children < 6 yrs)
  - **Midazolam 0.1 mg/kg IV, max dose 2 mg**

## Setting up the room

- **Order blood products**
  - **PRBCS:** 2 units (4 mL/kg raises Hb by 1)
    - *washed* if weight <10 kg, takes longer so order early
  - **FFP:** 1 unit (10-15 mL/kg to increase factor levels by 15-20%)
  - **Platelets and cryo:** generally ordered after going on CPB, please discuss with attending
  - **Cell saver** available if >10 kg
  
- **Infusions through spider with carrier fluid (syringe pumps if <45 kg)**
  - **Dopamine** (5 mcg/kg/min)
  - **Nitroglycerin** (0.5 mg/kg/min)
  - **Milrinone** (0.5 mg/kg/min, not needed for simple ASD/VSD repairs)
  - **Tranexamic acid\***
    - 60 mg (0.6 mL) to given to perfusionist to add to pump prime
    - 0-12 mo: 50 mg/kg LD, 10 mg/kg/hr infusion
    - >12 mo: 20 mg/kg LD, 10 mg/kg/hr infusion
  - **Epinephrine** (have available in room if <10 kg or concern for heart failure)

\* **Tranexamic Acid** is available in the pediatric anesthesia workroom pyxis. May draw up undiluted 100 mg/ml concentration and infuse using a syringe pump. Confirm dose with attending, max LD 2 gms. Do not use for shunts (BTS), cases involving the coronaries, or in hypercoagulable patients, check with surgeon if needed. **Do not use as the carrier fluid. Discontinue prior to transfer to the ICU.**

- **Draw up induction/anesthesia maintenance meds**
  - **Fentanyl**
    - High dose (TIVA, remains intubated): 50 mcg/kg
    - Fast track (anticipated extubation), max dose during anesthesia:
      - <5 yo: 15 mcg/kg
      - 5-10 yo: 12.5 mcg/kg
      - >10 yo: 10 mcg/kg
  - **Ketamine** or **propofol** (discuss with attending)
  - **Rocuronium**
  - **Morphine** 0.025 mg/kg- consider titrating in after extubation or giving in place of post-bypass fentanyl dose (discuss with attending)
  - **Precedex** for  $\geq 2$  yo: prepare 0.25 mcg/kg bolus (4mcg/ml concentration) once stable off CPB, have a second dose ready for post-extubation as needed. Consider an infusion if at high risk for post-extubation agitation or if patient is to remain intubated
  - **Ofirmev** 12.5 mg/kg after CPB, if extubating
  
- **Draw up emergency meds (IM needle available, TB syringes if <10 kg)**
  - **Epinephrine** 10 mcg/ml (also 1mcg/ml in 10 mL syringe if < 5 kg)
  - **Phenylephrine** 40 mcg/ml (also 4 mcg/ml in 10 mL syringe if < 5 kg)
  - **Atropine**
  - **Succinylcholine**
  - **Calcium gluconate** (undiluted, use 3 mL syringe if <5 kg)
  - **Lidocaine** (2 mg/kg)
  
- **Other medications**
  - **Cefazolin** 25-30 mcg/kg, re-dose every 4 hours
  - **Heparin** 400 U/kg for CPB cases, 100 U/kg if plan is off pump (RT will unit-dose)
  - **Protamine** (RT will unit-dose)
  - **Decadron**-dose drawn and given by perfusionist in CPB prime, clarify if giving for older kids (dose 1mg/kg, max dose 20mg)

## Line Sizing Tips

### IJ CVL line sizing guidelines (please discuss with attending):

- <4 kg: 4fr 5cm
- ≥4 kg: 5fr 5cm
- ≥10 kg: 5fr 8cm
- ≥20 kg: 5fr 12cm
- ≥30 kg: 7fr 16cm
- ≥60 kg: 8fr quad lumen

**\*Discuss with surgeon regarding placing femoral CVL for Norwood and BDG procedures\***

### CVL expected insertion length (cm) for R IJ:

- Height ≤ 100cm: ht(cm)/10 – 1
- Height >100cm: ht(cm)/10 – 2

### Arterial line sizing:

- <3.5 kg
  - Radial: 24g Braun or 24g 2.5cm Arrow
  - Femoral: 24g 5cm Arrow
- ≤10 kg
  - Radial: 2.5fr 2.5 cm Arrow or 22g short Braun
  - Femoral: 22g long Braun or 22g 5cm Arrow
- >10 kg
  - Radial: 22g Braun or Arrow
  - Femoral: 3fr 5cm catheter
- >25 kg
  - Radial: 20g catheter (adult aline kit)
- Notes:
  - May use umbilical aline if in place
  - Do not attempt ulnar artery cannulation if same-extremity radial artery puncture attempted
  - Avoid LUE aline for IAA repairs (L subclavian may be sacrificed)
  - Avoid same side as aberrant subclavian artery

### TTE probe sizing:

- ≤3 kg: neo probe
- >3 kg: pediatric probe
- >25 kg: pediatric or adult probe
- ≥50 kg: adult probe

## Pediatric Thoracic Anesthesia

When lung isolation is required for infants, typically a main-stem technique with a single lumen endotracheal tube is used. In older infants and toddlers, bronchial blockers can be used.

The noodle scope fits into ETTs > 2.5 mm and the 2.8 mm bronchoscope fits into ETTs >3.5 mm.

Below is a table to estimate age-appropriate methods of single-lung ventilation (BB=bronchial blocker; DLT=double lumen tube; ID=internal diameter, where measurements=mm). If cuffed ETTs are selected in patients less than 8 years old, the size should be decreased by 0.5 mm.

Age (yr)	ETT (ID)	BB (Fr)	Univent	DLT (Fr)
0.5-1	3.5-4.0	2		
1-2	4.0-4.5	3		
2-4	4.5-5.0	5		
4-6	5.0-5.5	5		
6-8	5.5-6.0	5	3.5	
8-10	6.0 cuffed	5	3.5	26
10-12	6.5 cuffed	5	4.5	26-28
12-14	6.5-7.0 cuffed	5	4.5	32
14-16	7.0 cuffed	5, 7	6.0	35
16-18	7.0-7.5 cuffed	7, 9	7.0	35, 37

Adapted from: Hammer GB, Fitzmaurice BG, Brodsky JB: *Methods for single lung ventilation in pediatric patients. Anesth Analg* 89:1426-1429, 199

## Pediatric Cardiothoracic Surgery References

### Books:

1. Pediatric Cardiac Anesthesia: C Lake, 4<sup>th</sup> edition, Lippincott-Williams 2005.
2. The Pediatric Cardiac Anesthesia Handbook: V Nasr, Wiley Blackwell 2017.
3. Pediatric Heart Surgery: A Ready Reference for Professionals: LE May, 5<sup>th</sup> Edition, MaxiSHARE 2012.
4. Illustrated Field Guide of Congenital Heart Disease and Repair: A Everett, 3<sup>rd</sup> Edition, Scientific Software Solutions 2011.

### Articles:

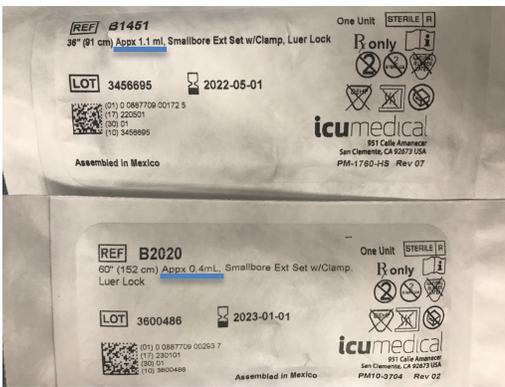
1. Burch T, et al. Congenital Supravalvular Aortic Stenosis and Sudden Death Associated with Anesthesia: What's the Mystery? *Anesthesia & Analgesia* 2008;107:1848-1854.
2. Yuki K, et al. Anesthetic management of noncardiac surgery for patients with single ventricle physiology. *J Anesthes* 2011; 2.5:247-256
3. Feinstein A, et al. Hypoplastic Left Heart Syndrome. *JACC* 2012;59:S1-S42.
4. Holtby H. Anesthetic considerations for neonates undergoing modified Blalock-Taussig shunt and variations. *Pediatric Anesthesia* 2014;24:114-119.
5. Gewilling M. The Fontan Circulation. *Heart* 2005;91:839-846.
6. Cholette J, et al. Patient Blood Management in Pediatric Cardiac Surgery: A Review. *Anesth Analg* 2017; Oct 5 [Epub ahead of print]

## Picture Appendix

LLUCH Anesthesia workroom fridge with high and low dose premixed infusions.



IV extension tubing 1.1 mL (top) and syringe pump tubing 0.4 mL (bottom). Do not use green extension tubing for pediatric cases.



[Print the echo and CVL reports for reference on DOS.](#) For cath reports, go to **Chart Review**→**Cardiology**→**CVL Report**. Scroll down and click on link as it appears below to get a full cath report. At the end of the report will be a sketch of the heart and associated pressures and anatomical variations.

**OnBase PDF Result**

[Show images for CVL Left And/Or Right Cath](#)

[To continue infusions in the ICU:](#) go to Orders (*not* manage orders) and select Continue in Recovery, then order the current infusion rate. In **admin inst** box, simply write “Contact house officer for titration parameters.” For phase of care, select **PACU to Post-op**.

**Orders**

Pre Intra Post

**Medications**

Discontinue Unselected

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Anesthesia Intra-op

dexmedetomidine (PRECEDEX) 200 mcg in sodium chloride 0.9% (NS) 50 mL infusion	Continue in Recovery Discontinue
DOPamine (peds >10 kg)	Continue in Recovery Discontinue
milrinone in D5.2NS (PRIMACOR) 10 mg/50 mL IV syringe	Continue in Recovery Edit
Nitroglycerin	Continue in Recovery Discontinue

Intravenous, Continuous PRN, Starting Mon 6/11/18 at 1636, Anesthesia Intra-op

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Pre-op

lactated ringers (LR) IV infusion	25 mL/hr, Intravenous, at 25 mL/hr, Continuous, Starting Mon 6/11/18 at 0610, For 30 days, Pre-op	Discontinue Edit
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# **NEUROANESTHESIA ROTATION GOALS & OBJECTIVES**

## **NEUROANESTHESIA ROTATION**

### **Goals**

At the completion of this rotation the trainee will:

- Fully understand the pathophysiology of the disease states that are managed by craniotomy including common tumor types and their anesthetic implications, head injury, vascular malformations and craniofacial anomalies
- Be skilled in the pre intra and post operative management of the neurosurgical patient including the manipulation of intracranial pressure, cerebral blood flow and blood volume autoregulation
- Be able to diagnose and manage peri-operatively both diabetes insipidus and SIADH
- Be aware of the risk factors, prevention of, diagnosis of and treatment of venous air embolism
- Understand the developmental changes in cerebral blood flow and intracranial pressure in the child of all ages & the subsequent implications this has on anesthetic management

### **Objectives**

#### **Patient Care**

##### *Preoperative evaluation*

A comprehensive and concise preoperative evaluation of the neurosurgical patient provides the critical information necessary to develop an appropriate plan of anesthetic management, anticipate potential problems and prepare contingency plans. It also provides the opportunity to discuss anesthetic options and plans with the patient and patient's family and answer any questions.

- Complete a thorough and concise preoperative evaluation in a timely manner
- Identify and prioritize medical and anesthetic concerns
- Identify the need for further medical work up or medical optimization prior to providing anesthesia
- Explain anesthetic options and plan to the patient and family members and answers questions in a clear and respectful manner
- Verbally present a clear and concise preoperative evaluation to supervising faculty
- Identify the need for and order appropriate preoperative medication

##### *Development of Anesthetic Plan*

- Develop and be able to justify an anesthetic plan based on preoperative evaluation, accurate and current scientific information, standards of care, clinical judgment, and patient preference if applicable
- Anticipate potential problems and develop contingency plans
- Verbally present a clear and concise anesthetic plan to supervising faculty.

##### *Intraoperative Anesthetic Management*

- Adequately prepare the anesthetic setting, including machine and equipment checks and availability of emergency/resuscitative drugs
- Perform procedures on awake patients in a manner that addresses patient comfort without compromising patient safety
- Effectively implement the anesthetic plan, while demonstrating the ability to adapt to changing clinical conditions
- Demonstrate proficiency in clinical/technical skills, including intravenous catheterization; direct laryngoscopy; fiberoptic intubation; placement of laryngeal mask airway; placement of invasive monitors such as an arterial catheter, central venous catheter, and placement of special monitors such as a precordial doppler
- Demonstrate an understanding of the risks, benefits, and indications for invasive monitoring
- Develop knowledge and skills necessary to interpret data from invasive monitors and special monitors, along with how to use this data in clinical decision-making.
- Interact with members of other medical specialties or other health care teams effectively as

an anesthesiology consultant for the purpose of providing patient-focused care

### *Postoperative Care*

- Demonstrate an understanding of common problems associated with the postoperative care of the neurosurgical patient in the post anesthetic care unit (PACU) and the neurosurgical intensive care unit (NICU), including pain, hemodynamic and respiratory derangements, and nausea and vomiting; demonstrate knowledge of appropriate treatment options
- Demonstrate an understanding of clinical criteria for discharge from the PACU

### **Medical Knowledge**

- Attend and participate in lectures, case conferences, journal club meetings, and other scheduled didactic activities
- Demonstrate evidence of outside study
- Demonstrate and investigatory approach to and analysis of clinical situations
- Apply basic and clinically supportive sciences to anesthetic management
- Understand and be able to discuss the following:

#### *Neuroanatomy and neurophysiology*

- Major structures of the brain, spinal cord, intracranial compartments, and their function
- Major white matter pathways of the brain and spinal cord
- Vascular supply of the brain and spinal cord
- Concepts of intracranial pressure, cerebral blood volume, and cerebral blood flow
- Autoregulation of CBF, including the effects of O<sub>2</sub> and CO<sub>2</sub> tension and blood pressure
- Relationship between CMRO<sub>2</sub>, CBF, CBV and effects of anesthetic agents
- Formation, composition and absorption of CSF
- Intracranial hypertension, including differential diagnosis, compliance/elasticity curve, CPP and treatment
- Osmolality, tonicity, osmotic pressure and implications for fluid management
- Neurologic findings in the brain-dead patient and the various methods by which diagnosis of brain death is made

#### *Electrophysiologic monitoring*

- EEG, SSEP, MEP brainstem auditory and visual evoked potentials
- Effects of ischemia and anesthetic agents

#### *Monitoring of ICP*

#### *Anesthetic agents and neuroanesthesia*

- Effects of various anesthetic agents including induction agents, narcotics, muscle relaxants, inhalation agents and vasoactive agents on ICP, CBF and CMRO<sub>2</sub>

#### *Venous air embolism*

- Indications for monitoring
- Techniques of monitoring, including relative sensitivities
- Placement of air aspiration catheter
- Diagnosis and treatment

#### *Brain and spinal cord protection*

- Primary and secondary injury
- Neuroprotectant drugs and interventions
- Proposed mechanisms of protection
- Physiologic and regional effects of decreased CBF

#### *Positioning for neurosurgery*

- Supine, prone, concorde, lateral, park bench, sitting
- Physiologic alterations and complications

#### *Anesthetic considerations for specific conditions, disease states, and procedures*

- Traumatic head injuries, including scalp injuries, skull fractures, epidural hematoma, subdural

hematoma, and intracerebral hematoma

- Traumatic spinal cord injury
- Intracranial neoplasms common in infants and children, especially infratentorial and midbrain lesions; medulloblastomas, cerebellar astrocytomas, brainstem gliomas, ependymomas of 4<sup>th</sup> ventricle, craniopharyngiomas, optic gliomas, pituitary adenomas, hypothalamic tumors, glioblastomas, oligodendrogliomas
- Neurogenic diabetes insipidus-diagnosis, perioperative management
- Hydrocephalus-perioperative management
- Craniostyostosis surgery and craniofacial reconstruction
- Neurovascular anomalies, including intracranial aneurysm, arteriovenous malformations, intracranial vascular occlusive disease (Moyamoya disease)
- Emergent neurosurgery, including subdural and epidural hematomas, and herniation
- Epilepsy surgery, including depth electrode placement, seizure focus ablation, and vagal nerve stimulator placement
- Congenital anomalies-encephalocele, meningomyelocele, myelodysplasia, Chiari malformations, and other spinal defects (lipomeningoceles, lipmyelomeningoceles, diastematomyelias, dermoid tracts)
- Surgery for neuroradiology (diagnostic-CT, MRI), including embolization of aneurysms, AVMs, and intracranial vascular angioplasty and stent placement
- Complex spine surgery, including transthoracic and transabdominal approaches with instrumentation
- Various ventricular and spinal shunts

### **Practice-based Learning and Improvement**

- Critically review and discuss current publications on topics pertaining to the practice of neuroanesthesia as well as anesthesiology and medicine in general
- Assimilate into clinical practice new advances upheld by current peer-reviewed literature
- Demonstrate an understanding of how to use various technological resources, such as computerized medical databases, to obtain current information

### **Interpersonal and Communication Skills**

- Effective communication with patients and families to create and sustain professional and therapeutic relationships
- Effective communication with physicians, other health professionals and organizations
- Effective participation as a member or leader of a health care team or organization
- Consultative role with physicians and health professionals
- Comprehensive, timely, and legible medical records
- Counseling patients and families
  - Measures needed to enhance or maintain health and function and prevent disease and injury
  - Active participation in care
  - Information that fosters increased independence and compliance
  - Assistance to patients and families to understand the illness and treatment, share in decisions, and give informed consent
  - Compassionate provision of “bad news”, allowing families time to grieve and adjust
  - Identification and effective utilization of other resources, e.g., case managers, pastoral care
- Care that is sensitive to each patient’s cultural, economic, and social circumstances
  - Sensitivity to age, gender, culture, and ethnicity
  - Appreciation of economic factors influencing decision making and their impact on families
- Competence in meeting the unique needs of pediatric patients and their families
  - Psychological needs
  - Multiple family structures
  - Special needs of children with complex congenital abnormalities

## **Professionalism**

- Prove to be responsible, reliable, and conscientious to all members of the care team
- Demonstrate a willingness to accept constructive feedback and change practice when indicated
- Demonstrate initiative by preparing for cases and asking appropriate questions
- Respect of all patients and families as well as colleagues who are different with respect to age, culture, disabilities, ethnicity, gender, and/or sexual orientation
- Acceptance of responsibility for patient care, including continuity of care
- Ethics knowledge and consistent demonstrate of ethically sound practice
- Professional behaviors
  - Integrity
  - Honesty
  - Compassion
  - Empathy
  - Dependability
  - Commitment

## **Systems-Based Practice**

- Advocacy for patients and families
- Effective participation in health care teams and alternative health care settings
- Awareness of cost of diagnostic tests, procedures and medications
- Advocacy for quality patient care, optimal patient care systems, and reduction in medical errors
- Health promotion and prevention of disease and injury
- Knowledge of basic principles of practice management
  - Interaction between practices and larger health care system
  - Models of practice and delivery systems
  - Basic principles of health care reimbursement and billing and coding

## **Evaluation**

Fellows are evaluated on care of patients undergoing neurosurgical and neurodiagnostic procedures. An electronic evaluation is completed by the supervising faculty member, which focuses on the fellow's ability to successfully meet the goals and objectives stated above based on the six core competencies.

# **AMBULATORY ROTATION GOALS & OBJECTIVES**

## **AMBULATORY ROTATION**

### **Goals**

The pediatric anesthesiology fellow will spend 4 weeks in the ambulatory surgery center. Upon completion of the Ambulatory Anesthesia rotation, trainee should be able to:

- Understand the preoperative outpatient evaluation process
- Recognize which patients are suitable for ambulatory surgery and those that are not
- Understand how to choose the type of anesthetic that is appropriate for any given patient: general, regional, sedation, or local
- Develop proficiency with airway devices used in the ambulatory setting
- Understand the need for intraoperative consideration of postoperative problems
- Understand the pharmacology of anesthetic agents, narcotics, sedatives and antiemetics that are used in ambulatory anesthesia
- Understand discharge criteria for outpatient surgery
- Develop the skills to provide excellent anesthetic care in a time-conscious and cost efficient facility

### **Objectives**

#### **Patient Care**

- Performance of a focused preoperative anesthesia pediatric ambulatory surgical patients.
- Establish and maintain professional relationships with pediatric ambulatory patients, their families, and the nursing staff involved in their care
- Describe appropriate anesthetic techniques for pediatric outpatients surgery; including the proper use of anxiolytic medications, opioids, and antiemetics using an evidence based approach
- Describe and perform appropriate regional anesthetic techniques for pediatric ambulatory patients
- Describe and perform the proper use of the Laryngeal Mask Airway (LMA) in pediatric ambulatory patients
- Identify and locate all supporting equipment and medications required to manage emergency situations such as cardiac arrest and malignant hyperthermia
- Participate in the assessment and stabilization of children in PACU phase I
- Evaluate patients for discharge from PACU

#### **Medical Knowledge**

- Discuss the criteria for pediatric outpatient surgery related to appropriate patient selection, surgical factors and results of pre-op lab tests
- Read assigned articles related to ambulatory anesthesia

#### **Practice-Based Learning and Improvement**

- Based on a review of the literature, identify the major causes of hospital admission from ambulatory centers in pediatric patients.
- Demonstrate ability to start cases on time and maintain an appropriate pace for an ambulatory center
- Analyze their clinical practice and use practice-based improvement techniques
- Demonstrate the ability to research the literature for information on patient conditions and evaluate the usefulness and validity of clinical studies using statistical analysis
- Use information technology to access on-line medical information, manage information, and support their own education
- Facilitate the learning of medical students and residents assigned to OSC

## **Interpersonal and Communication Skills**

- Effective communication with patients and families to create and sustain professional and therapeutic relationships
- Effective communication with physicians, other health professionals and organizations
- Effective participation as a member or leader of a health care team or organization
- Consultative role with physicians and health professionals
- Comprehensive, timely, and legible medical records
- Counseling patients and families
  - Measures needed to enhance or maintain health and function and prevent disease and injury
  - Active participation in care
  - Information that fosters increased independence and compliance
  - Assistance to patients and families to understand the illness and treatment, share in decisions, and give informed consent
  - Compassionate provision of “bad news”, allowing families time to grieve and adjust
  - Identification and effective utilization of other resources, e.g., case managers, pastoral care
- Care that is sensitive to each patient’s cultural, economic, and social circumstances
  - Sensitivity to age, gender, culture, and ethnicity
  - Appreciation of economic factors influencing decision making and their impact on families
- Competence in meeting the unique needs of pediatric patients and their families
  - Psychological needs
  - Multiple family structures
  - Special needs of children with complex congenital abnormalities

## **Professionalism**

- Prove to be responsible, reliable, and conscientious to all members of the care team
- Demonstrate a willingness to accept constructive feedback and change practice when indicated
- Demonstrate initiative by preparing for cases and asking appropriate questions
- Respect of all patients and families as well as colleagues who are different with respect to age, culture, disabilities, ethnicity, gender, and/or sexual orientation
- Acceptance of responsibility for patient care, including continuity of care
- Ethics knowledge and consistent demonstrate of ethically sound practice
- Professional behaviors
  - Integrity
  - Honesty
  - Compassion
  - Empathy
  - Dependability
  - Commitment

## **Systems-Based Practice**

- Advocacy for patients and families
- Effective participation in health care teams and alternative health care settings
- Awareness of cost of diagnostic tests, procedures and medications
- Advocacy for quality patient care, optimal patient care systems, and reduction in medical errors
- Health promotion and prevention of disease and injury
- Knowledge of basic principles of practice management
  - Interaction between practices and larger health care system
  - Models of practice and delivery systems
  - Basic principles of health care reimbursement and billing and coding

**Evaluation**

Fellows are evaluated on care of patients undergoing outpatient surgical procedures. An electronic evaluation is completed by the supervising faculty member, which focuses on the fellow's ability to successfully meet the goals and objectives stated above based on the six core competencies.

# **PAIN MANAGEMENT ROTATION GOALS & OBJECTIVES**

## **PAIN MANAGEMENT ROTATION**

### **Goals**

The 1-month pain/regional rotation during the pediatric anesthesiology fellowship is designed to provide a foundation experience that will allow trainees to acquire and maintain knowledge, psychomotor skills and attitudes necessary to provide excellent care of children who suffer acute pain. The pain rotation consists of

- Clinical care activities for pediatric patients in in-patient hospital units and critical care units and
- A didactic curriculum presented in lectures and conferences.

Upon successful completion of the rotation (learning the cognitive [content] material, psychomotor skills and affective [psychosocial] behaviors), the fellow will be able to:

- Perform appropriate assessment of a pediatric patient with a pain problem
- Prescribe management modalities to treat these problems

### **Objectives**

#### **Patient Care and Technical Skills**

Develop proficiency in performing a Pain Management Consult in children with:

- Acute post-surgical or post-traumatic pain
- Acute medical pain
- Develop proficiency in using the pain management modalities of:
  - intravenous patient-controlled analgesia
  - epidural analgesia
  - peripheral nerve blocks both single-dose and continuous infusion
  - intravenous, oral, and alternate routes for spectrum of opioid, NSAID, benzodiazepine, and sympathomimetic and neuropathic analgesic drugs
  - converting from intravenous or regional modalities to oral analgesics
- Obtain exposure to acute post-operative and inpatient consultative pain management on the Pain Service rotation

#### **Medical Knowledge**

- The pediatric anesthesia fellow will learn appropriate pain assessment techniques for verbal and non-verbal children.
- The pediatric anesthesia fellow will acquire basic knowledge of the pathophysiology of pain, pain pathways, pain transmission, and target sites for pain relief.
- The pediatric anesthesia fellow will acquire knowledge of the pharmacodynamics and pharmacokinetics of a variety of analgesic agents used for treatment of acute and chronic pain.
- The pediatric anesthesia fellow will acquire knowledge of interventional techniques for pain control appropriate for the condition and age of the patient.
- The pediatric anesthesia fellow will learn to utilize this knowledge to treat pediatric patients with chronic pain, cancer pain, or perioperative pain.
- Topics of discussion during this rotation will include:
  - Pathophysiology of pain
  - Postoperative pain management in children (caudal, epidural and peripheral nerve blocks)
  - Pharmacological management of pain in pediatric patients and non-pharmacological modalities
  - Pain crisis in sickle cell disease
  - Overview of invasive interventions

## **Practice-Based Learning and Improvement**

- Become familiar with pediatric pain management resources including textbooks, journals, and computer-based search resources
- Become familiar with multi-disciplinary resources in pediatric pain management including general and hospitalist pediatrics, rehabilitation medicine, neurology, psychiatry/behavioral medicine, oncology, neurosurgery

## **Interpersonal and Communication Skills**

- Effective communication with patients and families to create and sustain professional and therapeutic relationships
- Effective communication with physicians, other health professionals and organizations
- Effective participation as a member or leader of a health care team or organization
- Consultative role with physicians and health professionals
- Comprehensive, timely, and legible medical records
- Counseling patients and families
  - Measures needed to enhance or maintain health and function and prevent disease and injury
  - Active participation in care
  - Information that fosters increased independence and compliance
  - Assistance to patients and families to understand the illness and treatment, share in decisions, and give informed consent
  - Compassionate provision of “bad news”, allowing families time to grieve and adjust
  - Identification and effective utilization of other resources, e.g., case managers, pastoral care
- Care that is sensitive to each patient’s cultural, economic, and social circumstances
  - Sensitivity to age, gender, culture, and ethnicity
  - Appreciation of economic factors influencing decision making and their impact on families
- Competence in meeting the unique needs of pediatric patients and their families
  - Psychological needs
  - Multiple family structures
  - Special needs of children with complex congenital abnormalities

## **Professionalism**

- Prove to be responsible, reliable, and conscientious to all members of the care team
- Demonstrate a willingness to accept constructive feedback and change practice when indicated
- Demonstrate initiative by preparing for cases and asking appropriate questions
- Respect of all patients and families as well as colleagues who are different with respect to age, culture, disabilities, ethnicity, gender, and/or sexual orientation
- Acceptance of responsibility for patient care, including continuity of care
- Ethics knowledge and consistent demonstrate of ethically sound practice
- Professional behaviors
  - Integrity
  - Honesty
  - Compassion
  - Empathy
  - Dependability
  - Commitment
- Advocacy for patients and families
- Effective participation in health care teams and alternative health care settings
- Awareness of cost of diagnostic tests, procedures and medications
- Advocacy for quality patient care, optimal patient care systems, and reduction in medical errors
- Health promotion and prevention of disease and injury
- Knowledge of basic principles of practice management
  - Interaction between practices and larger health care system

- Models of practice and delivery systems
- Basic principles of health care reimbursement and billing and coding

### **Systems-Based Practice**

- Advocacy for patients and families
- Effective participation in health care teams and alternative health care settings
- Awareness of cost of diagnostic tests, procedures and medications
- Advocacy for quality patient care, optimal patient care systems, and reduction in medical errors
- Health promotion and prevention of disease and injury
- Knowledge of basic principles of practice management
  - Interaction between practices and larger health care system
  - Models of practice and delivery systems
  - Basic principles of health care reimbursement and billing and coding

### **Evaluation**

Fellows are evaluated on their ability to perform appropriate assessment of a pediatric patient with pain issues and prescribe management modalities. An electronic evaluation is completed by the supervising faculty member, which focuses on the fellow's ability to successfully meet the goals and objectives stated above based on the six core competencies.

# **REGIONAL ANESTHESIA ROTATION GOALS & OBJECTIVES**

## **REGIONAL ANESTHESIA ROTATION**

### **Goals**

Upon successful completion of the 1-month regional anesthesia/pain rotation the pediatric anesthesiology fellow will be able to:

- Choose the most appropriate regional anesthesia technique, based on patient characteristics (eg. age, type of operation, clinical status, psychological background)
- Perform neuraxial (spinal, caudal, epidural) and peripheral (penile, pudendal, ilioinguinal-iliohypogastric, iliofascial, femoral, sciatic, popliteal, axillary, median, ulnar, radial) blocks in awake and anesthetized patients
- Prescribe management modalities for neuraxially (caudal and epidural) and peripherally (iliofascial, femoral, popliteal, and axillary) placed catheters to control postoperative pain and/or facilitate rehabilitation

### **Objectives**

#### **Patient Care**

- Be skilled and knowledgeable in the anatomical differences in children of all ages
- Understand the implications of nerve block placement in the anesthetized patient
- Be skilled in the use of ultrasound guidance, and nerve stimulation for nerve block placement
- Understand the rationale for the use of respective nerve blocks in conjunction with the correct decision making process to determine whether the use of the afore mentioned block is in the patients best interests
- Be skilled in the use of neuro-axial blocks in pediatric patients
- Be able to recognize and manage all potential complications of regional anesthesia including: local anesthetic toxicity, epidural abscess, hematoma, failed block and nerve damage

#### **Technical Skills**

- Demonstrate proficiency in performing regional anesthetic techniques in children
- Demonstrate ability to place caudal, lumbar, and thoracic epidural catheters in children, infant through adolescent
- Demonstrate proficiency in performance of single-shot caudal blocks in children
- Demonstrate proficiency in performance of basic peripheral nerve blocks including ilio-inguinal, femoral, axillary
- Demonstrate ability to place peripheral nerve block catheters for continuous infusions
- Demonstrate familiarity with performance of infra-clavicular block, interscalene block, popliteal block, and sciatic block
- Demonstrate facility with the use of ultrasound in performance of peripheral regional blocks, both one-shot and catheter placement

#### **Medical Knowledge**

- Pre-anesthetic assessment including psychological preparation of the pediatric patient and their family
- Neuraxial and regional neurological innervation related to specific surgical procedures
- Pertinent anatomy for each neuraxial and peripheral nerve block
- Local anesthetic pharmacology in the neonatal and pediatric populations
- Neuraxial and regional anesthesia equipment

## **Practice-Based Learning and Improvement**

- Evaluate and ensure the adequacy of regional anesthesia by instituting changes in the patient care plan when the initial regional anesthesia strategy fails to meet the patient's needs
- Evaluate, diagnose, and treat the side effects and complications of therapy
- Understand the physiologic response to central and peripheral nerve conduction blocks

## **Interpersonal and Communication Skills**

- Effective communication with patients and families to create and sustain professional and therapeutic relationships
- Effective communication with physicians, other health professionals and organizations
- Effective participation as a member or leader of a health care team or organization
- Consultative role with physicians and health professionals
- Comprehensive, timely, and legible medical records
- Counseling patients and families
  - Measures needed to enhance or maintain health and function and prevent disease and injury
  - Active participation in care
  - Information that fosters increased independence and compliance
  - Assistance to patients and families to understand the illness and treatment, share in decisions, and give informed consent
  - Compassionate provision of "bad news", allowing families time to grieve and adjust
  - Identification and effective utilization of other resources, e.g., case managers, pastoral care
- Care that is sensitive to each patient's cultural, economic, and social circumstances
  - Sensitivity to age, gender, culture, and ethnicity
  - Appreciation of economic factors influencing decision making and their impact on families
- Competence in meeting the unique needs of pediatric patients and their families
  - Psychological needs
  - Multiple family structures
  - Special needs of children with complex congenital abnormalities

## **Professionalism**

- Prove to be responsible, reliable, and conscientious to all members of the care team
- Demonstrate a willingness to accept constructive feedback and change practice when indicated
- Demonstrate initiative by preparing for cases and asking appropriate questions
- Respect of all patients and families as well as colleagues who are different with respect to age, culture, disabilities, ethnicity, gender, and/or sexual orientation
- Acceptance of responsibility for patient care, including continuity of care
- Ethics knowledge and consistent demonstrate of ethically sound practice
- Professional behaviors
  - Integrity
  - Honesty
  - Compassion
  - Empathy
  - Dependability
  - Commitment

## **Systems-Based Practice**

- Advocacy for patients and families
- Effective participation in health care teams and alternative health care settings
- Awareness of cost of diagnostic tests, procedures and medications
- Advocacy for quality patient care, optimal patient care systems, and reduction in medical errors
- Health promotion and prevention of disease and injury
- Knowledge of basic principles of practice management

- Interaction between practices and larger health care system
- Models of practice and delivery systems
- Basic principles of health care reimbursement and billing and coding

**Evaluation**

Fellows are evaluated on their management of regional anesthesia techniques and their ability to prescribe the appropriate management modalities. An electronic evaluation is completed by the supervising faculty member, which focuses on the fellow's ability to successfully meet the goals and objectives stated above based on the six core competencies.

# **OR/AC NEONATAL ROTATION GOALS & OBJECTIVES**

## **OR/AC/NEONATAL ROTATION**

### **Goals**

At the conclusion of this 3-month rotation the trainee should:

- Understand basic principles of pediatric anesthesia. These include breathing circuits, how equipment needs to be modified in management of pediatric patients, and how the underlying anatomy and physiology effects these modifications
- Understand all aspects of co-morbidity and unique syndromes in pediatric patients, which may effect the anesthetic management (asthma, sickle cell disease, trisomy-21, cerebral palsy, Hurler's syndrome, etc).
- Understand the use of preoperative sedatives in the pediatric patients, especially those who have had numerous procedures and have complex problems. They must appreciate the pharmacologic options available and their side effects. The fellow should then select the appropriate drugs for the procedure and the patient's underlying disease
- Understanding preoperative evaluation and teaching and they should also interact with child life specialists
- Understand fluid replacement (blood, blood products, crystalloids and volume expanders). They must understand the physiology that underlies specific fluid replacement, the advantages of a specific therapy, and how the surgical procedure effects fluid management
- Understand the use of anesthetic agents and adjuvant drugs in children, which include: volatile agents; narcotics; alpha<sub>2</sub> agonists; muscle relaxants; and local anesthetics. They must understand the side effects, treatment of complications, and how the patient's age affects these problems
- Understand unusual syndromes that can occur in children such as, malignant hyperthermia and latex allergy. They must be able to make the correct diagnosis and to administer appropriate treatment
- Understand the management of cardiopulmonary resuscitation. This involves understanding the most current concepts in CPR, which drugs should be used and the different techniques for infants, children, and adults
- Understand the anatomic airway differences that are present in infants and children and which techniques are involved in managing patients who may present with abnormal airways
- Understanding the unique management of neonates. These include diaphragmatic hernia, omphalocele, necrotizing enterocolitis, tracheo-esophageal fistula, meningomyelocele, and gastroschisis. These patients may also have complex co-existing diseases, which may effect the anesthetic management
- Understand the physiology of transplants, cardiac, and kidney. They must also understand the underlying physiology and pharmacology involved in caring for transplantation patients, (eg. immunosuppressives and how the new organ function differs from the normal patients). These patients also may return for nontransplant procedures, such as strabismus surgery, inguinal hernia repair, and ENT procedures. The fellow must understand the pathophysiology of the transplanted organ and be able to appropriately manage the anesthetic in these patients.

### **Objectives**

#### **Patient Care**

##### **Preoperative Evaluation**

- Perform thorough and effective preoperative assessment of children scheduled for surgery. A comprehensive and concise preoperative evaluation provides the critical information necessary to develop an appropriate plan of anesthetic management as well as to anticipate potential problems and prepare contingency plans. It also provides the opportunity to discuss anesthetic options and plans with the patient and patient's family, and answer any questions.
  - Completes a thorough and concise preoperative evaluation in a timely manner
  - Uses available information technology, such as computerized laboratory reporting, to obtain

- pertinent information
  - Identifies and prioritizes medical and anesthetic concerns
  - Identifies need for further medical work up or medical optimization prior to providing anesthesia
  - Demonstrate judgment as when to seek and obtain appropriate medical and/or surgical consultation for clarification of issues. Explains anesthetic options and plan to patient and family members and answers questions in a clear and respectful manner.
- Demonstrate ability to provide appropriate psychological support of children and their families in the peri-operative period. Verbally presents a clear and concise preoperative evaluation to supervising faculty.
  - Identifies need for and orders appropriate preoperative medication
- Development of Anesthetic Plan
  - Develops and is able to justify an anesthetic plan based on preoperative evaluation, accurate and current scientific information, standards of care, clinical judgment, and patient preference if applicable
  - Anticipates potential problems and develops contingency plans
  - Verbally presents a clear and concise anesthetic plan to supervising faculty
- Intraoperative Anesthetic Management
  - Adequately prepares the anesthetic setting, including machine and equipment checks and availability of emergency/resuscitative drugs
  - Performs procedures on awake patients in a manner that addresses patient comfort without compromising patient safety
  - Effectively implements the anesthetic plan, while demonstrating the ability to adapt to changing clinical conditions
  - Demonstrates technical skills in pediatric airway management
- Demonstrate proficiency in the management of normal and difficult pediatric airway
  - Demonstrate proficiency in mask ventilation, endotracheal intubation, and anesthesia ventilator management in routine and difficult pediatric cases in neonates, infants, children, and adolescents
  - Demonstrate proficiency with alternate airway management modalities including fiberoptic endoscopy, lighted stylet, and fiberoptic laryngoscopy with specialty blades
- Postoperative Care
  - Demonstrates an understanding of common problems occurring in the PostAnesthetic Care Unit (PACU), including pain, hemodynamic and respiratory derangements, and postoperative nausea and vomiting, and demonstrates knowledge of appropriate treatment options
  - Demonstrates proficiency in providing cardiopulmonary resuscitation
- Demonstrate effective management of children requiring general anesthesia for elective and emergent surgery for the spectrum of pediatric surgical subspecialty conditions, including neonatal surgical emergencies and congenital disorders.
  - Pediatric Surgery
  - Neonatal emergencies such as tracheoesophageal fistulas, diaphragmatic hernias, gastroschisis, and omphalocele
  - Intra-abdominal cases such as tumors and intestinal obstructions
  - Intrathoracic non-cardiac cases
  - Kidney transplantations
  - Otolaryngology – Airway procedures such as tracheostomies and foreign body removals
  - Orthopedics – major orthopedic procedures such as posterior spinal fusions
  - Plastic Surgery – craniofacial reconstructive procedures
- Demonstrate understanding and proper management of both normal perioperative fluid therapy and massive fluid and/or blood loss
- Demonstrate effective use of pharmacologic agents in support of the circulation
- Demonstrate understanding of the management priorities on cardiopulmonary resuscitation and pediatric advanced life support

- Demonstrate understanding and effective use of mechanical ventilation both within and outside the OR in neonates, infants, children, and adolescents
- Demonstrate understanding and effective management for temperature regulation in children
- Demonstrate understanding and effectiveness in obtaining and interpreting appropriate laboratory information; demonstrate appropriate response to results
- Demonstrate the recognition, prevention, and treatment of pain in medical and surgical pediatric patients
- Demonstrate understanding of the indications for regional anesthesia techniques for inpatient and ambulatory surgery in children
- Demonstrate understanding of the pharmacology and proper use of analgesic agents in children in both acute and chronic pain issues
- Demonstrate timely recognition and treatment of perioperative vital organ dysfunction including in the post anesthesia care unit
- Demonstrate understanding of the issues of and proper preparation for transport of critically ill children between hospitals and/or within the hospital

### **Technical Skills**

- Demonstrate proper performance of cardiopulmonary resuscitation in children
- Resident is to be certified in Pediatric Advanced Life Support
- Demonstrate ability to initiate proper fluid resuscitation
- Demonstrate ability to utilize pharmacologic agents in support of the circulation
- Demonstrate ability to utilize electrical therapy for malignant dysrhythmias
- Demonstrate proficiency of management of normal and difficult pediatric airways with proper airway assessment, mask ventilation, endotracheal intubation, LMA placement, and anesthesia ventilator management.
- Demonstrate proficiency with alternate airway modalities including:
  - Fiberoptic Intubating scope
  - Lighted Stylet
  - Fiberoptic laryngoscope blades (Glide Scope, McGraw Scope)
- Demonstrate ability to initiate one-lung ventilation and manage intra-operatively
- Demonstrate understanding and ability to prepare and potentially utilize emergency airway modalities including trans-tracheal jet ventilation, emergent cricothyrotomy
- Demonstrate proficiency in the placement of venous and arterial catheters, including central venous catheters
- Demonstrate understanding and proficiency in the use of ultrasound in the placement of venous and arterial catheters

### **Medical Knowledge**

- Understand the pertinent developmental physiology of pediatric patients
- Understand normal and abnormal physical and psychological development
- Understand management of pathophysiology in cardiovascular, pulmonary, renal, hepatic, and CNS systems
- Understand developmental pharmacokinetics and pharmacodynamics and mechanisms of pediatric anesthetic drug delivery
- Understand congenital and acquired airway problems in children
- Understand common medical and surgical problems in children
- Understand congenital anomalies and developmental delay
- Understand the metabolic and endocrine effects of surgery and critical illness
- Understand pediatric coagulation abnormalities and therapy
- Understand infectious disease pathophysiology and therapy
- Understand pediatric trauma and burn management

- Understand pediatric pain management
- Understand use and toxicity of local and general anesthetics
- Understand organ transplantation in children
- Understand ethical and legal aspects of pediatric anesthesia care
- Understand issues in transport of critically ill children

### **Practice-Based Learning and Improvement**

- Engagement in lifelong learning to improve knowledge, skills, and practice performance
- Identification of strengths, deficiencies, and limits in knowledge and expertise
  - Reflection on personal program of learning to foster continued professional growth
  - Participation in educational and scholarly activities of the program and institution
- Use of performance evaluations provided by peers, patients, superiors, and subordinates to improve practice
- Improvement of patient care quality through participation on teams and committees
- Facilitation of the learning of students, residents, and other health care professionals
- Use of information technology to manage information, access on-line medical information, and support own education
- Application of knowledge of study designs and statistical methods to the appraisal of clinical studies and another information on diagnostic and therapeutic effectiveness
- Analysis of information about their own patient population to identify trends and opportunities for improvement
- Application of the principles and practice of performance improvement
- Critical appraisal of the medical literature
- Participation in scholarly work and generation of new knowledge

### **Interpersonal and Communication Skills**

- Effective communication with patients and families to create and sustain professional and therapeutic relationships
- Effective communication with physicians, other health professionals and organizations
- Effective participation as a member or leader of a health care team or organization
- Consultative role with physicians and health professionals
- Comprehensive, timely, and legible medical records
- Counseling patients and families
  - Measures needed to enhance or maintain health and function and prevent disease and injury
  - Active participation in care
  - Information that fosters increased independence and compliance
  - Assistance to patients and families to understand the illness and treatment, share in decisions, and give informed consent
  - Compassionate provision of “bad news”, allowing families time to grieve and adjust
  - Identification and effective utilization of other resources, e.g., case managers, pastoral care
- Care that is sensitive to each patient’s cultural, economic, and social circumstances
  - Sensitivity to age, gender, culture, and ethnicity
  - Appreciation of economic factors influencing decision making and their impact on families
- Competence in meeting the unique needs of pediatric patients and their families
  - Psychological needs
  - Multiple family structures
  - Special needs of children with complex congenital abnormalities

### **Professionalism**

- Prove to be responsible, reliable, and conscientious to all members of the care team
- Demonstrate a willingness to accept constructive feedback and change practice when indicated
- Demonstrate initiative by preparing for cases and asking appropriate questions

- Respect of all patients and families as well as colleagues who are different with respect to age, culture, disabilities, ethnicity, gender, and/or sexual orientation
- Acceptance of responsibility for patient care, including continuity of care
- Ethics knowledge and consistent demonstrate of ethically sound practice
- Professional behaviors
  - Integrity
  - Honesty
  - Compassion
  - Empathy
  - Dependability
  - Commitment

### **Systems-Based Practice**

- Advocacy for patients and families
- Effective participation in health care teams and alternative health care settings
- Awareness of cost of diagnostic tests, procedures and medications
- Advocacy for quality patient care, optimal patient care systems, and reduction in medical errors
- Health promotion and prevention of disease and injury
- Knowledge of basic principles of practice management
  - Interaction between practices and larger health care system
  - Models of practice and delivery systems
  - Basic principles of health care reimbursement and billing and coding

### **Evaluation**

Fellows are evaluated on their ability to understand the basic principles of pediatric anesthesia, unique syndromes in pediatric patients, the preoperative evaluation, fluid replacement, use of anesthetic agents in complex pediatric patients, and unique management of neonates. An electronic evaluation is completed by the supervising faculty member, which focuses on the fellow's ability to successfully meet the goals and objectives stated above based on the six core competencies.

# **NORA/OUTLYING ROTATION GOALS & OBJECTIVES**

## **NORA/OUTLYING ROTATION**

### **Goals**

At the completion of the 3-week rotation the trainee will be skilled in the care of patients who are undergoing non-invasive or short procedures, which can be managed with a short and less intense anesthesia. These patients are generally anesthetized outside the operating room in radiology suites, procedure areas (hematology/oncology, gastroenterology, pulmonology), cardiac catheterization suite, radiation therapy and sites set up for speedy and efficient care of this group of patients.

### **Objectives**

#### **Patient Care**

- Become expert in the assessment of suitability of pediatric patients for general anesthesia outside the operating room. These patients would be expected to have an anesthetic that would produce ideal conditions for the exam or procedure, and to awaken rapidly and require a short recovery period.
- Be insightful of the resources required to set up and manage a sedation. They are expected to be aware of standards relating to provision of sedation by anesthesiologists and non-anesthesiologists and to know how to keep abreast of developments in this rapidly changing field.
- Demonstrate understanding of the issues and proper preparation for providing sedation or anesthesia for children outside the operating rooms, including those undergoing radiologic studies

#### **Medical Knowledge**

- Knowledge of provision of anesthesia in the non-operative environment
- Knowledge of radiation safety, both personal and for the patient
- Risks of anesthesia without the ability to be directly present (radiation therapy)
- Knowledge of patient safety and anesthesia equipment issues associated with magnetic resonance imaging.

#### **Practice-Based Learning and Improvement**

- Engagement in lifelong learning to improve knowledge, skills, and practice performance
- Identification of strengths, deficiencies, and limits in knowledge and expertise
  - Reflection on personal program of learning to foster continued professional growth
  - Participation in educational and scholarly activities of the program and institution
- Use of performance evaluations provided by peers, patients, superiors, and subordinates to improve practice
- Improvement of patient care quality through participation on teams and committees
- Facilitation of the learning of students, residents, and other health care professionals
- Use of information technology to manage information, access on-line medical information, and support own education
- Application of knowledge of study designs and statistical methods to the appraisal of clinical studies and another information on diagnostic and therapeutic effectiveness
- Analysis of information about their own patient population to identify trends and opportunities for improvement
- Application of the principles and practice of performance improvement
- Critical appraisal of the medical literature
- Participation in scholarly work and generation of new knowledge

## **Interpersonal and Communication Skills**

- Effective communication with patients and families to create and sustain professional and therapeutic relationships
- Effective communication with physicians, other health professionals and organizations
- Effective participation as a member or leader of a health care team or organization
- Consultative role with physicians and health professionals
- Comprehensive, timely, and legible medical records
- Counseling patients and families
  - Measures needed to enhance or maintain health and function and prevent disease and injury
  - Active participation in care
  - Information that fosters increased independence and compliance
  - Assistance to patients and families to understand the illness and treatment, share in decisions, and give informed consent
  - Compassionate provision of “bad news”, allowing families time to grieve and adjust
  - Identification and effective utilization of other resources, e.g., case managers, pastoral care
- Care that is sensitive to each patient’s cultural, economic, and social circumstances
  - Sensitivity to age, gender, culture, and ethnicity
  - Appreciation of economic factors influencing decision making and their impact on families
- Competence in meeting the unique needs of pediatric patients and their families
  - Psychological needs
  - Multiple family structures
  - Special needs of children with complex congenital abnormalities

## **Professionalism**

- Prove to be responsible, reliable, and conscientious to all members of the care team
- Demonstrate a willingness to accept constructive feedback and change practice when indicated
- Demonstrate initiative by preparing for cases and asking appropriate questions
- Respect of all patients and families as well as colleagues who are different with respect to age, culture, disabilities, ethnicity, gender, and/or sexual orientation
- Acceptance of responsibility for patient care, including continuity of care
- Ethics knowledge and consistent demonstrate of ethically sound practice
- Professional behaviors
  - Integrity
  - Honesty
  - Compassion
  - Empathy
  - Dependability
  - Commitment

## **Systems-Based Practice**

- Advocacy for patients and families
- Effective participation in health care teams and alternative health care settings
- Awareness of cost of diagnostic tests, procedures and medications
- Advocacy for quality patient care, optimal patient care systems, and reduction in medical errors
- Health promotion and prevention of disease and injury
- Knowledge of basic principles of practice management
  - Interaction between practices and larger health care system
  - Models of practice and delivery systems
  - Basic principles of health care reimbursement and billing and coding

**Evaluation**

Fellows are evaluated on care of patients undergoing procedures outside of the operating room suite, their ability to assess suitability for general anesthesia in these locations, and their ability to anticipate the resources required. An electronic evaluation is completed by the supervising faculty member, which focuses on the fellow's ability to successfully meet the goals and objectives stated above based on the six core competencies.

# **NICU ROTATION GOALS & OBJECTIVES**

## **NICU ROTATION**

### **Goals**

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

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

Each fellow is expected to actively participate in all aspects of daily patient management (as described in detail below) and to take ownership of his/her patients. The rotating pediatric anesthesiology fellow will act as a junior fellow on the service. They will be assisted and supervised in these activities by the NICU faculty and senior fellows.

### **Objectives**

#### **Patient Care**

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

Expectations of fellows:

- Understand and utilize mechanical ventilation to manage premature infants with BPD using conventional and alternative ventilator techniques including HVF
- Participate in the medical management of common medical problems in premature infants such as BPD, NEC, and IVH
- Develop knowledge and clinical management skills in fluid and nutrition management of premature infants
- Serve as a consultant in airway and acute pain management for NICU patients and understand issues involved in airway management techniques utilized in the NICU setting
- Develop experience in the preoperative and postoperative management of NICU patients that require a variety of surgical interventions
- Participate in transport of critically ill NICU patients within the hospital when diagnostic and therapeutic procedures are required out of the NICU

#### **Medical Knowledge**

- Develop knowledge and clinical experience in management of extremely premature neonates
- Develop knowledge and clinical experience regarding management of NICU patients requiring prolonged hospitalization
- Develop understanding of transition of care for NICU patients to other hospital units or to home
- Develop knowledge of the roles served by physicians from other specialties, APNs, RNs, and allied health personnel in the multidisciplinary care of NICU patients. Participate in the daily communication with patients and families during periods of acute stress
- Participate in discussion and decision making regarding ethical concerns identified in the care of critically ill or dying patients
- Appreciate the NICU specific challenges for procedures commonly performed by pediatric anesthesiologists such as; arterial line placement, central venous catheter placement and endotracheal intubation
- Apply principles of quality improvement to the neonatal/perinatal setting

### **Practice Based Learning and Improvement**

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

Expectations of fellows:

- Locate and assimilate evidence from scientific studies related to the health care problems of their patients
- Use available evidence and information to make educated diagnoses and clinical management plans
- Recognize that in certain clinical situations, it is appropriate and necessary to accept/admit uncertainty
- Recognize their own personal limitations with regard to knowledge, skills, and tolerance for stress and ask for help appropriately
- Actively participate in the education of NICU team members, patients, and families
- Acknowledge mistakes and learn from them
- Use evaluations of performance to improve their own patient care practices

### **Interpersonal Skills and Communication**

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

Fellows must be able to:

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

### **Professionalism**

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

Expectations of fellows:

- Demonstrate a respect for and responsiveness to the needs of patients and their families including the demonstration of personal accountability for each patient's medical care
- Demonstrate honesty, integrity, compassion, and empathy in dealing with patients and their families
- Demonstrate a respect for patient privacy and confidentiality
- Demonstrate sensitivity to the age, gender, culture, and disabilities of each patient
- Exhibit professional and ethical behavior in all interactions with members of the PICU team and the medical staff

**Systems-Based Practice**

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

Expectations of fellows:

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

**Evaluation**

Fellows are evaluated on their ability to evaluate, stabilize, and provide comprehensive medical care to patients in the neonatal intensive care unit. An electronic evaluation is completed by the supervising faculty member, which focuses on the fellow's ability to successfully meet the goals and objectives stated above based on the six core competencies.

# **PICU ROTATION GOALS & OBJECTIVES**

## **PICU ROTATION**

### **Goals**

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

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

Each fellow is expected to actively participate in all aspects of daily patient management (as described in detail below) and to take ownership of his/her patients. The rotating pediatric anesthesiology fellow will act as a junior fellow on the service. They will be assisted and supervised in these activities by the PICU faculty and senior fellows.

### **Objectives**

#### **Patient Care**

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

Expectations of fellows:

- Gather and be familiar with essential and accurate information about their patients using medical history, appropriately detailed physical exam, pertinent diagnostic studies, recommendations by consultants, and physiologic variables
- Use patient's medical information, clinical judgment, and current scientific evidence to make informed diagnostic and therapeutic recommendations
- Develop and carry out appropriate medical management plans in conjunction with the PICU attending
- Counsel patients and families in the understanding of the patient's illness and available/recommended treatment options
- Participate in the medical decision making process and in obtaining informed consent for diagnostic and therapeutic procedures
- Attend and participate appropriately in discussions between the medical staff and families regarding end of life issues including:
  - Do Not Resuscitate (DNR) orders
- Withdrawal/withholding of life support
- Brain death (definition, criteria for pronouncement) and organ donation (when asked by family)
- Describe how to formulate management plans for terminally ill patients including:
  - Management of pain/comfort
  - Minimizing invasive procedures
  - Involvement of ancillary services to support patient and family (i.e social work, child life, chaplain)
  - Outpatient management for patients going home

#### **Medical Knowledge**

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

### PICU Admission

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

### Resuscitation and Stabilization

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

### Common Signs and Symptoms

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

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

### Common Conditions

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

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

### ICU Monitoring and Supportive Therapies

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

- Pulse oximetry
- End-tidal CO<sub>2</sub> monitoring
- Arterial blood pressure monitoring
- Central venous pressure monitoring
- Intracranial pressure monitoring

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

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

### Procedures

Fellows are expected to demonstrate an understanding of the indications and contraindications for, potential complications of, need for sedation/analgesia for, and appropriate monitoring during the following procedures.

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

### **Practice Based Learning and Improvement**

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

Expectations of fellows:

- Locate and assimilate evidence from scientific studies related to the health care problems of their patients
- Use available evidence and information to make educated diagnoses and clinical management plans
- Recognize that in certain clinical situations, it is appropriate and necessary to accept/admit uncertainty
- Recognize their own personal limitations with regard to knowledge, skills, and tolerance for stress and ask for help appropriately
- Actively participate in the education of PICU team members, patients, and families
- Acknowledge mistakes and learn from them
- Use evaluations of performance to improve their own patient care practices

### **Interpersonal Skills and Communication**

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

Fellows must be able to:

- Recognize the value of a team approach to the delivery of pediatric health care
- Communicate effectively with the PICU team members and other health care professionals
- Develop a problem oriented approach to the formal presentation of patient data in which pertinent exam findings, lab results, etc. are communicated in an organized fashion and are linked to the specific diagnoses/problems of each patient
- Produce accurate, timely, and legally appropriate medical records for pediatric patients
- Ensure that appropriately detailed medical information is passed on to cross-covering physicians for night call and days off such that patient care is seamless
- Actively participate in daily patient care/teaching rounds

- Share knowledge gained from past experience and reading with PICU team members
- Communicate with patients and family members in an unhurried and thorough manner using language that can be easily understood (i.e. without use of medical jargon)

### **Professionalism**

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

Expectations of fellows:

- Demonstrate a respect for and responsiveness to the needs of patients and their families including the demonstration of personal accountability for each patient's medical care
- Demonstrate honesty, integrity, compassion, and empathy in dealing with patients and their families
- Demonstrate a respect for patient privacy and confidentiality
- Demonstrate sensitivity to the age, gender, culture, and disabilities of each patient
- Exhibit professional and ethical behavior in all interactions with members of the PICU team and the medical staff

### **Systems-Based Practice**

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

Expectations of fellows:

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

### **Evaluation**

Fellows are evaluated on their ability to function as part of a multi-disciplinary team to treat life-threatening conditions in the pediatric intensive care unit. An electronic evaluation is completed by the supervising faculty member, which focuses on the fellow's ability to successfully meet the goals and objectives stated above based on the six core competencies.

# **RESEARCH ROTATION GOALS & OBJECTIVES**

## **RESEARCH ROTATION**

### **Goals**

Upon completion of the Research Track, trainees should be able to:

- Conduct a literature search, which adequately supplies the information necessary to carry out their research project
- Prepare all necessary documentation for Investigational Review Boards application process including but not limited to Abstract, Protocol of Study and Informed Consent Documents
- Prepare analysis of cost and a list of funding sources or request for departmental funding
- Present and explain study to potential participants and obtain consent
- Set up and organize laboratory to run lab portion of study
- Set up Database format and all necessary calculations for data acquisition
- Acquire data in the clinical setting without compromising patient care
- Compile data into an intelligent and comprehensible presentation
- Articulate results in both written and graphic form
- Prepare and submit completed project for abstract presentation or publication

Fellows are highly encouraged to design a research project that can be published or presented at a major professional meeting, such as the annual SPA or ASA meetings.

### **Objectives**

#### **Patient Care**

- Fellows must be able to provide patient/subject care that is compassionate and respectful, especially in regard to maintaining patient confidentiality
- Fellows should understand the history, principles, and laws and regulations with regards to:
  - Patient/subject recruitment and screening
  - Subject management while on a study
  - Informed consent development and implementation
  - Proper withdrawal of a subject from a study

#### **Medical Knowledge**

- Fellows must be able to understand discuss basic principles of research design, implementation, and publication/presentation.
- Attends and participates in meetings discussing ongoing research projects
- Demonstrates evidence of outside study and preparation
- Understand the scientific principles of clinical and laboratory research
- Basic understanding of statistical analysis
- Understand and be able to discuss the following:
  - Roles and responsibilities for research
  - Standard operating procedures for research
  - Clinical research cost allocation
  - Research planning, initiation, and charging
  - Responsibilities of the research team members
  - Study setup
  - How to interact with and submit a proposal to the IRB (Institutional Review Board)

#### **Practice-Based Learning and Improvement**

- Understand how to properly manage collected data (security, confidentiality)
- Understand how to critically analyze peer-reviewed literature in a specific area of interest
- Understand when and how to report adverse research events

- Critically reviews and discusses current publications on topics pertaining to the practice of anesthesiology and medicine in general
- Assimilates into clinical practice new advances upheld by current peer-reviewed literature
- Demonstrates an understanding of how to use various technological resources, such as computerized medical databases, to obtain current information

### **Interpersonal and Communication Skills**

- Understand how to obtain informed consent for subject recruitment
- Understand how to educate (giving an In-Service) patients and participating health care personnel on the research protocol and their part in it
- Speaks in a clear and concise manner
- Maintains appropriate eye contact
- Conveys respect for others and displays an appropriate degree of confidence
- Engages in therapeutic and ethically sound relationships with patients
- Uses effective listening skills
- Interacts effectively with members of other medical specialties or health care teams

### **Professionalism**

- Demonstrates integrity, compassion and respect for patients/subjects and all others
- Demonstrates responsiveness and accountability to patients, society and the medical profession
- Demonstrates a commitment to ethical principles pertaining to patient care as well as business practices
- Demonstrates sensitivity and responsiveness to patients' culture, age, gender, and disabilities
- Demonstrates a commitment to excellence and continuing professional development

### **Systems-Based Practice**

- Demonstrates an understanding of the different types of research methods, medical practice, and health care delivery systems
- Practices cost-effective research and health care and resource allocation that does not compromise quality of care
- Advocates quality health care and assists patients in dealing with complex health care delivery systems
- Works with other members of the research and health care delivery team to improve protocol health care and health care system performance

### **Evaluation**

Fellows are evaluated on their ability to participate in all aspects of research such as literature search, preparation of documentation for the Investigational Review Board, presentation to potential participants and obtaining consent, their ability to set up a database, articulate results in written and graphic form, and submit completed project for abstract presentation or publication. An electronic evaluation is completed by the supervising faculty member, which focuses on the fellow's ability to successfully meet the goals and objectives stated above.

# **PACU ROTATION GOALS & OBJECTIVES**

## **PEDS PACU ROTATION**

### **Definition of Rotation**

Children's recovery from anesthesia is different from that of adults and the environment in the pediatric Post-Anesthesia Care Unit (PACU) is unique and challenging. The pediatric PACU rotation provides pediatric anesthesiology fellows the opportunity to focus on issues related to infants and children recovering from anesthesia after a broad spectrum of both surgical and non-surgical procedures. While issues related to the post-anesthesia care of infants and children are covered throughout all OR rotations during the fellowship year, this rotation is designed to allow fellows to observe the acute recovery process as a continuum from the point of entry into the PACU, through the point of discharge to another location.

The PACU rotation is a one-week rotation based on Unit 2800 at LLUCH, which is combined with a three week Non-OR Anesthesia (NORA) rotation to form a one-month block. The individual pediatric anesthesiologist responsible for the patient's anesthetic management will supervise the fellow. The pediatric anesthesiologist on call is also available for questions and consultations.

### **Curriculum**

During the PACU rotation, fellows will learn to evaluate and manage children in the immediate postoperative setting across the broad range of conditions that occur in PACU. This learning requires both clinical experience and formal instruction.

- Clinical experience: Clinical responsibility extends to all patients admitted to and discharged from PACU during the normal workday. Fellows are expected to learn medical team skills including communication, discharge readiness criteria and patient resource management skills. Decisions regarding patient management are discussed with the responsible attending anesthesiologist or the pediatric attending anesthesiologist on call. Changes in patient care are communicated to the perioperative care team and the surgical team involved in the patient's care.
- Formal instruction: Learning in PACU care extends across the clinical curriculum as fellows transfer care of patients to PACU staff during their entire fellowship, postoperative conditions and complications are recognized and followed during postoperative visits, and patients have conditions requiring return to OR following stays in PACU. Formal education in PACU includes case management discussions and a syllabus with a suggested reading list. Further instruction comes from discussion of specific patients and conditions with the responsible attending anesthesiologist or the pediatric attending anesthesiologist on call.

### **Goals**

Upon completion of the PACU rotation, fellows should be able to

- Evaluate postoperative patients independently.
- Recognize common postoperative complications independently and institute therapy in consultation with the attending anesthesiologist.
- Recognize complex perioperative conditions that require the patient receive a higher level of care than proposed (admission vs outpatient, ICU vs basic unit, intubated vs extubated, etc) and arrange for care in the system using the consultative and administrative resources available including the responsible attending anesthesiologist.
- Understand and apply discharge criteria in the system independently.
- Respond to CPR calls, and manage the airway of patients undergoing CPR independently. An understanding of PALS principles is expected by the end of this rotation.
- Understand nursing responsibilities toward postoperative patients, and facilitate the flow of patients through the perioperative process independently.

## Objectives

### Patient care

In our efforts To Make Man Whole, fellows must be able to provide patient care that is compassionate, appropriate, and effective in caring for patients after surgery, regardless of the procedure or type of anesthetic used. Fellows are expected to:

1. Evaluate and manage PACU conditions:
  - Pain control, including using adjunctive techniques such as regional analgesia/blocks, PCA and Pain Service consultation when appropriate
  - Agitation and emergence delirium.
  - Cardiovascular instability including hypertension, hypotension, and cardiac rhythm disturbances.
  - Respiratory system apnea of prematurity, obstructive sleep apnea, postobstructive pulmonary edema and postintubation croup.
  - Nausea and vomiting
  - Postoperative surgical complications such as bleeding
  - Metabolic complications including hypothermia, coagulopathy, electrolyte abnormalities, renal/bladder dysfunction: oliguria, polyuria, and urinary retention.
  - Readiness for discharge using criteria and indications for postoperative admission of patients scheduled for outpatient surgery and ICU admission
2. Obtain technical skills
  - Airway management skills
  - Evaluation of CXR for complications of central line placement or postoperative respiratory complications.
  - CPR and resuscitation, including a degree of understanding of PALS

### Medical Knowledge

Fellows are expected to mature into Consultants in Pediatric Anesthesiology prior to completion of their training program. Fellows caring for patients in the PACU need to master a broad knowledge base and apply that knowledge to safe patient care. This knowledge base is learned during the entire fellowship, with specific applications to perioperative care emphasized during the PACU rotation, including the impact of perioperative management on hospital stay and patient outcome. Fellows are expected to demonstrate understanding of:

1. Basic Science Knowledge
  - Physiology: impact of surgery on all organ systems and normal/abnormal recovery from anesthesia; thermoregulation, treatment of hypothermia; fluid/electrolyte balance, acid-base balance, volume assessment and management.
  - Pharmacology: differences between anesthetic agents and techniques in terms of postoperative recovery; advantages and disadvantages of regional vs general anesthesia; analgesic classes, effects, side effects and reversal agents; sedative agents and their reversal; antiemetic agents, classes, benefits, risks and alternatives; neuromuscular blocking agents, residual block, reversal; drug interactions
2. Clinical Knowledge
  - Admission and discharge criteria
  - Indications for additional testing in PACU including routine lab tests, ABG, radiographic tests and ECG.
  - Management of patient who requires higher level of care in the system, including communication needed to facilitate that care within the system
  - Management of common PACU conditions
  - Components of adequate transfer of care reports in keeping with ASA standards for Post Anesthesia Care
  - Ability to give appropriate discharge report to ICU team

### **Practice-based learning improvement.**

Fellows are expected to mature into Consultants in Pediatric Anesthesiology prior to completion of their training program. This includes the ability to investigate and evaluate their postoperative patient care practices, appraise and assimilate scientific evidence, and improve their postoperative patient care practices. Fellows are expected to:

1. Evaluate the adequacy of pain control, reassess patient pain levels, institute changes in pain control and ensure adequacy of the pain control methods prescribed
2. Evaluate the adequacy of antiemetic therapy, reassess the need for further therapy and ensure adequacy of the method prescribed.
3. Read the literature regarding PACU issues, including approaches to common PACU conditions, research into new modalities of treating these conditions and outcome data related to these modalities.

### **Interpersonal and Communication Skills**

Fellows must be able to communicate in a way consistent with being a Consultant in Pediatric Anesthesiology. This communication should demonstrate a degree of interpersonal and communication skills that result in effective information exchange with patients, PACU nurses, ICU teams and professional associates. Fellows are expected to:

1. Receive accurate communication from team members bringing patients into PACU.
2. Provide accurate communication to team members when discharging patients from PACU to other units or the ICU.
3. Document in a legible way, including procedure notes, progress notes and orders.
4. Communicate with all team members in the system to facilitate safe perioperative patient flow, including PACU nurses, transport team members, nursing supervisors, patient placement services personnel and physicians involved in care of the patient.
5. Communicate with patients and their parents about their condition, pain levels, perioperative care and any additional concerns the patient may have using language the patient is able to understand.
6. Facilitate compassionate care of patients including allowing family members to visit the patient when appropriate and acceptable to PACU nursing staff.

### **Professionalism**

Fellows are expected to mature into Consultants in Pediatric Anesthesiology prior to completion of their training program. This includes a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. While this learning takes place over the entire spectrum of clinical rotations, the PACU rotation provides numerous opportunities to develop professionalism. Fellows are expected to:

1. Act in a professional manner in all interactions with patients, perioperative care team members and other physicians when providing care to patients in the PACU.
2. Consult with appropriate attending anesthesiologists when disagreements about patient care arise.
3. Consistently apply ethical principles to patient care including patient confidentiality, equal care regardless of social, ethnic or economic factors.
4. Demonstrate respect and compassion when dealing with patients and their families, with an emphasis on the emotional and spiritual aspects of whole person care that demonstrate our commitment To Make Man Whole.

### **Systems-based practice**

Fellows are expected to mature into Consultants in Pediatric Anesthesiology prior to completion of their training program. This includes 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. Fellows are expected to:

1. Use consultant services appropriately, for example for difficult pain control or suspected myocardial ischemia.
2. Arrange for patient care within the system that is indicated by changes in patient condition such as admission for patients scheduled for outpatient surgery, reintubation or ICU admission.
3. Understand the impact of therapeutic choices made during patient care in PACU on the remainder of the hospital course, including the potential for unplanned admission of outpatients, prolonged ICU stay, etc.
4. Understand the components of perioperative patient flow, and appropriate management steps when system volume is greater than expected, including the role of patient placement services and the management of patients who require prolonged non-recovery time in the PACU.

### **Evaluations**

Residents are evaluated on care of patients in PACU. An electronic evaluation of the resident is completed at the end of the rotation, using input from attending anesthesiologists who worked with the resident in PACU, and perioperative nurses.

# **PROGRAM POLICIES**

# Loma Linda University Children's Hospital Pediatric Anesthesiology Fellowship

## Fellow Supervision Policy

### SCOPE

Attending physicians, as licensed independent practitioners, are responsible for the care provided to their patients. This responsibility requires personal involvement with each patient, and each fellow participating in the care of the patient. Each patient must have an attending whose name is recorded in the patient record. Other attendings may, at times, assume responsibility for the care of the patient and supervision of the fellows. It is the responsibility of the attending to ensure that the fellow involved in the care of the patient is informed of such delegation and can readily access an attending at all times.

Fellows always provide care under the supervision of an attending faculty member. A responsible attending must be available to the fellow in person or by telephone or other telecommunication device and be able to be present within a reasonable period of time as defined by department/service chief (typically within 5-10 minutes). Trainees and staff must be informed and understand the department's standards for staff availability. Each Anesthesia service will publish "call schedules" that indicate the responsible attending and reliable methods to contact the attending.

The Department's pediatric anesthesiology fellowship training program will permit fellows to assume increasing levels of responsibility, commensurate with their individual progress, level of training, and experience, skills, knowledge, and judgment.

All of the Loma Linda University Medical Center's Medical Treatment Facilities (MTF) will adhere to current accreditation requirements of the ACGME and JCAHO for matters pertaining to fellow training programs, including the level of supervision provided. It is also expected that the requirements of the various certifying bodies, such as the member boards of the American Board of Medical Specialties (AMBS), will be incorporated into the training programs at Loma Linda, and fulfilled through program level policy that ensures each graduate will be eligible to sit for the specialty-certifying board examination. The provisions of this policy are applicable to all patient care services, including inpatient and outpatient services, and the performance and interpretation of diagnostic and therapeutic procedures.

In order to ensure quality patient care and provide opportunity for maximizing the educational experience of the fellow in the ambulatory surgical setting, it is required that an appropriately privileged attending be available for supervision during anesthesia administration during these procedures. Attendings are ultimately responsible for ensuring the quality of care provided to their patients.

Facilities utilized in the training program will ensure that there is appropriate supervision for all fellows, as well as a duty hour schedule and a work environment that is consistent with proper patient care, the educational needs of fellows, and the applicable program requirements.

## **SUPERVISION**

The responsibility of anesthesiology attendings is to enhance the knowledge of fellows while ensuring patient safety and quality care. Such responsibility is exercised by observation, consultation, and direction, and includes the imparting of knowledge, skills, and attitudes/behaviors to the fellows and the assurance that care is delivered in an appropriate, timely, and effective manner. Supervision may be exercised in many ways including face-to-face contact with fellows in the presence of the patient, face-to-face contact in the absence of the patient, and through consultation via the telephone or other communication devices.

Faculty Involvement has many forms, including

**Direct Supervision:** The supervising physician is physically present with the fellow and patient

**Indirect Supervision with Direct Supervision Immediately Available:** The supervising physician is physically within the hospital or other site of patient care and is immediately available to provide direct supervision

**Indirect Supervision with Direct Supervision Available:** The supervising physician is not physically present in the hospital, but is immediately available by telephone or pager, and is available to provide direct supervision

**Oversight:** The supervising physician is available to provide review of procedures/encounters with feedback provided after care is delivered

If on-site supervision is not necessary, the Department faculty physician must be able to be present, within a reasonable period of time, as determined by the department/service chief and documented in departmental policies.

Graduated level of responsibility: progressive responsibility will be given to a fellow for the care of patients based on the fellow's clinical experience, judgment, knowledge, and technical skills. As part of the pediatric anesthesiology medical training, fellows will be given progressive responsibility for the care of patients. The determination of an individual fellow's ability to provide care to patients without a supervisor present or act in a teaching capacity will be based on documented evaluation of the fellow's clinical experience, judgment, knowledge, and technical skills. Ultimately, it is the decision of the attending as to which activities the individual fellow will be allowed to perform within the constraints of the program director's assigned levels of responsibility. The overriding consideration will always be the safe and effective care of the patient.

## **RESPONSIBILITIES**

Fellow training occurs in the context of different disciplines and in a variety of appropriately structured clinical settings. The administrative organization and titles may vary but the following functions must be assigned.

Attending. The attending is responsible for, and must be personally involved in the care provided to individual patients in inpatient and outpatient settings. When a fellow is involved in the care of a patient, the responsible attending must continue to maintain a personal involvement in the care of

the patient. The attending is expected to fulfill this responsibility, at a minimum, in the following manner:

- (1) Attendings will be knowledgeable of the graduated levels of responsibility for fellows rotating on their service.
- (2) Each attending will be available to direct the care of every patient and provide appropriate fellow supervision based on the nature of the patient's condition, the likelihood of significant changes in the treatment plan, the complexity of care, and the experience and judgment of the fellows being supervised. Anesthesia services must be rendered with attending supervision of fellows readily available or be personally furnished by the attending. Confirmation of fellow supervision will be documented in patient record entered by the attending or reflected within fellow notes. Each outpatient record must reflect an attending and indicate if the case was discussed with the attending of record or another anesthesiology attending.
- (3) When consultation is requested, an attending anesthesiologist will either render the consultation or personally supervise the consultation (via telecommunications device as appropriate). The consulting attending will meet the patient as soon as possible and will remain involved in the consultation process as long as the service is requested by the attending responsible for the care of the patient (i.e. pain consultation).

Fellow: An anesthesiology subspecialty fellow may be assigned to a case with a resident trainee. This will typically occur after a number of months of fellowship training. In such instances, the fellow will function in a junior supervising attending role; however, when the fellow is involved in the care of a patient, the responsible attending must continue to maintain a personal involvement in the anesthetic management of the patient, as appropriate. The fellow is expected to fulfill the junior supervising role in the following manner:

- (1) Fellows will be knowledgeable of the graduated levels of responsibility for residents involved in the anesthetic care of the patient.
- (2) The fellow will remain closely involved with any case involving a resident, and be available to supervise and direct the care of the patient and provide appropriate resident supervision based on the nature of the patient's condition, the likelihood of significant changes in the treatment plan, the complexity of care, and the experience and judgment of the residents being supervised. Anesthesia services must always be rendered with appropriate attending supervision of residents, in addition to the fellow supervision. Confirmation of resident supervision by the fellow will be documented in the patient record entered by the resident and/or attending, or reflected within resident notes.

Fellow: Fellows must not attempt to provide clinical services nor do procedures outside of the graduated level of responsibility for which they are trained and privileged (see privilege sheet in each fellow's file). Each fellow must make all efforts to communicate to the attending significant issues as they relate to patient care. Such communication should be documented in the medical care record. Failure to function within graduated levels of responsibility may result in adverse action.

- (1) Operating Room. Fellow supervision in the operating room is guided by RRC guidelines for Anesthesiology supervision that limit a staff anesthesiologist to supervise no more than two total anesthetizing locations. In practice, the LLUMC Department of Anesthesiology service director will review the cases scheduled for the day and make staffing decisions based on complexity of the cases and the experience level of the fellows. There are times when the appropriate level of supervision is deemed to be 1:1 and the schedule will be adjusted to allow for direct and undivided supervision. At all times, the trainees will be responsible for notifying

staff of any significant changes in patient condition.

- (2) Anesthesia Consultative Service: The majority of patients presenting for surgery at LLUMC and affiliated health care facilities are seen in the PACE Clinics. Trainees working in the clinic will perform a focused exam and history to delineate any need for further evaluation prior to surgery and to present anesthetic options to the patients along with the risks and benefits of the anesthetic plan. All patients deemed to be ASA Class III or higher who are evaluated by a PGY 1 or 2 (i.e. CA-1 or below) resident should be discussed with a staff anesthesiologist whenever appropriate and documentation of this discussion will be annotated on the record. On the day of surgery, the anesthesiology attending managing the anesthetic is responsible for verifying the history and physical as well as confirming the anesthetic plan with the patient. This interaction will be documented in the medical record. Fellows may initiate evaluations and/or modify current therapy following discussion with the primary surgical/medical team.

## **DOCUMENTATION OF SUPERVISION OF FELLOWS**

The medical record must clearly demonstrate the active involvement of the attending. Documentation requirements for evaluation and management and ongoing care for inpatients and outpatients are included in all departmental policies appropriate to specialty needs. Some diagnostic or therapeutic procedures require a high-level of expertise in their performance and interpretation. Although gaining experience in performing such procedures is an integral part of the education of the fellow, such procedures may be performed only by fellows who possess the required knowledge, skill, and judgment, and under an appropriate level of supervision by attendings. Attendings will be responsible for authorizing the performance of such procedures, and such procedures should only be performed with the explicit approval of the attending. Excluded from the requirements of this section are procedures that, although invasive by nature, are considered elements of routine and standard patient care. Examples are intravenous lines, lumbar puncture, and arterial lines. Supervision for these types of activities is addressed through the provisions under graduated levels of responsibility.

Attendings will provide appropriate supervision for the patients' evaluation and management decisions and for procedures. For elective or scheduled procedures, the attending will evaluate the patient and document a procedural note attesting to attendance during the procedure. During the performance of such procedures, an attending will provide an appropriate level of supervision. Determination of this level of supervision is generally left to the discretion of the attending, within the context of the previously described levels of responsibility assigned to the individual fellow involved. This determination is a function of the experience and competence of the fellow, and of the complexity of the specific case.

All Anesthesia Preoperative evaluations which are completed by fellows will be reviewed and cosigned by either the assigned anesthesiologist in the PACE clinic or by the supervising attending within the OR suite. This documentation will be located in the medical record and completed the same day of the evaluation. All Anesthesia Intraoperative Records will be signed by the attending anesthesiologist. If supervision is delegated to another attending, the change in supervising anesthesiologist must be clear to the fellow and documented in the anesthesia record.

## **EMERGENCY SITUATIONS**

An “emergency” is defined as a situation where immediate care is necessary to preserve the life of, or to prevent serious impairment to the health of a patient. In such situations, any fellow, consistent with the informed consent provisions of the institution, is permitted to do everything possible to save the life of a patient or to save a patient from serious harm. The appropriate attending will be contacted and appraised of the situation as soon as possible. The fellow will document the nature of this discussion in the patient’s record. In situations involving diagnostic or therapeutic procedures with significant risk to the patient, the fellow must consult with and obtain approval from an attending that will be available to assist or to advise as appropriate. In such cases, the attending will determine, based on the circumstances of the case and the fellow’s level of experience, whether to be physically present or to be available by telephone or other communication device. If circumstances do not permit the attending to document a preanesthesia attestation, the fellow’s note will include the name of the responsible attending. The note will indicate that the details of the case, including the proposed procedure, were discussed with and approved by the attending.

## **EVALUATION OF RESIDENTS AND ATTENDING**

- (1) Each fellow will be evaluated according to the general competencies monthly. Evaluations will be in accordance with the certifying bodies and the institutional policy. Evaluations will be available to and discussed with the fellow and maintained by the Program Director, located in the Residency office.
- (2) If at any time a fellow’s performance or conduct is judged by the Clinical Competency Committee and/or Program Director to be detrimental to the care of a patient(s), action will be taken to ensure the safety of the patient(s). Additional actions will be in accordance with the institutional due process policy for fellows.
- (3) Annually, each fellow will complete an anonymous written evaluation of attendings and of the quality of their training program. Such evaluations will include the adequacy of clinical supervision by the attendings. The Program Director and Chair will review the evaluations. The Chair and/or Program Director will provide feedback to the attendings to identify areas where improvements can be made.
- (4) All evaluations of fellows and attendings will be kept on file by the residency Program Director, in an appropriate location and for the required timeframe according to the guidelines established by their respective ACGME Residency Review Committee or other accrediting or certifying agencies.

# **Loma Linda University Children's Hospital Pediatric Anesthesiology Fellowship Program Selection of Fellows Policy**

1. The Pediatric Anesthesiology Program Director will assure that each fellow admitted into the programs is qualified, on the basis of previous education and experience, to assume the responsibilities that she/he will be given as a fellow. This assurance will be based on an evaluation of the credentials of each applicant. Medical education recognizes the criteria of knowledge, skills (including judgment), values and attitudes as separately important in the evaluation of students. The quality of each applicant for a fellow position will be evaluated in light of these separate criteria.

Another goal of the Pediatric Anesthesiology Program Director is to select fellows that are able to fulfill the mission of LLUMC to support the medical outreach of the Seventh-day Adventist Church. Fellows teach and serve as role models for students of Loma Linda University as part of the Fellow's own graduate medical education.

2. The Program Director is familiar with the relationship between undergraduate performance and success as a fellow, particularly as it concerns recent graduates of Loma Linda University School of Medicine (LLUSM). Because of the accreditation process and standards shared by the Liaison Council on Medical Education (LCME) accredited medical schools, similar familiarity is recognized with the relationship between undergraduate performance and fellow performance when the applicant is a graduate of a LCME accredited medical school. These two groups, first, recent graduates of LLUSM and second, recent graduates of other LCME accredited medical schools form the "reference group" against which the Program Director will be able to infer the relative quality of all other applicants.
3. For individuals applying to enter pediatric anesthesiology fellowship training immediately after completing an anesthesiology residency, important information that will be used to judge the quality of the potential fellow will be the academic record of the applicant while in medical school. Students presenting credentials from schools that have not been subjected to the same accreditation process and standards as LCME accredited medical schools may be more difficult to evaluate. The Program Director will use those tools available that will allow a qualitative comparison with the "reference group" in evaluating such applicants. A Dean's letter provided by LCME schools is important in adequately evaluating a prospective fellow's candidacy for training, as it contains evaluations by multiple preceptors that typically address such areas as skills, values, attitudes, etc. Subjective evaluation tools such as a review of an applicant's CV or Personal Statement, or evaluation of the applicant by the interview process will be considered as additional evaluation tools.
4. For fellow applicants who completed their anesthesiology residency at an outside institution, entry into the Loma Linda University (LLU) Pediatric Anesthesiology Fellowship training program as a fellow will be dependent upon satisfactory completion of the educational requirements of the residency program of training. Satisfactory completion must be documented by a letter from the program director stating that the fellow applicant has successfully passed the requirements of the anesthesiology residency program.

5. The Division of Pediatric Anesthesiology has no gender-specific requirements, and discrimination on the basis of gender will not be practiced.
6. Discrimination on the basis of race, national origin or ethnicity will not be practiced.
7. Appointments to programs will be based on the ability of the individual to perform the tasks required for that position. Discrimination based on disability will not be practiced. Programs will develop technical standards from physical and/or psychological skills necessary for their specialty.
8. The Division of Pediatric Anesthesiology seeks qualified individuals who have demonstrated, or will demonstrate, commitment to the mission of LLUMC. This includes qualified applicants who have clear future commitments to participate in the medical outreach of the Seventh-day Adventist church or other similar outreach programs.
9. All residents and fellows at LLUMC must be able to support the mission of LLUMC "to continue the healing ministry of Jesus Christ, 'to make man whole' in a setting of advancing medical science and to provide a stimulating clinical and research environment for the education of physicians, nurses, and other health professionals." Further, they must agree to be subject to the standards of conduct and ethics, which are not in conflict with the ethics, principles and philosophy of the Seventh-day Adventist Church.
10. The Division of Pediatric Anesthesiology will accept for consideration applications for a fellowship position from qualified physicians who meet one of the following criteria, in order to best evaluate applicants by the criteria referred to in Paragraph 1 above:
  - A. Graduates of medical schools accredited by the LCME;
  - B. Graduates of osteopathic schools accredited by the American Osteopathic Association (AOA);
  - C. ECFMG certified graduates of other medical schools.
11. The Division of Pediatric Anesthesiology will NOT accept for consideration the applications of individuals who have violated the rules of the National Resident Matching Program. Neither will it knowingly offer a position to individuals who have terminated a training agreement without a letter of release from the institution.
12. Program-specific policies must be adhered to in addition to LLUMC's Policies and Procedures.
13. All applicants are required to provide all documentation listed below prior to the application being processed for consideration:
  - A. A completed Pediatric Anesthesiology Fellowship Universal application with a signed statement indicating that the information in the application is true.
    1. Current curriculum vitae. Please account for all time periods since graduation from medical school;
    2. Photocopy of medical school diploma (or evidence of anticipated graduation prior to appointment) from a medical school acceptable to the State of California and translation if not in English;
    3. Official medical school transcript(s), and translation, if not in English;
    4. Evidence of having achieved a passing score on at least one of the following examinations:

- a. USMLE Step 1
  - b. NBME Part 1
  - c. COMLEX 1
5. Recommendation letters from each of the following:
    - a. Dean's letter from the medical school of graduation
    - b. Program Director verification of previous educational experiences and a summative competency-based performance evaluation must be provided.
    - c. Two reference letters from physicians currently acquainted with applicant
  6. International Medical School Graduates will be required to submit the following additional documentation:
    - a. "Postgraduate Training Authorization Letter" (PTAL) from the Medical Board of California (MBC) dated within the past year, indicating acceptance of their medical education in meeting MBC requirements and eligibility to commence postgraduate training in California OR a letter from MBC stating the applicant is in the process of fulfilling all requirements for a PTAL except for providing a Social Security Number, should a position be offered.
    - b. ECFMG Standard Certificate with valid date
    - c. Scores for examinations used to qualify for the ECFMG Certificate.
  7. All applicants must have successfully completed the appropriate training prescribed for beginning their specific fellowship program by the Accreditation Council for Graduate Medical Education.
- B. Additional documentation may be required by House Staff Office (HSO), the Graduate Medical Education Committee (GMEC), or the specific GME program prior to acting on a completed application.
- C. All completed applications must be processed and approved by the HSO or GMEC prior to any offer being made to applicant. Official offers of acceptance are issued by the House Staff Office.
- D. Prior to starting in the Pediatric Anesthesiology Fellowship program, an accepted individual will at a minimum:
1. Complete a Pediatric Anesthesiology Fellowship Universal application, provide all required documentation and satisfy all requirements for such training;
  2. Present evidence of an unrestricted license to practice medicine in the State of California if he/she has completed training as noted below:
    - US Graduate: 36 months of ACGME accredited training;
    - International Medical Graduate: 36 months of ACGME accredited training;
  3. Pass a LLUMC pre-employment physical examination including a urine drug screen;
  4. Pass a criminal background check and CMS Fraud list check;
  5. Present evidence of an unexpired CPR Certificate - Basic, ACLS, or PALS (for Pediatric specialties);
  6. Attend required Orientation activities;
  7. Complete all required in-services, including, but not limited to, B.L.U.E. BOOK, P.U.R.P.L.E. BOOK, Compliance, and HIPAA training, as instructed by House Staff Office.

# Loma Linda University Children's Hospital Pediatric Anesthesiology Fellowship Program Fellow Evaluation Policy

The goal of the pediatric anesthesiology fellowship program at LLU is to train physicians in the basic and clinical sciences of anesthesiology. Any individual accepted into the training program has the capability of becoming an exceptional pediatric anesthesiology consultant. It is the responsibility of the faculty to assist each fellow in making satisfactory progress towards this goal. To this end, the evaluation process is fundamental in monitoring the clinical growth and maturation of each fellow as he/she prepares to become a consultant in pediatric anesthesiology. The evaluation process consists of 3 types of evaluations:

## **Daily Evaluations**

A daily evaluation form is available for use by the supervising faculty when deemed appropriate. This form follows the basic 6-competency outline, and should be utilized to document outstanding performance, as well as performance that is considered below the accepted standard of a trainee for that day of work. The supervising faculty is expected to discuss clinical performance with the fellow prior to a "daily evaluation form" being placed in the fellow's file.

## **Rotation Evaluations**

At the end of each rotation the appropriate supervising faculty will complete an electronic evaluation for each fellow. The end-of-rotation evaluation assesses the fellow's performance in each of the six core competencies. Additional space is left for comments by the evaluator. These evaluations will be available to the fellow in the "MedHub" site. All evaluations are reviewed regularly by the program director. If there are any *serious* issues, the program director will discuss such issues with the fellow. If the PD does not discuss the issues with the resident, then the matter should not be considered serious or to be of concern by the Department.

## **Semi-Annual Evaluation**

The ACGME stipulates that each fellow have a face-to-face meeting with the program director every 6 months. During this meeting, the fellow will be given feedback on his/her clinical and academic performance, particularly as it applies to the ACGME six competencies; areas of strength or weakness will be identified as well. The specific rotation evaluation forms will also reviewed with the program director at this time. A fellow-program director form will be completed documenting this meeting. The fellow will have the opportunity to see and sign these evaluations before they are sent to the Board. The fellow's signature does not indicate that the fellow agrees with the evaluation, just that they have read it.

## **Clinical Competency Committee (CCC) Evaluation**

If the fellow has successfully satisfied Departmental and ACGME requirements for the six months of period of training, then the CCC will recommend submission of a 6-month "satisfactory" report to the American Board of Anesthesiology (ABA). If the CCC determines that the fellow has not satisfied the expected duties then the fellow will be placed on either remediation or probation status, and the CCC may vote to send an "unsatisfactory" report to the ABA for the six months period of training. In this instance, the program director will meet with the fellow to discuss the CCC's decision and outline a program of improvement while on remediation/probation status. All fellows are given a copy of the

Department's remediation and probation policy annually; the policy is also available in electronic form for easy reference.

### **Personnel Files**

A personnel file is maintained in the Residency office for each fellow. Information kept on file consists of applications, correspondence, leave requests, daily evaluations, rotation evaluations, semi-annual ABA evaluations, and other miscellaneous items. The fellow is encouraged to review the evaluations regularly. These files will also be reviewed during the Program Director-fellow meeting.

### **Fellow Evaluations of Rotations & Attending Staff**

Regularly, the fellow is expected to evaluate the attending staff with whom they have worked and the rotation that they have just completed. These evaluation forms are distributed to the fellow electronically through MedHub or via a form distributed to the fellow's e-mail account. These evaluations are confidential and are used, in part, for promotion of the attending staff and also for changes that may be appropriate to improve the educational effectiveness of the rotation. The attending physicians also recognize the need for constant awareness of ways to improve their methods of instruction and the fellows are encouraged to help in bringing about this awareness. By evaluating the rotation, the fellow can bring to the attention of the Department any areas they feel need improvement. These evaluations are reviewed by the Chairman and program director and are taken very seriously.

# Loma Linda University Children's Hospital Pediatric Anesthesiology Fellowship Program Fellow Duty Hours Policy

## Duty Hours

- Duty hours are defined as all clinical and academic activities related to the program. Such activities include patient care (both inpatient and outpatient), administrative duties relative to patient care, the provision for transfer of patient care, time spent in-house during call activities, and scheduled activities, such as conferences.
- Duty hours do NOT include reading and preparation time spent away from the duty site.
- Fellows in the final year of education must be prepared to enter the unsupervised practice of medicine and care for patients over irregular or extended periods. As such, there may be special circumstances when these fellows must stay on duty to care for their patients or return to the hospital with fewer than eight hours free of duty. In these instances, the duty hours of fellows will be monitored by the program director.
- Duty hours must not exceed 80 hours per week, averaged over a four-week period, inclusive of all in-house call activities.
- A summary of the ACGME duty hour regulations is listed in the table at the end of this policy statement

## On-Call Activities

- Continuous on-site duty, including in-house call, must not exceed 24 consecutive hours. Fellows may remain on duty for up to four additional hours to participate in didactic activities, transfer care of patients, and maintain continuity of medical and surgical care. During the four additional hours, fellows must not administer anesthesia for a new perioperative care or manage new admissions to the intensive care unit. Fellows are provided with one day in seven free from all educational and clinical responsibilities, averaged over a four-week period, inclusive of call.
- 8 hour rule: This consists of a minimum 8-hour (preferably 10-hour) time period, free of clinical duty, provided between ALL daily duty periods and after in-house call. It also applies to at-home pager call, such that any clinical obligation that necessitates the fellow coming to work from home shall require that the fellow NOT resume clinical duties until 8 hours AFTER that same clinical obligation.
- Backup support will be available when patient care responsibilities are especially difficult or prolonged, resulting in fellow fatigue sufficient to jeopardize patient care.
- Support services, such as transportation aides and electronic laboratory data retrieval will be available to decrease the amount of time spent by fellows in non-educational activities.
- At-home call (or pager call): The frequency of at-home call is not subject to the every-third night, or 24+4 hour limitation. However, at-home call must not be so frequent as to preclude rest and reasonable personal time for each fellow. Fellows taking at-home call must be provided with one day in seven completely free from all educational and clinical responsibilities, averaged over a four-week period. When fellows are called into the hospital from home, the hours fellows spend in-house are counted toward the 80-hour limit.

## Tracking Work Hours

- In order to adequately follow fellow's work-hours, the Department regularly tracks work hours utilizing information entered into the fellow's case logs section of MedHub.
- It is imperative that fellows appropriately enter work-hours in accordance with the above definitions of work duties, and that this process is done on a daily, or every other day, basis.
- If there are work-hour violations due to *attending insistence*, notification of such violations should be made to the Program Director directly, as this is not the Department policy and all attendings have been notified that keeping fellows beyond allowed work hours is prohibited.
- Fellows are expected to notify the service director 1 hour *before* an anticipated work shift work hour violation occurs. The fellow is responsible for this notification, in order to avoid violations. If the fellow records a work-hour violation, that fellow will be required to answer to the program director as to why the violation occurred.
- It is strongly advised that each fellow keep a "hard copy" (small notebook will suffice) of all case logs as a backup of procedures and cases performed, and for verification of work hours entered into MedHub.

## Moonlighting

- The Pediatric Anesthesiology Department policy on moonlighting follows the ACMGE's duty hour policy, which is addressed moonlighting work hours, and is included in the ACMGE Duty Hour summary table.
- The House Staff Office of Loma Linda University Medical Center strongly discourages moonlighting.
- If the CA state-licensed pediatric anesthesiology fellow desires to moonlight, approval to do so must first be granted by the Pediatric Anesthesiology Program Director. Any clinical duty hours dedicated to moonlighting are included in the 80 hour work week totals; thus a schedule of the fellow's outside work duties must be given to the Program Director in order for the fellow to comply with the 80 hours-per-week work hour limit.

# **Loma Linda University Children's Hospital Pediatric Anesthesiology Fellowship Program**

## **Protocol for Fellows Remaining on Duty Beyond Scheduled Hours**

Residents at the PGY-2 level and above should have 10 hours free of duty between scheduled work hours and there must be an 8-hour respite according to the current ACGME requirements.

During the pediatric anesthesiology fellowship year, there are necessary and unique cases (e.g., index cases, ECMO, neonatal emergencies) that may come at the end of the usual period of duty or during the night hours. In order to give the fellows the optimum exposure to these cases they are given the opportunity to participate in the care of these patients. If they are scheduled for OR cases the next morning and there are not 8 hours of respite before these morning cases start, the attending physician on call arranges for another resident to be scheduled for that list and the fellow will only return to duty after the 8 hours respite period.

If a fellow should be involved in these cases which goes beyond the 2011 ACGME requirement that include a duty hours work limit of 24 continuous hours on duty, the resident may stay beyond a 24 hour period of duty for an additional 4 hours in order to carry out an effective patient care transfer. They will then have 14 hours free from duty.

The fellow is required to document the reasons for remaining to care for a specific patient and submit the information to the program director and fellowship coordinator.

# **Loma Linda University Children's Hospital Pediatric Anesthesiology Fellowship Program Disciplinary Actions and Termination Policy**

Disciplinary actions directed toward Department of Pediatric Anesthesiology fellows are typically utilized for serious acts requiring immediate actions. These actions include suspension, probation, and dismissal. The fellowship program, the Loma Linda University Graduate Medical Education Program, and the Loma Linda University Health Sciences Center are under no obligation to pursue remediation actions prior to recommending a disciplinary action. All disciplinary actions are subject to the Loma Linda University Graduate Medical Education Academic Appeals (Grievance) process. All disciplinary actions will become a permanent part of the fellow training record.

## **Suspension**

A fellow may be suspended from all program activities and duties by the program director, department chair, the Director of GME (DIO), the Associate Dean for Academic Affairs, or the LLU Medical School Dean. Program suspension may be imposed for program-related conduct that is deemed to be grossly unprofessional, incompetent, erratic, potentially criminal, noncompliant with the Loma Linda University policies, procedures, and Code of Conduct, federal health care program requirements, or conduct threatening to the well-being of patients, other fellows, faculty, staff, or the fellow.

A decision involving program suspension of a fellow must be reviewed within three (3) working days by the department chair (or designee) to determine if the fellow may return to some or all program activities and duties and/or whether further action is warranted (including, but not limited to counseling, fitness for duty evaluation, referral to the AIRS program, drug testing, probation, non-renewal of contract, or dismissal). Suspension may be with or without pay at the discretion of institutional officials.

## **Probation**

Probation is a disciplinary action that constitutes notification to the fellow that dismissal from the program can occur at any time during or at the conclusion of probationary period. In most cases, remedial actions including but not limited to Remediation are utilized prior to placement on probation, however, a fellow may be placed on probation without prior remediation actions based upon individual program policies.

Probation is typically the final step before dismissal occurs. However, dismissal prior to the conclusion of a probationary period will occur if there is further deterioration in performance or additional deficiencies are identified. Additionally, dismissal prior to the end of the probationary period may occur if grounds for suspension or dismissal exist. Thresholds for placing fellows on probation may include, but are not limited to the following examples:

1. Failure to complete the requirements of Remediation status
2. Failure to perform at an adequate level of competence, to include clinical and/or academic performance standards
3. Unprofessional or unethical behavior
4. Misconduct, disruptive behavior, or failure to fulfill the responsibilities of the anesthesiology program as stipulated in the Department's Policies and Procedures and the Resident Manual.

**Dismissal**

Fellows may be dismissed for a variety of serious acts. The fellow does not need to be on suspension or probation for this action to be taken. These acts include but are not limited to the following: serious acts of incompetence, impairment, unprofessional behavior, falsifying information or lying, or noncompliance.

Immediate dismissal will occur if the fellow is listed as an excluded individual by any of the following:

1. Department of Health and Human Services Office of the Inspector General's "List of Excluded Individuals/Entities".
2. General Services Administration "List of Parties Excluded from Federal Procurement and Non-Procurement Programs".
3. Convicted of a crime related to the provision of health care items or services.

# **Loma Linda University Children's Hospital Pediatric Anesthesiology Fellowship Program Faculty Involvement in Patient Care Protocol**

In general, in accordance with our shared goal of patient safety, faculty are involved in all high level decisions in patient care and in complex patients or issues. Fellows are provided with full faculty and attending support in all aspects of clinical care.

In situations, which involve complex patients or issues such as ICU transfer, DNR, death, or imminent death, notification to patients/parents of difficult diagnosis or complications, faculty attending involvement is present. However, the fellow is expected to take the lead in the presentation and discussion. The faculty is immediately and directly available for clarification to the patient/family and for feedback/guidance to the fellow.

With increasing experience, fellows should be involved in the decision making process in these and other situations while the faculty provide a support supervisory role.

When there is any question whether the faculty should be involved in particular patient care situations, the fellows are assured that communicating with the faculty is encouraged and preferred.

# Loma Linda University Children's Hospital Pediatric Anesthesiology Fellowship Program NPO Guidelines

Toddlers and children should not be given solid food by mouth or feeding tube within 8 hours of inducing anesthesia for elective cases and kept NPO according to the **"2-4-6-8 rule"**:

- 2 hours: Clear liquids (water, glucose water, apple or other juice not containing pulp, carbonated clear drinks, Gatorade, Pedialyte, etc.)
- 4 hours: Breast milk
- 6 hours: Formula or milk
- 8 hours: Solids

# Loma Linda University Children's Hospital Pediatric Anesthesiology Fellowship Program Criteria for Discharge of Ex-premature Infants

Revised June 2016

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There is clearly a risk of postoperative apnea following anesthesia in ex-preterm infants. In a review of prospective trials, Cote demonstrated the risk of apnea to vary with post-conceptual age. Post-conceptual age (PCA) is defined as estimated gestational age (EGA) at birth plus age in weeks after birth. The risk was stratified based on PCA:

EGA	PCA	Risk of apnea
32	56	<1%
32	51	<5%
35	54	<1%
35	48	<5%

Review of the articles referenced below shows significant incidence of apnea in ex-preterm infants less than 60 weeks PCA undergoing surgery and anesthesia (up to half in ex-preterm infants). Risk factors in the ex-preterm infant that correlate with postoperative apnea have been identified: the major risk factor continues to be post-conceptual age, but other conditions also correlate to greater risk for postoperative apnea. Recommendations for managing term infants vary, but consensus is that term infants under one month of age (<45 weeks PCA) should be monitored for at least 12 hours following anesthesia, and are thus not candidates for outpatient surgery in the LLUMC system.

The major risk factors for postoperative apnea following anesthesia in the ex-preterm infant up to 60 weeks of post-conceptual age are:

- Apnea at home
- Anemia
- Neurological diseases such as seizures, intraventricular bleeding or AVM
- Chronic lung disease, need for CPAP or home oxygen
- Congenital heart disease
- Extreme prematurity or very low birth weight

The preoperative evaluation of these infants requires reserving a monitored bed postoperatively and a clear discussion with the family regarding the perioperative risks of anesthesia and apnea. If the child is receiving theophylline or caffeine preoperatively, this therapy should be continued postoperatively. A Cochrane review of prophylactic caffeine in formerly preterm infants concluded that although caffeine can be used to prevent postoperative apnea, bradycardia, and episodes of oxygen desaturation, there was insufficient evidence to adopt this as routine anesthetic practice. *If caffeine is administered to a former preterm infant, postoperative admission and overnight respiratory monitoring are still required, because caffeine is not 100% effective in preventing postoperative apnea.*

A recent Cochrane review found “no difference in the effect of spinal compared to general anesthesia on the overall incidence of postoperative apnea, bradycardia, oxygen saturation, need for postoperative analgesics or respiratory support.” Additive drugs used to prolong the duration of a spinal or caudal block, such as clonidine, or sedatives such as midazolam and dexmedetomidine have been associated with postoperative or intraoperative apnea. Spinal anesthesia is also associated with a significant failure rate (20% in some studies) and the need for multiple attempts to achieve accurate placement of the needle, although in experienced hands, the success rate for placing a spinal block was 97.4% and an adequate level of spinal anesthesia was achieved in 95.4% of infants. Despite many medical advances, former preterm infants should not be anesthetized as outpatients even when a regional technique has been used; they require admission for postoperative monitoring overnight for apnea.

With respect to full-term neonates, three reports have described infants who developed apnea after apparently uneventful general anesthesia. Therefore, if a full-term infant who is younger than 44 weeks PCA demonstrates any abnormality of respiration after anesthesia, we recommend that they be admitted overnight for apnea monitoring.

### **LLUMC Anesthesiology Policy:**

- Healthy full term infants less than 45 weeks PCA are not candidates for outpatient anesthesia.
- Preterm infants less than 60 weeks PCA who have any of the listed morbidities, or who are ASA class 3 or 4 require postoperative monitoring for at least 12 hours following anesthesia, and are thus not candidates for outpatient anesthesia.
- Preterm infants between 54 and 60 weeks PCA may be acceptable candidates for outpatient anesthesia in the LLUMC system if they have NO other morbidities.
- Preterm infants over 60 weeks PCA should be acceptable candidates for outpatient anesthesia in the LLUMC system if they are ASA 1 or 2.

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# **Loma Linda University Children's Hospital Pediatric Anesthesiology Fellowship Program Monitoring for Patients with Central Sleep Apnea**

Infants and children with central sleep apnea are at an increased risk for post-anesthetic complications. These patients should be admitted and monitored overnight.

Patients with central sleep apnea and any of the following criteria are not candidates for out-patient surgery and should be admitted overnight after a general anesthetic:

- Age younger than 3 years
- Pulmonary disease
- Complex congenital cardiac disease
- Neuromuscular disorders, including hypotonia
- Cerebral palsy
- Craniofacial anomalies affecting the airway (e.g. Down syndrome)
- Genetic, metabolic or storage diseases
- Greater than 95<sup>th</sup> percentile for age and gender
- Procedure requiring postoperative opioids

# Loma Linda University Children's Hospital Pediatric Anesthesiology Fellowship Program Pre-operative Medication

Most children over the age of one can benefit from premedication for anxiety. It is beneficial to give young children **in whom there is no contraindication** Midazolam 0.5 mg/kg syrup orally 20 – 30 minutes before surgery with a maximum of 15 to 20 mg for procedures that are longer than 30 minutes duration. Patients with intravenous access may be given IV Midazolam just prior to going to surgery.

Unless cleared by the attending anesthesiologist, patients with altered mental status, OSA, central apnea, cyanotic congenital heart disease, infants under the age of one, and those scheduled for laryngoscopies & bronchoscopies should receive **NO** premedication.

In patients with asthma and reactive airway disease, a “breathing treatment” consisting of nebulized Albuterol (0.25 – 0.5 mL of 0.5% solution in 2.5 mL NS) should be considered. Albuterol dosing by weight is as follows: 0.15-0.25 mg/kg with a minimum of 1.25 mg and a maximum of 5 mg.

# Loma Linda University Children's Hospital Pediatric Anesthesiology Fellowship Program Handover/Transfer Policy

## Purpose

The purpose of this policy is to define a safe process to convey important information about a patient's care when transferring care responsibility from one caregiver to another in order to ensure the continuity of care and safety of the patient. Proper handover should prevent the occurrence of errors due to failure to communicate changes in the status of a patient that have occurred during that shift.

## Definitions

A **handover**, also known as "sign-out", is a real time, active process of passing patient-specific information from one caregiver to another or from one team of caregivers to another.

A **transfer** is a real time, active process of conveying the responsibility for the care of a patient from one entity to another. It may involve the discharge from one entity and the admission to another along with the patient's medical records or copies.

## Scope

Caregivers involved in the hand-off process include, but are not limited to, attending physicians, residents/fellows, nurses, therapists, technicians and transporters.

## Policy

A standardized approach to handovers/transfers at Loma Linda University Medical Center provides an opportunity to ask and respond to questions.

A handoff/transfer occurs each time any of the following situations exist for an inpatient, emergency room patient, clinic patient, observation patient, or any other patient:

- Move to a new unit
- Transport to or from a different area of the hospital for care (e.g. diagnostic/treatment area)
- Assignment to a different physician temporarily (e.g. overnight/weekend coverage) or longer (e.g. rotation change)
- Discharge to another institution of facility

Key elements of patient information are included in the handover/transfer process as determined by the service or team of caregivers. Patient information related to current condition and present treatment patient information will include at a minimum:

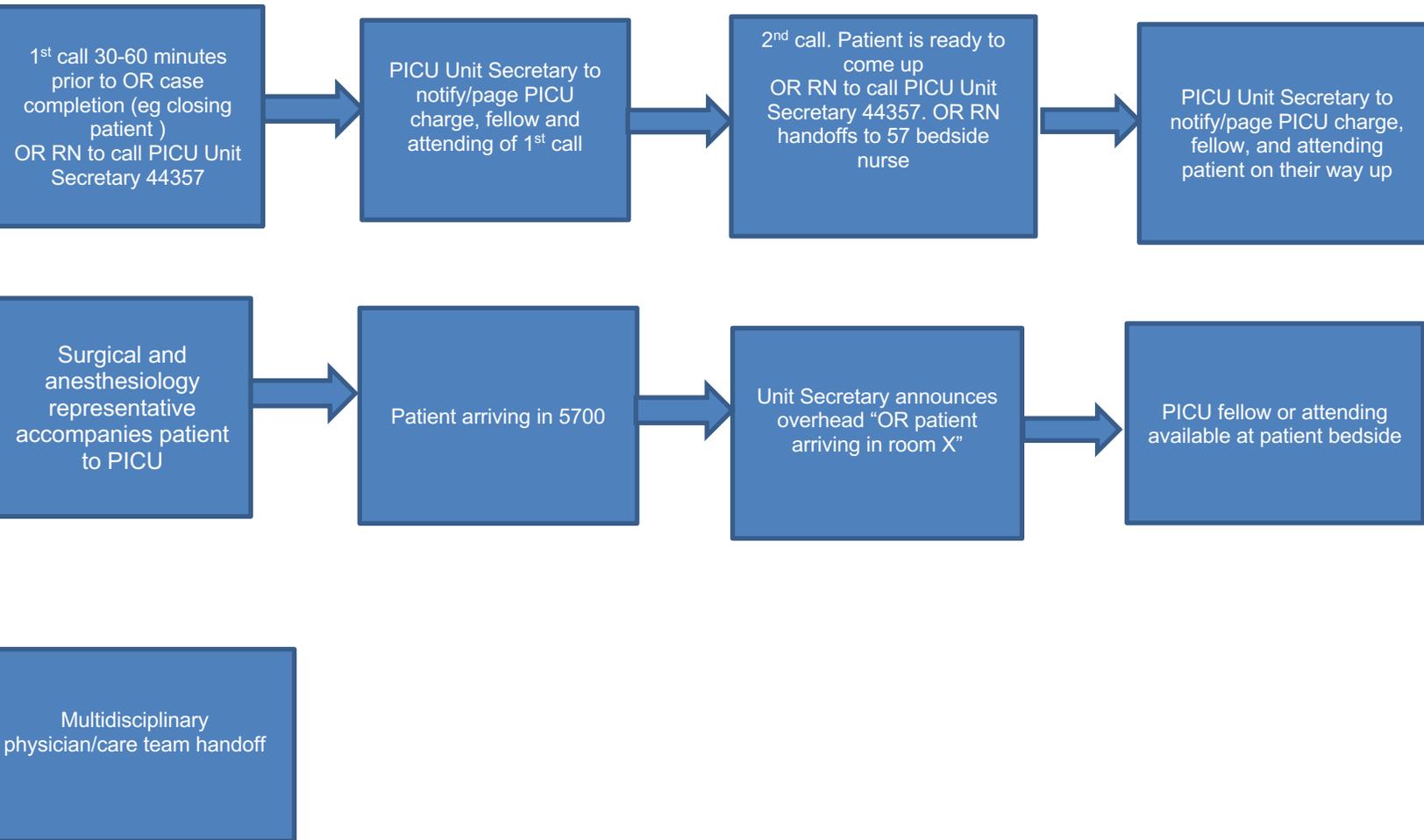
- Patient name
- MR #
- Diagnosis
- Allergies
- Isolation status
- Potential changes in condition
- What to watch for or monitor during the next interval of care

Handover/transfer communication includes verbal face-to-face or telephone reports; written reports or handover/transfer forms or SBAR checklists. Anytime written communication is used in a handover/transfer, the name and contact number of the caregiver handing off or transferring care will be included to facilitate the asking of questions.

### **Procedure**

- Caregivers will identify a quiet area to give report that is conducive to transferring information with limited interruptions.
- Caregivers will have at hand any supporting documentation or tools used to convey information and immediate access to patient record.
- All communication and transfers of information will be provided in a manner consistent with protecting patient confidentiality.
- Caregivers will afford each other the opportunity to ask or answer questions and read or repeat back information as needed. If the contact is not made directly (face-to-face or telephone), the caregiver must provide documentation of name and contact information (extension, pager, or email address) to provide opportunity for follow up call or inquiry.
- The patient will be informed of any transfer of responsibility even if temporary or brief.

OR TO PICU HANDOFF FLOWSHEET



# Loma Linda University Children's Hospital

## Pediatric Anesthesiology Fellowship Program

### Tranexamic Acid Dosing for Pediatric Surgery

Intraoperative administration of tranexamic acid significantly reduces blood loss during cardiac, spine surgery for scoliosis and cranial vault remodeling (craniosynostosis repair).

The dosing regimen at LLUCH is as follows:

#### Pediatric Cardiac Surgery

- 60 mg (0.6 mL) to given to perfusionist to add to pump prime
- 0-12 mo: 50 mg/kg LD, 10 mg/kg/hr infusion
- >12 mo: 20 mg/kg LD, 10 mg/kg/hr infusion
- Confirm dose with attending, max LD 2 gms. Do not use for shunts (BTS), cases involving the coronaries, or in hypercoagulable patients, check with surgeon if needed. Do **not** use as the carrier fluid. **Discontinue prior to transfer to the ICU.**

#### Pediatric Spine Surgery for Scoliosis

- Bolus: 20 mg/kg (max LD 1gm)
- Infusion: 10 mg/kg/hr until skin closure
- Drs. Nelson and Morrison both agreed to the above dosing

#### Cranial Vault Reconstruction (craniosynostosis)

- Bolus: 50 mg/kg (max 1000 mg)
- Infusion: 5 mg/kg/hr until skin closure
- Please select the appropriate diluent volume for the bolus dose especially when ordering this medication for infants weighing < 10 kg

**Tranexamic Acid** is available in the pediatric anesthesia workroom pyxis. May draw up undiluted 100 mg/ml concentration and infuse using a syringe pump.

# Loma Linda University Children's Hospital Pediatric Anesthesiology Fellowship Program OR-NICU Process Improvement Initiative

June 3, 2014

LJ Mason MD, Director of Pediatric Anesthesiology

The OR-NICU Process Improvement Committee, a multidisciplinary group of physicians and nurses, has worked for several months to develop mechanisms for improving OR turnover times for surgical cases involving NICU patients. This memo outlines proposed practice changes affecting anesthesia providers with a target implementation date of Monday, June 9, 2014.

**Practice Change #1:** Allow pre-operative surgical holds in unit 2800 for selected NICU patients (i.e. "growers and feeders").

*Patients must meet the following criteria:*

1. Weight minimum: 3 kg
2. No cyanotic heart disease
3. No vasopressors
4. Not intubated, no non-invasive respiratory support (ex. CPAP, NIPPY)
5. No invasive monitors (ex. Arterial line, EVD/ICP monitor)
6. No apnea and/or bradycardia
7. No adverse overnight events
8. In regular open NICU crib (i.e. not requiring NICU warmer)

*Proposed workflow (for "growers and feeders")*

1. Time permitting, a pre-operative evaluation will be performed by the anesthesia resident and discussed with the anesthesia attending.
2. The anesthesia attending will make the ultimate determination of a patient's candidacy for 2800 pre-op hold. If the patient is a suitable candidate, a member of the anesthesia team will write the following "nursing communication" order in Epic: "Patient is approved by anesthesia to go to 2800 pre-op area prior to surgical procedure on (date)."
3. OR circulating nurse will notify Children's Hospital OR front desk when ready to send for patient (i.e. as previous case nearing completion), after confirming approval from 2800 pre-op hold with attending anesthesiologist.
4. 2800 nursing staff will receive SBAR handoff from NICU nurse before assuming care of patient
5. Post-operatively, patient will return directly to 3700. NICU nurses will continue to come to OR to assist with patient transport

**Practice Change #2:** NICU patients not eligible for pre-operative surgical hold in unit 2800 will be transported directly to assigned operating room by NICU staff.

*Proposed workflow:*

1. As previous case finishing, Children's Hospital OR front desk to give NICU nurse a "get ready call."
2. During room turnover, anesthesia providers notify OR circulating nurse when they are ready to send for NICU patient.
3. OR circulator notifies Children's Hospital OR front desk when circulator/scrub are also ready to send for NICU patient. Front desk sends for patient.
4. NICU nurse/RT put on paper scrubs ("bunny suits") and hats in the NICU before beginning patient transport. NICU front desk to notify Children's Hospital OR front desk when patient exits NICU. Children's Hospital OR front desk to relay this information to OR circulator/anesthesia resident.
5. Anesthesia resident to await NICU nurse/RT at elevator and walk with them to assigned OR. If parents arrive with patient, anesthesia resident will explain risks/benefits of anesthesia to parents before proceeding to OR.
6. Circulating nurse to verify consents, site markings, etc. in operating room instead of at elevator.
7. Anesthesia assumes care of patient only AFTER confirmation of appropriate consents, site markings, etc. completed.
8. Post-operatively, patient will return directly to 3700. NICU nurses will continue to come to OR to assist with patient transport.

During the initial phase of these practice changes, the OR-NICU Process Improvement Committee welcomes constructive feedback. Thank you for your participation in this endeavor.

## **ACKNOWLEDGEMENT FORM**

I have received a copy of the 2021-2022 Handbook / Goals and Objectives / Policies for the Pediatric Anesthesiology Fellowship Program.

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**Printed Name**

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**Signature**

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**Date**

***Please complete and return to the Fellowship Coordinator.***