

**Attachment H**  
**Guidelines for Care of Children in the Emergency Department**





# Joint Policy Statement—Guidelines for Care of Children in the Emergency Department

AMERICAN ACADEMY OF PEDIATRICS  
COMMITTEE ON PEDIATRIC EMERGENCY MEDICINE  
AMERICAN COLLEGE OF EMERGENCY PHYSICIANS  
PEDIATRIC COMMITTEE  
EMERGENCY NURSES ASSOCIATION  
PEDIATRIC COMMITTEE

## KEY WORD

pediatric emergency preparedness

## ABBREVIATIONS

ED—emergency department

EMS—emergency medical services

EMSC—emergency medical services for children

QI—quality improvement

PI—performance improvement

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## abstract

Children who require emergency care have unique needs, especially when emergencies are serious or life-threatening. The majority of ill and injured children are brought to community hospital emergency departments (EDs) by virtue of their geography within communities. Similarly, emergency medical services (EMS) agencies provide the bulk of out-of-hospital emergency care to children. It is imperative, therefore, that all hospital EDs have the appropriate resources (medications, equipment, policies, and education) and staff to provide effective emergency care for children. This statement outlines resources necessary to ensure that hospital EDs stand ready to care for children of all ages, from neonates to adolescents. These guidelines are consistent with the recommendations of the Institute of Medicine's report on the future of emergency care in the United States health system. Although resources within emergency and trauma care systems vary locally, regionally, and nationally, it is essential that hospital ED staff and administrators and EMS systems' administrators and medical directors seek to meet or exceed these guidelines in efforts to optimize the emergency care of children they serve. This statement has been endorsed by the Academic Pediatric Association, American Academy of Family Physicians, American Academy of Physician Assistants, American College of Osteopathic Emergency Physicians, American College of Surgeons, American Heart Association, American Medical Association, American Pediatric Surgical Association, Brain Injury Association of America, Child Health Corporation of America, Children's National Medical Center, Family Voices, National Association of Children's Hospitals and Related Institutions, National Association of EMS Physicians, National Association of Emergency Medical Technicians, National Association of State EMS Officials, National Committee for Quality Assurance, National PTA, Safe Kids USA, Society of Trauma Nurses, Society for Academic Emergency Medicine, and The Joint Commission. *Pediatrics* 2009;124:1233–1243

## INTRODUCTION

This policy statement delineates guidelines and the resources necessary to prepare hospital emergency departments (EDs) to serve pediatric patients. Adoption of these guidelines should facilitate the delivery of emergency care for children of all ages and, when appropriate, timely transfer to a facility with specialized pediatric services. This policy is an update of previously published guidelines.<sup>1,2</sup>

This statement has been endorsed by the Academic Pediatric Association, American Academy of Family Physicians, American Academy of Physician Assistants, American College of Osteopathic Emergency Phy-

sicians, American College of Surgeons, American Heart Association, American Medical Association, American Pediatric Surgical Association, Brain Injury Association of America, Child Health Corporation of America, Children's National Medical Center, Family Voices, National Association of Children's Hospitals and Related Institutions, National Association of EMS Physicians, National Association of Emergency Medical Technicians, National Association of State EMS Officials, National Committee for Quality Assurance, National PTA, Safe Kids USA, Society of Trauma Nurses, Society for Academic Emergency Medicine, and The Joint Commission.

## BACKGROUND

The National Hospital Ambulatory Medical Care Survey reported that in 2006, there were approximately 3833 EDs in the United States. Most of these EDs routinely care for patients of all ages.<sup>3-6</sup> Of the 119 million ED visits in the United States in 2006, almost 20% were for children.<sup>5,6</sup>

In 1993, after nearly a decade of efforts to integrate the needs of children into emergency medical services (EMS) systems, the Institute of Medicine was asked to provide an independent review of emergency medical services for children (EMSC) and report to the nation on the state of the continuum of care for children within the EMS system.<sup>7</sup> Summary recommendations of that report concluded that all agencies with jurisdiction over hospitals "require that hospital emergency departments . . . have available and maintain equipment and supplies appropriate for the emergency care of children" and that they "address the issues of categorization and regionalization in overseeing and development of EMSC and its integration into state and regional EMS systems."

Published data have suggested that

compliance with national guidelines is low and that many EDs in the United States and Canada still do not have some of the basic equipment and supplies needed to care for children of all ages.<sup>8-10</sup> Middleton and Burt,<sup>8</sup> in the emergency pediatric services and equipment supplement of the 2002-2003 National Hospital Ambulatory Medical Care Survey, reported that only 6% of US EDs have all of the recommended pediatric supplies and equipment as outlined in previously published national guidelines. Gausche-Hill et al<sup>10</sup> reported similar results in a nationwide survey of EDs in the United States and cited reasons for the lack of equipment availability in many EDs (including lack of awareness, with only 59% of ED managers being aware of the published guidelines) and relative lack of pediatric experience among the workforce, with limited exposure to critically ill or injured pediatric patients at many US hospitals. In fact, 50% of EDs care for fewer than 10 pediatric patients per day; therefore, pediatric planning by these facilities is crucial.<sup>10</sup>

Access to optimal emergency care for children is affected by the lack of availability of equipment, appropriately trained staff to care for children, and policies and procedures that ensure timely transfer to definitive care.<sup>11</sup> Although advances have been made that promote access to emergency care for children, improved awareness of the pediatric resources available to hospitals, in addition to the development of regionalized and coordinated emergency and trauma care systems, may optimize access and outcomes for many acutely ill and injured children.<sup>12,13</sup>

The Institute of Medicine, in a comprehensive report on the state of emergency care in the United States in 2006, made a strong recommendation for regionalized systems of care and fur-

ther recommended that hospitals and EMS systems appoint qualified coordinators for pediatric emergency care.<sup>12</sup> Only 18% of EDs in the United States currently appoint a physician coordinator, and 12% appoint a nursing coordinator for pediatric emergency care. EDs that do appoint these positions tend to be more prepared as measured by compliance with guidelines on the care of children in the ED published by the American College of Emergency Physicians and American Academy of Pediatrics.<sup>10</sup>

The Health Resources and Services Administration-EMSC program has also advocated for such regionalized systems, and in response to the need to document outcomes of the program's activities, performance measures for states and territories were outlined in 2009.<sup>14</sup> These performance measures call for the existence of a statewide, territorial, or regional standardized system that recognizes hospitals that are able to stabilize and/or manage pediatric medical emergencies and trauma. Target dates have been set for states to comply with these performance measures. Clearly, much work is left to be done to promote and measure pediatric preparedness in all EDs in the United States and for emergency and trauma care systems to be ready to meet the needs of children in disasters.

The following guidelines are intended for all hospital EDs that provide emergency care 24 hours a day, 7 days a week that are continuously staffed by a physician. Children may be cared for in other emergency settings, such as freestanding EDs or urgent care centers, critical access hospitals<sup>15</sup> or stand-by emergency facilities, retail-based clinics, and primary care office practices. These care settings are not addressed in this document, but administrators, physicians, nurses, and other health care providers who staff

these settings should ensure that these facilities maintain the necessary equipment, medications, and supplies and are staffed appropriately to care for pediatric patients. Pediatric emergency-preparedness guidelines have been created for urgent care centers as well as for offices of primary care providers.<sup>16,17</sup>

These guidelines provide current information on equipment, medications, supplies, and personnel considered essential for managing pediatric emergencies in EDs. This statement also offers guidelines for the administration and coordination of pediatric care in the ED; pediatric emergency care quality improvement (QI), performance improvement (PI), and patient safety activities; policies, procedures, and protocols for pediatric care; and key ED support services. It is expected that all EDs in the United States that are staffed by a physician 24 hours a day, 7 days a week can meet or exceed these guidelines and that some hospitals, such as pediatric critical care centers or children's hospitals with greater resources, will develop and implement even more comprehensive guidelines and share their expertise with their local and regional communities. New technology and research will require that such emergency drug, equipment, and supply lists be kept current and that updated recommendations be readily available to hospitals that provide emergency care to children.

### **I. GUIDELINES FOR ADMINISTRATION AND COORDINATION OF THE ED FOR THE CARE OF CHILDREN**

A. A physician coordinator for pediatric emergency medicine is appointed by the ED medical director.

1. The physician coordinator has the following qualifications:

a. Meets the qualifications for

credentialing by the hospital as a specialist in emergency medicine or pediatric emergency medicine. It is recognized that physicians in these specialties may not always be available in some communities; in these areas, the physician coordinator must meet the qualifications for credentialing by the hospital as a specialist in pediatrics or family medicine and demonstrate, through experience or continuing education, competence in the care of children in emergency settings, including resuscitation.

b. Has special interest, knowledge, and skill in emergency medical care of children as demonstrated by training, clinical experience, or focused continuing medical education.

c. Maintains competency in pediatric emergency care (see "III. GUIDELINES FOR QI/PI IN THE ED").

d. May be a staff physician who is currently assigned other roles in the ED or may be shared through formal consultation agreements with professional resources from a hospital that is capable of providing definitive pediatric care.

2. The physician coordinator is responsible for the following:

a. Promoting and verifying adequate skill and knowledge of ED staff physicians and other ED health care providers (ie, physician assistants and advanced practice nurses) in the emergency care and resuscitation of infants and children.

b. Overseeing ED pediatric QI, PI, patient safety, injury and illness prevention, and clinical care activities.

c. Assisting with development and periodic review of ED policies and procedures and standards for medications, equipment, and supplies to ensure adequate resources for children of all ages.

d. Serving as liaison/coordinator to appropriate in-hospital and out-of-hospital pediatric care committees in the community (if they exist).

e. Serving as liaison/coordinator to a definitive care hospital (such as a regional pediatric referral hospital and trauma center), EMS agencies, primary care providers, health insurers, and any other medical resources needed to integrate services for the continuum of care of the pediatric patient.

f. Facilitating pediatric emergency education for ED health care providers and out-of-hospital providers affiliated with the ED.

g. Ensuring that competency evaluations completed by the staff are pertinent to children of all ages.

h. Ensuring that pediatric needs are addressed in hospital disaster/emergency-preparedness plans.

i. Collaborating with the nursing coordinator to ensure adequate staffing, medications, equipment, supplies, and other resources for children in the ED.

B. A nursing coordinator for pediatric emergency care is appointed by the ED nursing director.

1. The nursing coordinator has the following qualifications:

- a. Is a registered nurse (RN) who possesses special interest, knowledge, and skill in the emergency medical care of children as demonstrated by training, clinical experience, or focused continuing nursing education.
- b. Maintains competency in pediatric emergency care (see "III. GUIDELINES FOR QI/PI IN THE ED").
- c. Is credentialed and has competency verification per the hospital policies and guidelines to provide care to children of all ages.
- d. May be a staff nurse who is currently assigned other roles in the ED, such as clinical nurse specialist, or may be shared through formal consultation agreements with professional resources from a hospital that is capable of providing definitive pediatric care.

2. The nursing coordinator is responsible for the following:

- a. Facilitating ED pediatric QI/PI activities.
- b. Serving as liaison to appropriate in-hospital and out-of-hospital pediatric care committees.
- c. Serving as liaison to inpatient nursing as well as to a definitive care hospital, a regional pediatric referral hospital and trauma center, EMS agencies, primary care providers, health insurers, and any other medical resources needed to integrate services for the continuum of care of the pediatric patient.

d. Facilitating, along with hospital-based educational activities, ED nursing continuing education in pediatrics and ensuring that pediatric-specific elements are included in orientation for new staff members.

e. Ensuring that initial and annual competency evaluations completed by the ED nursing staff are pertinent to children of all ages.

f. Promoting pediatric disaster preparedness for the ED and participating in hospital disaster-preparedness activities.

g. Promoting patient and family education in illness and injury prevention.

h. Providing assistance and support for pediatric education of out-of-hospital providers who are affiliated with the ED.

i. Working with clinical leadership to ensure the availability of pediatric equipment, medications, staffing, and other resources through the development and periodic review of ED standards, policies, and procedures.

j. Collaborating with the physician coordinator to ensure that the ED is prepared to care for children of all ages, including children with special health care needs.

## **II. PHYSICIANS, NURSES, AND OTHER HEALTH CARE PROVIDERS WHO STAFF THE ED**

A. Physicians who staff the ED have the necessary skill, knowledge, and training in the emergency evaluation and treatment of children of all ages who may be brought to the ED,

consistent with the services provided by the hospital.

B. Nurses and other ED health care providers have the necessary skill, knowledge, and training in providing emergency care to children of all ages who may be brought to the ED, consistent with the services offered by the hospital.

C. Baseline and periodic competency evaluations completed for all ED clinical staff, including physicians, are age specific and include evaluation of skills related to neonates, infants, children, adolescents, and children with special health care needs. Competencies are determined by each institution's medical staff privileges policy.

## **III. GUIDELINES FOR QI/PI IN THE ED**

A pediatric patient care-review process is integrated into the QI/PI plan of the ED according to the following guidelines:

A. Components of the process interface with out-of-hospital, ED, trauma, inpatient pediatric, pediatric critical care, and hospital-wide QI or PI activities.

B. The QI/PI plan of the ED shall include pediatric-specific indicators. Minimum components of the QI/PI process should include collecting and analyzing data to discover variances, defining a plan for improvement, and evaluating the success of the QI/PI plan with measures that are outcome based.

C. Pediatric clinical-competency evaluations should be developed as a part of the local credentialing process for all licensed ED staff (eg, sedation and analgesia, airway management [Appendix 1]). Competencies should be age specific and include those for neonates, infants, children, adolescents, and children with special health care needs.

D. Mechanisms should be in place to monitor professional performance, credentialing, continuing education, and clinical competencies, including integration of findings from QI audits and case reviews.

#### IV. GUIDELINES FOR IMPROVING PEDIATRIC PATIENT SAFETY IN THE ED

The delivery of pediatric care should reflect an awareness of unique pediatric patient safety concerns<sup>18,19</sup> and should include the following policies or practices:

- A. Children should be weighed in kilograms, with the exception of children who require emergent stabilization, and the weight should be recorded in a prominent place on the medical record, such as with the vital signs.
  1. For children who require resuscitation or emergency stabilization, a standard method for estimating weight in kilograms should be used (eg, length-based system).
- B. Infants and children should have a full set of vital signs recorded to include temperature, heart rate, and respiratory rate. Blood pressure and pulse oximetry monitoring should be available for children of all ages on the basis of illness and injury severity.
- C. A process should be in place for identifying abnormal vital signs according to the age of the patient and for notifying the physician of abnormal values obtained.
- D. Processes for safe medication storage, prescribing, and delivery should be established<sup>20,21</sup> and should include the use of precalculated dosing guidelines for children of all ages.
- E. Infection-control practices, including hand hygiene and use of per-

sonal protective equipment, should be implemented and monitored.

- F. Pediatric emergency services should be culturally and linguistically appropriate,<sup>22</sup> and the ED should provide an environment that is safe for children and supports patient- and family-centered care.<sup>23</sup>
- G. Patient-identification policies, consistent with the Joint Commission national patient safety goals, should be implemented and monitored.<sup>24</sup>
- H. Policies for the timely reporting and evaluation of patient safety events and for the disclosure of medical errors or unanticipated outcomes should be implemented and monitored, and education and training in disclosure should be available to care providers who are assigned this responsibility.<sup>18,19</sup>

#### V. GUIDELINES FOR POLICIES, PROCEDURES, AND PROTOCOLS FOR THE ED

- A. Policies, procedures, and protocols for the emergency care of children are developed and implemented; staff should be educated accordingly; and they should be monitored for compliance and periodically updated. These resources should include, but are not limited to, the following:
  1. Illness and injury triage.
  2. Pediatric patient assessment and reassessment.
  3. Documentation of pediatric vital signs, abnormal vital signs, and actions to be taken for abnormal vital signs.
  4. Immunization assessment and management of the underimmunized patient.<sup>25</sup>
  5. Sedation and analgesia for procedures, including medical imaging.<sup>26,27</sup>
  6. Consent (including situations in

which a parent is not immediately available).<sup>28</sup>

7. Social and mental health issues.
8. Physical or chemical restraint of patients.
9. Child maltreatment (physical and sexual abuse, sexual assault, and neglect) and domestic violence mandated reporting criteria, requirements, and processes.
10. Death of the child in the ED.<sup>29,30</sup>
11. Do-not-resuscitate orders.
12. Family-centered care,<sup>31-35</sup> including:
  - a. Involving families in patient care decision-making and in medication safety processes.
  - b. Family presence during all aspects of emergency care, including resuscitation.<sup>35,36</sup>
  - c. Education of the patient, family, and regular caregivers.
  - d. Discharge planning and instruction.
  - e. Bereavement counseling.
13. Communication with the patient's medical home or primary health care provider.<sup>37</sup>
14. Medical imaging policies that address age- or weight-appropriate dosing for children receiving studies that impart ionizing radiation, consistent with as-low-as-reasonably-achievable (ALARA) principles.<sup>38</sup>
15. All-hazard disaster-preparedness plan that addresses the following pediatric issues<sup>12,39-41</sup>:
  - a. Availability of medications, vaccines, equipment, and appropriately trained providers for children in disasters.
  - b. Pediatric surge capacity for both injured and noninjured children.
  - c. Decontamination, isolation, and

- quarantine of families and children of all ages.
  - d. A plan that minimizes parent-child separation and includes system tracking of pediatric patients, allowing for the timely reunification of separated children with their families.
  - e. Access to specific medical and mental health therapies, as well as social services, for children in the event of a disaster.
  - f. Disaster drills, which should include a pediatric mass-casualty incident at least every 2 years.
  - g. Care of children with special health care needs.
  - h. A plan that includes evacuation of pediatric units and pediatric specialty units.
- B. Hospitals should have written pediatric interfacility transfer procedures that include the following pediatric components of transfer<sup>42</sup>:
1. Defined process for initiation of transfer, including the roles and responsibilities of the referring facility and referral center (including responsibilities for requesting transfer and communication).
  2. Transport plan for delivering children safely and in a timely manner to the appropriate facility that is capable of providing definitive care.
  3. Process for selecting the appropriate care facility for pediatric specialty services not available at the hospital. These specialty services may include:
    - a. Medical subspecialty and surgical specialty care.
    - b. Critical care.

- c. Reimplantation (replacement of severed digits or limbs).
  - d. Trauma and burn care.
  - e. Psychiatric emergencies.
  - f. Obstetric and perinatal emergencies.
  - g. Child maltreatment (physical and sexual abuse and assault).
  - h. Rehabilitation for recovery from critical medical or traumatic conditions.
4. Process for selecting the appropriately staffed transport service to match the patient's acuity level (eg, level of care required by patient, equipment needed in transport) and appropriate for children with special health care needs.
  5. Process for patient transfer (including obtaining informed consent).
  6. Plan for transfer of patient information (eg, medical record and copy of signed transport consent), personal belongings of the patient, and provision of directions and referral institution information to family.
  7. Process for return transfer of the pediatric patient to the referring facility as appropriate.

#### **VI. GUIDELINES FOR ED SUPPORT SERVICES**

- A. The radiology department should have the skills and capability to provide imaging studies of children and have the equipment necessary to do so and must have guidelines for reducing radiation exposure that are age and size specific.<sup>36</sup>
1. The radiology capability of hospitals may vary from 1 institution to another; however, the radiology capability of a hospital must

meet the needs of the children in the community it serves.

2. A process should be established for the referral of children to appropriate facilities for radiologic procedures that exceed the capability of the hospital.
  3. A process should be in place for the timely review, interpretation, and reporting by a qualified radiologist for medical imaging studies.
- B. The laboratory should have the skills and capability to perform laboratory tests for children of all ages, including obtaining samples, and should have the availability of microtechnique for small or limited sample size.
1. The clinical laboratory capability must meet the needs of the children in the community it serves.
  2. There should be a clear understanding of what the laboratory capability is for any given community and definitive plans for referring children to the appropriate facility for laboratory studies should be in place.

#### **VII. GUIDELINES FOR EQUIPMENT, SUPPLIES, AND MEDICATIONS FOR THE CARE OF PEDIATRIC PATIENTS IN THE ED**

- A. Pediatric equipment, supplies, and medications should be appropriate for children of all ages and sizes and shall be easily accessible, clearly labeled, and safely and logically organized.
- B. Resuscitation equipment and supplies shall be located in the ED; trays and other items may be housed in other departments (such as the newborn nursery or central supply) as long as the items are immediately accessible to the ED staff. A mobile pedi-



TABLE 1 Guidelines for Medications for Use in Pediatric Patients in EDs

Resuscitation Medications	Other Drug Groups
Atropine	Activated charcoal
Adenosine	Topical, oral, and parenteral analgesics
Amiodarone	Antimicrobial agents (parenteral and oral)
Antiemetic agents	Anticonvulsant medications
Calcium chloride	Antidotes (common antidotes should be accessible to the ED) <sup>a</sup>
Dextrose (D10W, D50W)	Antipyretic drugs
Epinephrine (1:1000, 1:10 000 solutions)	Bronchodilators
Lidocaine	Corticosteroids
Magnesium sulfate	Inotropic agents
Naloxone hydrochloride	Neuromuscular blockers
Procainamide	Sedatives
Sodium bicarbonate (4.2%, 8.4%)	Vaccines
	Vasopressor agents

For a more complete list of medications used in a pediatric ED, see ref<sup>44</sup>. D10W indicates dextrose 10% in water; D50W, dextrose 50% in water.

<sup>a</sup> For less frequently used antidotes, a procedure for obtaining them should be in place.

atric crash cart is strongly recommended.

- C. ED staff shall be appropriately educated on the location of all items.
- D. Each ED shall have a method of daily verification of proper location and function of equipment and supplies.
- E. Medication chart, length-based tape, medical software, or other systems shall be readily available to ED staff to ensure proper sizing of resuscitation equipment and proper dosing of medications.
- F. Table 1 and Appendix 2 outline medications, equipment, and supplies that are necessary for the care of children in the ED.

## SUMMARY

The 2006 Institute of Medicine report *Emergency Care for Children: Growing Pains* uses the word “uneven” to describe the current status of pediatric emergency care in the United States.<sup>12</sup> Although programs such as EMSC have led toward improvement in the level of pediatric emergency readiness in many communities,<sup>45</sup> there remains a significant opportunity for further progress nationwide. The updated guidelines offered in this policy statement are intended to

serve as a resource for clinical and administrative leadership of hospital EDs as they endeavor to improve their readiness for children of all ages. An important first step in ensuring readiness is the identification of both a physician and a nurse coordinator for pediatric emergency care.

All hospital EDs must be continually prepared to receive, accurately assess, and, at a minimum, stabilize and safely transfer acutely ill or injured children, which is necessary even for hospitals located in communities with readily accessible pediatric tertiary care centers and regionalized systems for pediatric trauma and critical care. The vast majority of children who require emergency services in the United States receive this care in a non-children's hospital ED, with 50% of EDs providing care for fewer than 10 children per day.<sup>10</sup> This relatively infrequent exposure of hospital-based emergency care professionals to seriously ill or injured children represents a substantial barrier to the maintenance of essential skills and clinical competency. Recognition of the unique needs of the ill and/or injured children served by a hospital, including children with special health care needs;

the commitment to better meeting those needs through adoption of these guidelines; and the ongoing commitment to evaluating care quality and safety and maintaining pediatric emergency care competencies should provide a strong foundation for pediatric emergency and all-hazard disaster readiness.

## APPENDIX 1: CLINICAL AND PROFESSIONAL COMPETENCY

Demonstration and maintenance of pediatric clinical competency may be achieved through a number of continuing education mechanisms including participation in local educational programs, professional organization conferences, and national life-support programs (ie, Pediatric Advanced Life Support [PALS], Advanced Pediatric Life Support [APLS]: The Pediatric Emergency Medicine Course, Emergency Nursing Pediatric Course [ENPC]) or through scheduled mock codes or patient simulation, team training exercises, or experiences in other clinical settings such as the operating room (ie, airway management).

Potential areas for the development of pediatric competency and professional performance evaluations may include but should not be limited to:

1. Triage
2. Illness and injury assessment and management
3. Pain assessment and treatment, including sedation and analgesia
4. Airway management
5. Vascular access
6. Critical care monitoring
7. Neonatal and pediatric resuscitation
8. Trauma care
9. Burn care
10. Mass-casualty events
11. Patient- and family-centered care

12. Medication delivery and device/equipment safety
13. Team training and effective communication

## APPENDIX 2: GUIDELINES FOR EQUIPMENT AND SUPPLIES FOR USE IN PEDIATRIC PATIENTS IN THE ED

### General Equipment

- Patient warming device
- Intravenous blood/fluid warmer
- Restraint device
- Weight scale, in kilograms only (not pounds), for infants and children
- Tool or chart that incorporates both weight (in kilograms) and length to assist physicians and nurses in determining equipment size and correct drug dosing (by weight and total volume), such as a length-based resuscitation tape
- Pain-scale–assessment tools appropriate for age

### Monitoring Equipment

- Blood pressure cuffs (neonatal, infant, child, adult–arm and thigh)
- Doppler ultrasonography devices
- Electrocardiography monitor/defibrillator with pediatric and adult capabilities including pediatric-sized pads/paddles
- Hypothermia thermometer
- Pulse oximeter with pediatric and adult probes
- Continuous end-tidal CO<sub>2</sub> monitoring device\*

\*End-tidal CO<sub>2</sub> monitoring is considered the optimal method of assessing for and monitoring of endotracheal tube placement in the trachea; however, for low-volume hospitals, adult and pediatric CO<sub>2</sub> colorimetric detector devices could be substituted. Clinical assessment alone is not appropriate.

### Respiratory Equipment and Supplies

- Endotracheal tubes
  - Uncuffed: 2.5 and 3.0 mm
  - Cuffed or uncuffed: 3.5, 4.0, 4.5, 5.0, and 5.5 mm
  - Cuffed: 6.0, 6.5, 7.0, 7.5, and 8.0 mm
- Feeding tubes (5F and 8F)
- Laryngoscope blades (curved: 2 and 3; straight: 0, 1, 2, and 3)
- Laryngoscope handle
- Magill forceps (pediatric and adult)
- Nasopharyngeal airways (infant, child, and adult)
- Oropharyngeal airways (sizes 0–5)
- Stylets for endotracheal tubes (pediatric and adult)
- Suction catheters (infant, child, and adult)
- Tracheostomy tubes (sizes 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5 mm)
- Yankauer suction tip
- Bag-mask device (manual resuscitator), self-inflating (infant size: 450 mL; adult size: 1000 mL)
- Clear oxygen masks (standard and nonrebreathing) for an infant, child, and adult
- Masks to fit bag-mask device adaptor (neonatal, infant, child, and adult sizes)
- Nasal cannulas (infant, child, and adult)
- Nasogastric tubes (sump tubes): infant (8F), child (10F), and adult (14F–18F)
- Laryngeal mask airway† (sizes 1, 1.5, 2, 2.5, 3, 4, and 5)

†Laryngeal mask airways could be shared with anesthesia but must be immediately accessible to the ED.

### Vascular Access Supplies and Equipment

- Arm boards (infant, child, and adult sizes)
- Catheter-over-the-needle device (14–24 gauge)
- Intraosseous needles or device (pediatric and adult sizes)
- Intravenous catheter–administration sets with calibrated chambers and extension tubing and/or infusion devices with ability to regulate rate and volume of infusate
- Umbilical vein catheters (3.5F and 5.0F)‡
- Central venous catheters (4.0F–7.0F)
- Intravenous solutions to include: normal saline; dextrose 5% in normal saline; and dextrose 10% in water

### Fracture-Management Devices

- Extremity splints, including femur splints (pediatric and adult sizes)
- Spine-stabilization method/devices appropriate for children of all ages§

### Specialized Pediatric Trays or Kits

- Lumbar-puncture tray including infant (22-gauge), pediatric (22-gauge), and adult (18- to 21-gauge) lumbar-puncture needles
- Supplies/kit for patients with difficult airway conditions (to include but not limited to supraglottic airways of all sizes, such as the laryngeal mask airway,<sup>2</sup> needle cricothyrotomy supplies, surgical cricothyrotomy kit)
- Tube thoracostomy tray

‡Feeding tubes (size 5F) may be used as umbilical venous catheters but are not ideal. A method for securing the umbilical catheter, such as an umbilical tie, should also be available.

§A spinal stabilization device should be a device that can also stabilize the neck of an infant, child, or adolescent in a neutral position.

- Chest tubes to include infant, child, and adult sizes (infant: 10F–12F; child, 16F–24F; adult, 28F–40F)
- Newborn delivery kit (including equipment for initial resuscitation of a newborn infant: umbilical clamp, scissors, bulb syringe, and towel)
- Urinary catheterization kits and urinary (indwelling) catheters (6F–22F)

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#### AMERICAN ACADEMY OF PEDIATRICS, COMMITTEE ON PEDIATRIC EMERGENCY MEDICINE, 2007–2008

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