

The University of Arizona Pediatric Residency Program

Primary Goals for Rotation

Surgery, Pediatric

1. **GOAL:** Anesthesia. Participate in the care and management of pediatric patients requiring general and local anesthesia.
2. **GOAL:** Understand the principles of pediatric sedation and apply them in the appropriate setting.
3. **GOAL:** Recognize and manage pain occurring with common pediatric conditions.
4. **GOAL:** Differentiate normal conditions from pathologic ones requiring surgical intervention.
5. **GOAL:** Evaluate and appropriately treat or refer signs and symptoms that may require surgery.
6. **GOAL:** Diagnose and manage common conditions that generally do not require surgical referral.
7. **GOAL:** Diagnose, provide initial stabilization, and refer appropriately conditions that usually require surgical evaluation.
8. **GOAL:** Collaborate with surgeons in the pre-operative and post-operative evaluation and management of pediatric patients, differentiating between adult and pediatric surgeons.
9. **GOAL:** Evaluate, stabilize, manage and refer as necessary patients presenting with trauma.
10. **GOAL:** Appendicitis. Recognize, diagnose, manage and refer patients with appendicitis.
11. **GOAL:** Acquire recommended proficiency in the use and performance of common surgical procedures.
12. **GOAL:** Demonstrate high standards of professional competence while working with patients under the care of a subspecialist.

1. GOAL: Anesthesia. Participate in the care and management of pediatric patients requiring general and local anesthesia.

A. Assist the anesthesiologist or surgeon in addressing issues related to pre-anesthesia evaluation, risk assessment and preparation.

1. Complete pre-op evaluation, including history, physical examination, laboratory testing, and pediatric assessment of anesthesia risk, and communicate concerns to anesthesiologist or surgeon.
2. Participate in deciding whether a child is appropriate for day surgery or inpatient surgery.
3. Assist in airway assessment as it relates to the anticipated anesthetic.
4. Refer for cardiovascular assessment as it relates to the anticipated anesthetic.
5. Participate in the pre-anesthesia management of children with the following conditions: recent upper respiratory infection, reactive airway disease, upper airway obstruction (croup, epiglottitis, airway foreign body), congenital heart disease, neonatal apnea, obstructive sleep apnea, diabetes, seizure disorder.
6. Recognize special anesthetic considerations for children with the following conditions: genetic disorders, musculoskeletal disorders and conditions requiring emergency surgery.
7. Manage issues related to the continuation of chronically administered medications.
8. Recognize the importance of and describe in general terms the principles of pre-anesthesia sedation.
9. Participate in educating families regarding principles related to NPO status and PO intake prior to induction of anesthesia.
10. Assist in the psychosocial preparation of the child and parents for anesthesia.
11. Recognize the importance of and describe in general terms the complication of malignant hyperthermia.

B. Demonstrate understanding of the following principles of intraoperative anesthetic management:

1. IV access and fluid management during anesthesia
2. Non-invasive monitoring of blood pressure, heart rate, oximetry and capnography
3. Temperature control in the peri-anesthetic period
4. Anesthetic equipment
5. Bag mask ventilation devices (self-inflating bag, anesthesia bag)
6. Airway devices (oral/nasal airways, endotracheal tubes, laryngeal mask airways)
7. Laryngoscopes
8. Use of physical examination and monitoring methods for early detection of airway obstruction
9. Airway suction devices

- 10. Oxygen supplementation devices
- 11. Anesthetic induction and reversal techniques, including basic pharmacology of inhalation anesthetic agents, intravenous anesthetic agents, muscle relaxants, local anesthetics, narcotic analgesics, and agents to reverse muscle relaxation

C. Understand the basic pharmacology of commonly used agents for local anesthesia and their side effects.

D. Demonstrate understanding of the following principles of post-anesthesia management:

- 1. Management of post-anesthesia nausea and vomiting
- 2. Post-surgical pain management (in-hospital, day surgery, home)
- 3. Re-establishment of PO intake after anesthesia
- 4. Discharge criteria
- 5. Adequate follow-up

E. Identify psychosocial barriers to obtaining adequate post-operative care (e.g., parental anxiety, cost, distance, school attendance)

F. Describe the role and general scope of practice of pediatric anesthesiologists; recognize situations where children should be cared for by anesthesiologists trained in the care of children; work effectively with these specialists in the care of children.

2. GOAL: Understand the principles of pediatric sedation and apply them in the appropriate setting.

A. Participate in managing children in the outpatient setting who require sedation for diagnostic and/or therapeutic procedures performed outside of the operating room.

B. Discuss patient/procedural factors that increase risk of morbidity from sedation, scenarios requiring anesthesia consultation regarding sedation safety, and issues that drive a need for general anesthesia rather than sedation.

C. Understand the basic pharmacology of commonly used agents for sedation and their side effects.

D. Identify safe procedures for administering and monitoring sedatives and analgesics when general anesthesia is not used, e.g., for the following procedures commonly ordered by general pediatricians:

- 1. Magnetic resonance imaging
- 2. Computed tomography
- 3. Lumbar puncture
- 4. Wound management

E. Demonstrate familiarity with safe procedures for administering and monitoring sedatives and analgesics when general anesthesia is not used, e.g., for the following procedures ordered or performed by subspecialists:

- 1. Radiological procedures other than MRI, CT
- 2. Gastrointestinal endoscopy
- 3. Pulmonary endoscopy
- 4. Radiation therapy

<ul style="list-style-type: none"> 5. Bone marrow aspiration 6. EEG
<p>E. Explain current terminology for various levels of sedation, including terms used by hospital accreditation bodies and credentialing committees (e.g., "conscious sedation") and demonstrate that you understand your hospital's standards for safety for each type of sedation.</p>
<p>F. Recognize circumstances when optimal care of the child requires the services of an anesthesiologist.</p>
<p>3. GOAL: Recognize and manage pain occurring with common pediatric conditions.</p>
<p>A. Skillfully use tools to assess pain in infants and children.</p>
<p>B. Understand general principles of pharmacologic pain management.</p> <ul style="list-style-type: none"> 1. Choice of analgesic agent (nonsteroidal anti-inflammatory, opioid) 2. Choice of administrative route 3. Dose escalation and weaning 4. Shifting between analgesics 5. Monitoring efficacy 6. Side effects
<p>C. Recognize the utility of regional nerve blocks for post-surgical pain relief.</p>
<p>D. Recognize and explain the principles of:</p> <ul style="list-style-type: none"> 1. Patient controlled analgesia (PCA) 2. Epidural infusion of analgesic medications 3. Patient-controlled epidural analgesia
<p>E. Address issues surrounding the management of chronic pain.</p> <ul style="list-style-type: none"> 1. Recognize the common scenarios associated with chronic pain. 2. Describe general principles about treatment for chronic pain syndromes, including approaches using pharmacology, behavioral/psychosocial, complementary or alternative therapies. 3. Recognize non-pharmacological treatment alternatives for chronic pain syndromes, including complementary and alternative methods. 4. Use behavioral and supportive care for pain management in acute situations. 5. Use psychosocial adjuncts for treatment of chronic pain syndromes in a variety of situations, such as neonatal intensive care treatments, sickle cell anemia, headache. 6. Consider special issues in the treatment of pain occurring in association with burns, terminal illness and emergency procedures.
<p>F. Address issues surrounding common pain problems (e.g., circumcisions, immunizations, phlebotomy, otitis media, pharyngitis, teething).</p>
<p>4. GOAL: Differentiate normal conditions from pathologic ones requiring surgical intervention.</p>
<p>A. Counsel parents regarding the natural history of uncomplicated umbilical hernia.</p>
<p>B. Distinguish inguinal hernia from hydrocele and describe when it is appropriate for the pediatrician to observe and follow, and when to refer for evaluation.</p>

C. Distinguish acute abdominal pain related to transient events like constipation, musculoskeletal pain or gastroenteritis from pain that is likely to come from a serious surgical condition.

D. Interpret clinical and laboratory tests to identify conditions that require surgical intervention, including:

1. Blood studies (CBC, ESR, Electrolytes, BUN, Creatinine, LFTs, amylase, lipase)
2. Occult blood in gastric fluid and stool
3. Cultures (blood, stool, wound, urine, fluid from body cavities and abscesses)
4. Radiographic studies (KUB and upright abdominal films, barium enema, UGI and small bowel follow through)

5. GOAL: Evaluate and appropriately treat or refer signs and symptoms that may require surgery.

A. Create a strategy to determine if the following presenting signs and symptoms are caused by a surgical condition, provide initial evaluation or treatment, and refer appropriately:

1. Acute abdominal pain
2. Acute scrotum
3. Vomiting, especially bilious or bloody
4. Inguinal swelling or mass
5. Abdominal mass
6. Bloody stools

6. GOAL: Diagnose and manage common conditions that generally do not require surgical referral.

A. Diagnose, manage, and counsel patients and parents about the following conditions that generally do not require surgical evaluation:

1. Umbilical hernia
2. Retractable testes
3. Resolving hydrocele
4. Transient lymphadenopathy
5. Minor lacerations

7. GOAL: Diagnose, provide initial stabilization, and refer appropriately conditions that usually require surgical evaluation.

A. Recognize, stabilize and initiate management and surgical referral for the following conditions:

1. Intussusception
2. Tumor
3. Trauma (e.g., blunt abdominal trauma)
4. Burns
5. Failure to thrive or gastroesophageal reflux requiring gastrostomy tube or Nissen fundoplication
6. Central venous access

7. Atypical mycobacterial adenitis
8. Acute lymphadenitis
9. Prenatal diagnosis of surgical condition: Congenital diaphragmatic hernia, Hirschsprung's, Atresia or stenosis of gastrointestinal tract, CCAM (cystic adenomatoid malformation), abdominal wall defects (gastroschisis and omphalocele), lymphatic malformations (cystic hygroma) of the neck, esophageal anomalies, sacrococcygeal teratomas
10. Caustic strictures of esophagus
11. Pleural effusion or empyema
12. Hypertrophic pyloric stenosis
13. Meconium ileus
14. Meckel's diverticulum
15. Malrotation, volvulus
16. Ascites
17. Premature infant with short bowel syndrome following necrotizing enterocolitis
18. Neck masses (thyroglossal duct cyst, branchial cleft cyst, cystic hygromas)
19. Anorectal anomalies (imperforate anus)
20. Chest wall defects: pectus excavatum and carinatum
21. Intersex and ambiguous genitalia
22. Lymphangiomas
23. Dysphagia, achalasia
24. Abdominal mass: Wilms Tumor, Neuroblastoma
25. Ovarian mass: teratomas, etc.
26. GI bleeding
27. Intestinal obstruction
28. Undescended testis
29. Ganglion cysts
30. Inflammatory bowel disease
31. Polyposis syndromes
32. Appendicitis
33. Biliary atresia
34. Gall bladder disease
35. Portal hypertension
36. Pancreatitis
37. Vascular anomalies

B. Identify the role and general scope of practice of pediatric surgeons; recognize situations where children benefit from the skills of surgeons with specialized training in the care of infants and children; and work effectively with these professionals in the care of children's surgical conditions.

8. GOAL: Collaborate with surgeons in the pre-operative and post-operative evaluation and management of pediatric patients, differentiating between adult and pediatric surgeons.

A. Refer patients needing surgical intervention to the appropriate pediatric surgical subspecialist, if available in your locale.

B. Evaluate patients pre-operatively to provide medical clearance for surgery.

1. Obtain history of prior surgery and anesthesia.

2. Identify bleeding tendencies.
3. Assess oral cavity for loose teeth if endotracheal intubation is anticipated.
4. Manage any chronic respiratory conditions (e.g., asthma) that may have an impact on surgery and recovery.

C. Participate in the post-operative follow-up of surgical patients.

1. Monitor fluid and electrolyte status.
2. Observe for fever and recognize different causes of fever and their appropriate evaluation.
3. Recognize and manage common post-operative complications (bleeding, stridor, infections, wound dehiscence).
4. Manage post-operative pain.
5. Assess discharge and follow-up plans.
6. Recognize psychosocial stresses of surgery on families and anticipate potential barriers to adequate post-op care.

D. Function as a pediatric consultant to surgical colleagues in the diagnosis and management of pediatric patients.

9. GOAL: Evaluate, stabilize, manage and refer as necessary patients presenting with trauma.

A. Counsel families regarding strategies to prevent traumatic injuries in childhood.

B. Evaluate patients presenting with simple or multiple trauma by performing a primary and secondary survey.

C. Manage mild trauma (e.g., mild closed head trauma or extremity soft tissue injury).

D. Stabilize and refer patients with multiple trauma.

1. Obtain venous access when possible.
2. Be prepared to intubate in managing the airway.
3. Splint suspected fractures.
4. Stabilize the cervical spine.
5. Fluid resuscitate when indicated, utilizing the appropriate product (colloid vs. blood products).
6. Order appropriate laboratory testing (e.g., type and cross match).
7. Monitor condition carefully until surgical evaluation can be performed.

E. Describe the main differences between a level 1, 2 and 3 trauma center, including specialists available at the site and type of pediatric patients served.

10. GOAL: Appendicitis. Recognize, diagnose, manage and refer patients with appendicitis.

A. Recognize common and unusual presenting signs and symptoms indicating appendicitis, and diagnose by eliciting the appropriate history and physical examination findings.

B. When the diagnosis is not certain, recognize situations warranting inpatient admission for medical observation and repeated surgical consultation during course of illness.

C. Use imaging studies appropriately in the diagnosis of appendicitis.

D. Obtain laboratory tests suitable for evaluation of appendicitis and also in anticipation of surgical intervention.

E. Discuss potential surgical intervention with patients and families.

11. GOAL: Acquire recommended proficiency in the use and performance of common surgical procedures.

A. Order or perform, collect proper specimens, and interpret results or response to the following clinical studies and procedures used in surgery:

1. Incision and drainage of simple abscess, including paronychia
2. Management of first and second degree burns
3. Gastric suction and lavage
4. Placement of gastric tube (orogastric or nasogastric)
5. Gastrostomy tube replacement
6. Reduction of simple hernia
7. Central line use and care
8. Drainage of subungual hematoma
9. Suture of simple lacerations
10. Needle thoracentesis
11. Simple wound care
12. Acute stabilization of a patient with a major burn
13. Neonatal paracentesis

12. GOAL: Demonstrate high standards of professional competence while working with patients under the care of a subspecialist.

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

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

2. Describe general indications for subspecialty procedures and interpret results for families.

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

1. Acquire, interpret and apply the knowledge appropriate for the generalist regarding the core content of this subspecialty area.

2. Critically evaluate current medical information and scientific evidence related to this subspecialty area and modify your knowledge base accordingly.

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

1. Provide effective patient education, including reassurance, for a condition(s) common to this subspecialty area.

2. Communicate effectively with primary care and other physicians, other health professionals, and health-related agencies to create and sustain information exchange and teamwork for patient care.

3. Maintain accurate, legible, timely and legally appropriate medical records, including referral forms and letters, for subspecialty patients in the outpatient and inpatient setting.

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

1. Identify standardized guidelines for diagnosis and treatment of conditions common to this subspecialty area and adapt them to the individual needs of specific patients.

2. Identify personal learning needs related to this subspecialty; systematically organize relevant information resources for future reference; and plan for continuing acquisition of knowledge and skills.

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

1. Demonstrate personal accountability to the well-being of patients (e.g., following up on lab results, writing comprehensive notes, and seeking answers to patient care questions).

2. Demonstrate a commitment to carrying out professional responsibilities.

3. Adhere to ethical and legal principles, and be sensitive to diversity.

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

1. Identify key aspects of health care systems as they apply to specialty care, including the referral process, and differentiate between consultation and referral.

2. Demonstrate sensitivity to the costs of clinical care in this subspecialty setting, and take steps to minimize costs without compromising quality

3. Recognize and advocate for families who need assistance to deal with systems complexities, such as the referral process, lack of insurance, multiple medication refills, multiple appointments with long transport times, or inconvenient hours of service.

4. Recognize one's limits and those of the system; take steps to avoid medical errors.

Procedures

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

1. Abscess: I & D of superficial abscesses

2. Abscess: aspiration

3. Anesthesia/analgesia: conscious sedation

4. Anesthesia/analgesia: digital blocks

5. Anesthesia/analgesia: local/topical

6. Anesthesia/analgesia: pain management
7. Burn: management of 1st & 2nd degree
8. Burn: acute stabilization of major burn
9. Central line: use/care
10. Chest tube placement
11. Foreign body removal (simple): subcutaneous
12. Gastric lavage
13. Gastric tube placement (OG/NG)
14. Gastrostomy tube replacement
15. Inguinal hernia: simple reduction
16. Sterile technique
17. Subungual hematoma: drainage
18. Thoracentesis
19. Wound care and suturing of lacerations

Adapted From

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