

Standard Rotation: Pediatric Emergency Medicine

Primary Goals for this Rotation

GOAL: EMS System for Children. Understand the basic principles and utilization of emergency medical services for children.

Objectives

1. Describe the organization and utilization of emergency medical systems for children in one's local area, including:
 - Pre-hospital care: access, training, roles, and limitations of providers; transportation systems; state and local resources and pediatric treatment protocols
 - Availability of trauma centers and other centers capable of providing care for critically ill and injured children
2. Describe the equipment, staff training, and reference material needed to insure office preparedness for emergencies.
3. Discuss how principles of injury prevention apply to the role of EMS for children (e.g., in minimizing the consequences of injury).
4. Demonstrate the ability to activate and use the local EMS for children, including interhospital transport.
5. Describe indications for use of the automated external defibrillator (AED) in children.
6. Describe the role of the pediatrician in preparing for and responding to disasters.

GOAL: Resuscitation and Stabilization (ED). Assess, resuscitate, and stabilize critically ill or injured children in the Emergency Department (ED) setting in a timely fashion.

Objectives

Rapidly recognize and assess emergent patients, such as those in respiratory failure or shock.

1. Perform the primary survey (ABCs) for all patients in an efficient manner.
2. Formulate a differential diagnosis quickly, especially with respect to conditions that may need respiratory or cardiovascular support or an immediate intervention (e.g. tension pneumothorax, increased intracranial pressure, cardiac tamponade, tracheostomy care, poisoning/toxicants).
3. Differentiate between cardiogenic, distributive, and hypovolemic shock.
4. Differentiate between respiratory distress and failure.
5. Assist in evaluating and stabilizing a child with multiple traumas.

Establish and manage the airways of infants, children and teens, recognizing the need for assistance with ventilation and/or oxygenation.

1. When caring for the critically ill child in the ED, demonstrate proficiency in proper airway positioning and suctioning, administration of supplemental oxygen, bag-valve-mask ventilation, management of nasal and oral airways, endotracheal intubation, rapid sequence induction, mechanical ventilation, oro- and naso-gastric tube placement, and C-spine immobilization to protect the airway in a head trauma patient.
2. Explain indications and describe technique for and complications of nasotracheal intubation, needle thoracotomy, emergency cricothyroidotomy, transtracheal ventilation and laryngeal mask airway.

Establish vascular access in the critically ill child as indicated, including cannulation of peripheral veins and intraosseous needle insertion.

Explain indications and describe technique for central venous access and arterial access.

Manage fluid and pressor therapy in the initial resuscitation of patients in distributive, hypovolemic, and cardiogenic shock.

Demonstrate proficiency at cardiopulmonary resuscitation by:

- Obtaining and maintaining certification as a provider of Advanced Pediatric Life Support
- Directing resuscitation efforts in mock codes and in actual emergency situations
- Using resuscitation drugs appropriately

GOAL: Common Signs and Symptoms (ED). Evaluate and manage common signs and symptoms in infants, children, and adolescents that present to the ED and urgent care center.

Objectives

Evaluate and manage patients with signs and symptoms that present in the ED setting (examples below).

1. General: acute life threatening event (ALTE), agitated/disturbed child, alleged or suspected child abuse or neglect, dehydration, exercise intolerance, failure to thrive, fatigue, fever, hypothermia, malaise, septic or ill-appearing infant/child, sudden death, weight loss, unexplained crying
2. Allergy/immunology: acute allergic reactions, anaphylaxis
3. Cardiorespiratory: apnea, bradycardia, chest pain, cough, cyanosis, hypertension, hypotension (including orthostatic), palpitations, respiratory distress, respiratory failure, stridor, syncope tachycardia, tachypnea or shortness of breath, wheezing

4. Dental: pain or trauma of mouth, jaw or tooth; tooth injury or loss
5. Dermatologic: hair loss, itching, skin rash
6. EENT: abnormal pupils or eye movement, dizziness, earache, ear discharge, eye pain, hearing loss, nosebleed, painful swallowing, sore throat, sudden red eye, visual disturbances
7. Endocrine: heat/cold intolerance, polyphagia, polydipsia
8. GI: abdominal pain, constipation, diarrhea, difficulty swallowing, distension, GI bleeding, jaundice, vomiting (bilious and non-bilious)
9. GU/Renal: bloody or discolored urine, edema, decreased or increased urination, dysuria, groin or scrotal mass or pain, urinary frequency or urgency
10. GYN: menstrual problems, vaginal bleeding, vaginal discharge
11. Hematologic/Oncologic: abnormal bleeding, acute illness or fever in a neutropenic child/cancer patient, bruising, hepatosplenomegaly, lymphadenopathy, masses, pallor, petechiae
12. Musculoskeletal: arthralgia, back pain, inability to move an extremity, joint swelling, limb pain, limp, trauma
13. Neurologic: abnormal movements, ataxia, bulging fontanel, coma, confusion, dizziness, fainting spells, headache, head injury, lethargy, paralysis, seizures, spasticity, stiff neck, weakness
14. Psychiatric: anxiety, depression, hallucinations, hysteria, suicidal ideation, violent behavior
15. Surgery/trauma: acute abdomen, burns, lacerations, trauma (Note: for major trauma, work with surgical trauma team)

GOAL: Common Conditions (ED). Recognize and manage common illnesses and injuries that present emergently.

Objectives

Evaluate and manage patients with common diagnoses that present in the ED setting (examples below).

1. Allergy/immunology: acute illness in an immunocompromised child, anaphylaxis, angioedema, asthma, serum sickness, urticaria
2. Cardiovascular: acute illness in a patient with congenital heart disease, congestive heart failure, cardiomyopathy, dysrhythmias (asystole, atrial fibrillation and flutter, bradycardia, electromechanical dissociation, SVT, ventricular fibrillation and tachycardia,), endocarditis, Kawasaki's disease, myocarditis, shock (hypovolemic, cardiogenic, distributive), pericarditis, rheumatic fever
3. Dermatology: acute drug reactions, bite and sting injuries, contact dermatitis, cutaneous manifestation of systemic and/or contagious diseases, infections of skin and hair (bacterial, fungal, and viral), pediculosis, scabies, warts
4. Endocrine/Metabolic: acute adrenal insufficiency, acute illness in a child with underlying endocrine/metabolic disease, diabetes insipidus, diabetes mellitus and ketoacidosis, hypocalcemia, hypoglycemia, hypo- and

- hypernatremia, inborn error of metabolism, syndrome of inappropriate secretion of antidiuretic hormone (SIADH), thyroid disease
5. GI/surgical: acute abdomen, appendicitis, biliary tract disease, bowel obstruction, caustic ingestion, constipation, dehydration, foreign body in GI tract, gastroenteritis, gastroesophageal reflux, hepatitis, hepatosplenomegaly, ileus, incarcerated hernia, inflammatory bowel disease, intussusception, malrotation, pancreatitis, peptic ulcer disease, peritonitis, pyloric stenosis, upper and lower GI tract bleeding
 6. GU/renal: acute hypertension, acute illness in a child on chronic dialysis or with transplanted kidney, acute renal failure, balanitis, edema, epididymitis, hematuria, labial adhesions, paraphimosis, phimosis, proteinuria, STD, renal lithiasis, testicular torsion, urinary tract infection
 7. GYN: cervicitis, dysfunctional vaginal bleeding, ovarian torsion, pelvic inflammatory disease (PID), pregnancy (intrauterine, ectopic, abortion), ruptured ovarian cyst, sexually transmitted diseases
 8. Hematologic/Oncologic: anemia, fever in a child with sickle cell disease or leukemia, coagulopathy, hemophilia with acute trauma, Henoch Schönlein purpura, possible tumor (masses), sickle cell pain crisis, sequestration and chest syndrome, thrombocytopenia
 9. Infectious disease: adenitis, cervical cellulitis (especially facial/orbital), dental abscess, encephalitis, fever without source, HIV/AIDS, infected wounds and bites, meningitis, otitis media/externa, pelvic inflammatory disease, pharyngitis, stomatitis, sinusitis, sepsis/bacteremia, [also infections in other categories]
 10. Neurologic: afebrile seizures, altered mental status, ataxia, brain tumor, febrile seizures, increased intracranial pressure, migraine, muscle contraction headache, paresis/paralysis, shunt malfunction/infection, status epilepticus
 11. Ophthalmologic: corneal abrasion, conjunctivitis, infection, ocular foreign body, hyphema, trauma
 12. Orthopedic: arthritis, common dislocations, discitis, fractures, gait disturbance, Osgood Slatter's Disease, overuse syndromes, osteomyelitis, septic arthritis, sprains, strains
 13. Otolaryngologic: epistaxis, foreign body aspiration, peritonsillar or retropharyngeal abscess
 14. Pulmonary: acute illness in a child with cystic fibrosis, asthma (including status), bacterial tracheitis, bronchiolitis, bronchopulmonary dysplasia (BPD), croup, epiglottitis, foreign body aspiration, pleural effusion, pneumonia, pneumothorax, respiratory failure, smoke inhalation
 15. Trauma/surgical: burns, closed head injury, dental injuries, intracranial hemorrhages (subdural, epidural, subarachnoid), skull fractures, soft tissue injury (including lacerations, abrasions, and contusions), major trauma to head or face, neck or spine, chest, abdomen, urogenital tract, major vessels or organs (with surgeon/trauma team)
 16. Toxicants/environmental injuries: electrical injury, heat and cold injury, ingestion/poisoning (unknown substance or common poisons:

acetaminophen, antidepressants, benzodiazepines, carbon monoxide, cocaine, cough and cold medicines, digitoxin, drugs of abuse, hydrocarbons, iron, narcotics, neuroleptics), smoke inhalation, submersion injury/near drowning, weapons of mass destruction or biological/chemical weapons

17. Psychiatric: combative patient, conversion reaction, depression, suicide attempt/ideation, panic attacks
18. Rheumatologic: arthritis, dermatomyositis, lupus, joint or soft tissue pain
19. Social: child abuse or neglect, intimate partner violence, rape, sexual abuse, substance abuse

GOAL: Diagnostic Testing (ED). Use common diagnostic tests and imaging studies appropriately in the ED setting.

Objectives

Demonstrate understanding of common diagnostic tests and imaging studies used in the ED by being able to:

1. Explain the indications for and limitations of the study.
2. Understand the benefits and disadvantages of family presence during procedures.
3. Know or be able to locate readily age-appropriate normal values for lab studies.
4. Apply knowledge of diagnostic test properties, including the use of sensitivity, specificity, positive predictive value, negative predictive value, likelihood ratios, and receiver operating characteristic curves, to assess the utility of tests in various clinical settings.
5. Discuss cost and utilization issues.
6. Interpret test results in the context of the care of the specific patient.
7. Discuss therapeutic options for correction of abnormalities.

Use appropriately the following laboratory studies when indicated for patients in the ED setting:

1. CBC with differential count, platelets, RBC indices
2. Bacterial, viral, and fungal cultures and rapid screens
3. Serologic tests for infection (e.g., monospot, VDRL, hepatitis)
4. Blood chemistries: electrolytes, calcium, magnesium, phosphate, and glucose
5. Arterial, venous, and capillary blood gases

6. Renal function tests
7. Tests of hepatic function and damage
8. Drug levels and toxic screens
9. Gram stain
10. Wet mount
11. Urinalysis
12. CSF studies
13. Stool studies
14. Coagulation studies
15. Pregnancy test (urine, blood)
16. Other fluid studies (e.g., pleural fluid, joint aspiration fluid)

Use the following imaging or radiographic studies when indicated for patients in the ED setting:

1. Plain radiographs of chest, skull, extremity bones, abdomen, cervical spine
2. Other imaging techniques, such as CT, MRI, ultrasound, and nuclear scans (interpretation not expected)
3. Contrast or air enema for suspected intussusception or upper GI series for suspected malrotation

Use the following screening and diagnostic studies when indicated for patients in the ED setting:

1. Electrocardiogram
2. Vision screening
3. Appropriate urgent use of echocardiography

GOAL: Monitoring and Therapeutic Modalities (ED). Understand how to use physiologic monitoring and special technology and treatment in the ED setting.

Objectives

Demonstrate understanding of the monitoring techniques and special treatments commonly used in the ED by being able to:

1. Discuss indications, contraindications, and complications.
2. Demonstrate proper use of technique or treatment for children of varying ages.
3. Interpret results of monitoring based on method used, age, and clinical situation.

Use appropriately the monitoring techniques used in the ED:

1. Physiologic monitoring of temperature, blood pressure, heart rate, respirations

2. Pulse oximetry

Utilize appropriately the treatments and techniques used in the ED:

1. Universal precautions
2. Gastrointestinal decontamination for poisoning
3. Administration of nebulized medication
4. Injury, wound and burn care
5. Suturing and topical adhesive
6. Splinting
7. Oxygen delivery systems
8. Gastric button replacement

Demonstrate understanding of the following methods of anesthesia or pain management used in the ED:

1. Methods for recognizing and evaluating pain
2. Topical/local/regional anesthesia
3. ASA classification system
4. Procedural sedation
5. Rapid sequence intubation
6. Sedatives, non-narcotic and narcotic analgesics
7. Behavioral techniques and supportive care
8. Other non-pharmacologic methods of pain control (e.g., distraction techniques and humor therapy)

GOAL: Pediatric Competencies in Brief (ED). Demonstrate high standards of professional competence while working with patients in the Emergency Department. [For details see Pediatric Competencies.]

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.

Use a logical and appropriate clinical approach to the care of emergency patients, applying principles of evidence-based decision-making and problem-solving, and demonstrating the ability to prioritize. Perform accurate ED triage.

1. Demonstrate the ability to multi-task by providing simultaneous care to multiple patients, with varying levels of acuity and severity of illness.
2. Use appropriate timing of diagnostic and therapeutic interventions.
3. Adjust pace to ED patient acuity, volume and flow.

Provide sensitive support to patients and families in the ED.

1. Provide sensitive support to critically ill patients and their families; arrange for ongoing support and/or preventive services if needed.
2. Be sensitive to the needs of families who use the ED for minor illness care (e.g., need for better orientation to the health care system, lack of community services or medical home).

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.

Demonstrate a commitment to acquiring the base of knowledge needed for the care of children in the ED.

Demonstrate the ability to efficiently access medical information, evaluate it critically and apply it to pediatric care in the ED.

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.

Provide effective patient education, including reassurance, for a condition(s) commonly seen in the ED.

Participate effectively as part of an interdisciplinary team in the ED to create and sustain information exchange, including communication with the primary care physician.

Provide case-based teaching related to clinical situations encountered in ED (for students, colleagues, other professionals and/or laypersons).

Maintain accurate, timely and legally appropriate medical records in the ED and urgent care settings.

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.

Use scientific methods and evidence to investigate, evaluate and improve one's patient care practice in the ED.

Identify personal learning needs, systematically organize relevant information resources for future reference, and plan for continuing acquisition of knowledge and skills.

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

Demonstrate a commitment to professionalism despite the pace and

stress of the ED setting.

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

1. Identify and describe potential ethical dilemmas that one may encounter in the ED (e.g., such as resuscitation of patients with little hope of recovery; treatment of disabled patients; providing confidential care to mature minors [pregnancy termination, STDs, substance abuse]; foregoing life-sustaining treatment; identifying and referring organ donors).
2. Discuss key principles and identify resources for information about legal issues of importance to practice in the ED (e.g., emergency care for indigent patients; laws regarding interhospital patient transfer; consent-to-treat issues in the emergency treatment of minors; rights of parents to refuse treatment and legal options of providers; reporting of child abuse and neglect; death reports; and obligations of physicians in the ED to facilitate follow-up care).

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.

Identify key aspects of health care systems, cost control, billing, and reimbursement as this relates to ED care and follow-up.

Demonstrate sensitivity to the costs of care in the ED setting and take steps to minimize costs without compromising quality.

Recognize and advocate for families who need assistance to deal with system complexities.

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

Procedures

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.

Abscess: I & D of superficial abscesses

Abscess: aspiration

Anesthesia/analgesia: conscious sedation

Anesthesia/analgesia: digital blocks

Anesthesia/analgesia: local/topical

Anesthesia/analgesia: pain management

Arterial puncture

Arthrocentesis

Bladder: catheterization

Burn: management of 1st & 2nd degree

Burn: acute stabilization of major burn

Cardioversion/defibrillation

Cervical spine immobilization

Conjunctival swab

Endotracheal intubation

Endotracheal intubation: rapid sequence intubation

Ear: cerumen removal

Eye: contact lens removal

Eye: irrigation

Eye: eyelid eversion

Eye: patch

Eye: fluorescein eye exam

Foreign body removal (simple): nose

Foreign body removal (simple): ear

Foreign body removal (simple): conjunctiva

Foreign body removal (simple): subcutaneous

Foreign body removal (simple): vagina

Gastric lavage

Gastric tube placement (OG/NG)

Gastrostomy tube replacement

Gynecologic evaluation: postpubertal

Immobilization techniques for common fractures & sprains

Ingrown toe nail treatment

Inguinal hernia: simple reduction

Intravenous line placement

Intraosseous line placement

Lumbar puncture

Medication delivery: endotracheal

Medication delivery: IM/SC/ID

Medication delivery: inhaled

Medication delivery: IV

Medication delivery: rectal

Pulmonary function tests: peak flow meter

Pulse oximeter: placement

Rectal swab

Reduction of nursemaid elbow

Reduction/splinting of simple dislocation

Sexual abuse: exam/evaluation

Sterile technique

Subungual hematoma: drainage

Suctioning: nares

Suctioning: oral pharynx

Suctioning: trachea (newborn)

Suctioning: tracheostomy

Throat swab

Tooth: temporary reinsertion

Tracheostomy tube: replacement

Urethral swab

Vaginal lavage

Venipuncture

Ventilation: bag-valve-mask

Ventilation support: initiation

Wood's lamp examination of skin

Wound care and suturing of lacerations

GOAL: Diagnostic and screening procedures. Describe the following tests or procedures, including how they work and when they should be used; competently perform those commonly used by the pediatrician in practice.

ECG: emergency interpretation

ECG: perform

Monitoring interpretation: cardiac

Monitoring interpretation: pulse oximetry

Monitoring interpretation: respiratory

Radiologic interpretation: abdominal ultrasound

Radiologic interpretation: abdominal X-ray

Radiologic interpretation: cervical spine X-ray

Radiologic interpretation: chest X-ray

Radiologic interpretation: CT of head

Radiologic interpretation: extremity X-ray

Radiologic interpretation: GI contrast study

Radiologic interpretation: lateral neck X-ray

Radiologic interpretation: skeletal X-ray (incl. abuse)

Radiologic interpretation: skull film for fracture

Radiologic interpretation: sinus films

Vision screening

Source

Kittredge, D., Baldwin, C. D., Bar-on, M. E., Beach, P. S., Trimm, R. F. (Eds.). (2004). APA Educational Guidelines for Pediatric Residency. Ambulatory Pediatric Association Website. Available online: www.ambpeds.org/egweb. [Accessed 02/12/2008]. Project to develop this website was funded by the Josiah Macy, Jr. Foundation 2002-2005.