

AMERICAN ACADEMY OF PEDIATRICS

American Academy of Pediatrics, Committee on Pediatric Emergency Medicine
and American College of Emergency Physicians, Pediatric Committee

Care of Children in the Emergency Department: Guidelines for Preparedness

ABSTRACT. Children requiring emergency care have unique and special needs. This is especially so for those with serious and life-threatening emergencies. There are a variety of components of the emergency care system that provide emergency care to children that are not limited to children. With regard to hospitals, most children are brought to community hospital emergency departments (EDs) by virtue of their availability rather than to facilities designed and operated solely for children. Emergency medical services (EMS) agencies, similarly, provide the bulk of out-of-hospital emergency care to children. It is imperative that all hospital EDs and EMS agencies have the appropriate equipment, staff, and policies to provide high quality care for children. This statement provides guidelines for necessary resources to ensure that children receive quality emergency care and to facilitate, after stabilization, timely transfer to a facility with specialized pediatric services when appropriate. It is important to realize that some hospitals and local EMS systems will have difficulty in meeting these guidelines, and others will develop more comprehensive guidelines based on local resources. It is hoped, however, that hospital ED staff and administrators and local EMS systems administrators will seek to meet these guidelines to best ensure that their facilities or systems provide the resources necessary for the care of children. *This statement has been reviewed by and is supported in concept by the Ambulatory Pediatric Association, American Association of Poison Control Centers, American College of Surgeons, American Hospital Association, American Medical Association, American Pediatric Surgical Association, American Trauma Society, Brain Injury Association Inc, Emergency Nurses Association, Joint Commission on Accreditation of Healthcare Organizations, National Association of Children's Hospitals and Related Institutions, National Association of EMS Physicians, National Association of EMTs, National Association of School Nurses, National Association of State EMS Directors, National Committee for Quality Assurance, and Society for Academic Emergency Medicine.*

ABBREVIATIONS. ED, emergency department; EMS-C, Emergency Medical Services for Children (program); EMS, emergency medical services; QI, quality improvement; PI, performance improvement.

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The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

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BACKGROUND

According to the *Child and Adolescent Emergency Department Visit Data Book*,¹ there are 31 447 000 child and adolescent visits to emergency departments (EDs) every year, corresponding to an annual rate of 41.2 visits/100 persons. Of these, 13 562 000 child and adolescent visits per year (17.8 visits/100 persons) were injury related. Children younger than 3 years represent the largest proportion of medically and injury related visits in this sample.

The Consumer Product Safety Commission surveyed a sample of 101 hospitals with EDs that were enrolled in the National Electronic Injury Surveillance System to identify the state of preparation of hospital EDs for managing pediatric emergencies.² The survey results were extrapolated to the estimated 5312 hospitals in the United States that have EDs. Although less than 10% have pediatric EDs or intensive care services, 76% admit children to their own facilities, and 25% of hospitals without trauma services admit critically injured children to their own facilities.

When the US Congress approved and funded the Emergency Medical Services for Children (EMS-C) program in 1984 to stimulate the organization of emergency medical services (EMS) systems to respond to the needs of children, a number of demonstration programs began to address issues related to emergency care for children. In 1993, after nearly a decade of efforts to integrate the needs of children into EMS systems, the Institute of Medicine was asked to provide an independent review of EMS-C and report to the nation on the state of the continuum of care for children within the EMS system.³

This expert panel concluded that EMS system design needed further improvement to meet the needs of all patients served. 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 EMS-C and its integration into state and regional EMS systems."

There has been a proliferation of guidelines to support the preparedness of emergency facilities to care for children.⁴⁻¹⁰ Available resources include guidelines developed by the American Medical Association Committee on Emergency Medical Services in 1990 and revised in 1995 by the American Academy of Pediatrics Committee on Pediatric Emergency Medicine, those prepared by the American College of Emergency Physicians, those proposed by an expert panel convened by the National Emergency Medical Services for Children Resource, additional resources prepared by several states through grants sponsored by the Maternal and Child Health Bureau and the National Highway Traffic Safety Administration, and others developed in individual counties within states. Available guidelines suggest equipment and supplies that should be available for the care of children and administration and staffing recommendations for ED facilities.

The following guidelines are intended for all hospital EDs that provide emergency care 24 hours a day, 7 days a week and are continuously staffed by a physician. Children may be cared for in other emergency settings, such as freestanding emergent or urgent care centers. These care settings are not addressed in this document, but administrators, physicians, nurses, and other health care providers staffing these centers should ensure that the appropriate equipment and staff to care for pediatric patients are available.

These guidelines provide current information on equipment and supplies considered essential for managing pediatric emergencies. New technology and research will require that such emergency drug, equipment, and supply lists are kept current and are readily available to hospitals providing 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. The Physician Coordinator meets the qualifications for credentialing by the Hospital as a specialist in emergency medicine, pediatric emergency medicine, or pediatrics.
 - b. The Physician Coordinator has special interest, knowledge, and skill in emergency medical care of children as demonstrated by training, clinical experience, or focused continuing medical education.

- c. The Physician Coordinator may be a staff physician who is currently assigned other roles in the ED, such as the Medical Director of the ED, or may be shared through formal consultation agreements with professional resources from a hospital capable of providing definitive pediatric care.
2. The Physician Coordinator is responsible for the following:
 - a. Ensure adequate skill and knowledge of staff physicians in emergency care and resuscitation of infants and children.
 - b. Oversee ED pediatric quality improvement (QI), performance improvement (PI), and clinical care protocols.
 - c. Assist with development and periodic review of ED medications, equipment, supplies, policies, and procedures.
 - d. Serve as liaison to appropriate in-hospital and out-of-hospital pediatric care committees in the community (if they exist).
 - e. Serve as liaison to a definitive care hospital, which includes 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 patient.
 - f. Facilitate pediatric emergency education for ED health care providers and out-of-hospital providers affiliated with the ED.
- B. A Nursing Coordinator for Pediatric Emergency Care is appointed.
1. The Nursing Coordinator has the following qualifications:

The Nursing Coordinator demonstrates special interest, knowledge, and skill in emergency care and resuscitation of infants and children as demonstrated by training, clinical experience, or focused continuing nursing education.
 2. The Nursing Coordinator is responsible for the following:
 - a. Coordinate pediatric QI, PI, and clinical care protocols with the Physician Coordinator.
 - b. Serve as liaison to appropriate in-hospital and out-of-hospital pediatric care committees.
 - c. Serve 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 patient.
 - d. Facilitate ED nursing continuing education in pediatrics and provide orientation for new staff members.
 - e. Provide assistance and support for pediatric education of out-of-hospital providers affiliated with the ED.
 - f. Assist in development and periodic review of policies and procedures for pediatric care.
 - g. Stock and monitor pediatric equipment and medication availability.

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

Resuscitation Medications	Other Drug Groups
Atropine	Activated charcoal
Adenosine	Analgesics
Bretylium tosylate	Antibiotics (parenteral)
Calcium chloride	Anticonvulsants
Dextrose	Antidotes (common antidotes should be accessible to the ED)†
Epinephrine (1:1000, 1:10 000)	Antipyretics
Lidocaine	Bronchodilators
Naloxone hydrochloride	Corticosteroids
Sodium bicarbonate (4.2%)	Inotropic agents
	Neuromuscular blocking agents
	Oxygen
	Sedatives

* Adapted from Committee on Pediatric Equipment and Supplies for Emergency Departments, National Emergency Medical Services for Children Resource Alliance. Guidelines for pediatric equipment and supplies for emergency departments. *Ann Emerg Med.* 1998;31:54-57.⁹

† For less frequently used antidotes, a procedure for obtaining them should be in place.

II. GUIDELINES FOR PHYSICIANS AND OTHER PRACTITIONERS STAFFING THE ED

- A. Physicians staffing the ED have the necessary skill, knowledge, and training to provide 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 practitioners have the necessary skill, knowledge, and training to provide nursing care to children of all ages who may be brought to the ED, consistent with the services offered by the hospital.
- C. Competency evaluations completed by the staff are age specific and include neonates, infants, children, and adolescents.

III. QUALITY IMPROVEMENT GUIDELINES FOR THE ED

A pediatric patient review process is integrated into the ED QI plan according to the following guidelines:

- A. Components of the process interface with out-of-hospital, ED, trauma, inpatient pediatrics, pediatric critical care, and hospital-wide QI or PI activities.
- B. Minimum components of the process include identifying indicators of good outcome, collecting and analyzing data to discover variances, defining a plan for improvement, and evaluating or measuring the success of the QI or PI process.
- C. A clearly defined mechanism exists to monitor professional education and staffing.

IV. GUIDELINES FOR POLICIES, PROCEDURES, AND PROTOCOLS FOR THE ED

- A. Policies, procedures, and protocols for emergency care of children are developed and implemented; staff should be educated accordingly; and they should be monitored for compliance and periodically updated. These should include, but are not limited to, the following (items 3 through 12 indicate policies, procedures, and protocols that may be integrated into ED policies and procedures with pediatric-specific components):

1. Child maltreatment (physical and sexual abuse, sexual assault, and neglect)
2. Consent (including situations in which a parent is not immediately available)
3. Death in the ED
4. Do not resuscitate orders
5. Illness and injury triage
6. Sedation and analgesia
7. Immunization status
8. Mental health emergencies
9. Physical or chemical restraint of patients
10. Family issues, including:
 - a. Education of the patient, family, and regular caregivers
 - b. Discharge planning and instruction
 - c. Family presence during care
11. Communication with patient's primary health care provider
12. Transfers necessary for definitive care, according to the following guidelines:
 - a. Transfer policies or procedures should include access to consultation (telephone or telemedicine), transfer guidelines, interfacility transfer agreements, and a plan for return of the child back to his/her community as appropriate.
 - b. Transferring facility must ensure that the patient is stabilized before transport.
 - c. Transferring facility must transfer only patients who need a higher level of care, as per the Emergency Medical Treatment and Active Labor Act.¹¹
- B. Hospitals may wish to adopt currently available clinical guidelines and protocols or develop their own.

V. GUIDELINES FOR SUPPORT SERVICES FOR THE ED

- A. A transport plan is in place to deliver children safely and in a timely manner to the appropriate facility capable of providing definitive care. The following pediatric specialty referral resources are incorporated into the transport plan:
 1. Medical and surgical intensive care
 2. Trauma
 3. Reimplantation (replacement of severed digits or limbs)
 4. Burns
 5. Psychiatric emergencies
 6. Perinatal emergencies
 7. Child maltreatment (physical and sexual abuse and assault)
- B. Radiology department has the skills and capability to provide imaging studies of children and has the equipment necessary to do so. The radiology capability of hospitals may vary from one institution to another; however, the radiology capability of a hospital must meet the needs of the children in the community it serves.
- C. Laboratory has the skills and capability to perform laboratory tests for children of all ages, including obtaining samples, and has the availability of micro technique for small or limited sample size. The clinical laboratory capability must meet the needs of the children in the community it serves.

TABLE 2. Guidelines for Equipment and Supplies for Use in Pediatric Patients in the ED***Monitoring equipment**

- Cardiorespiratory monitor with strip recorder
- Defibrillator with pediatric and adult paddles (4.5 cm and 8 cm) or corresponding adhesive pads
- Pediatric and adult monitor electrodes
- Pulse oximeter with sensors and probe sizes for children
- Thermometer or rectal probet
- Sphygmomanometer
- Doppler blood pressure device
- Blood pressure cuffs (neonatal, infant, child, and adult arm and thigh cuffs)
- Method to monitor endotracheal tube and placement‡
- Stethoscope

Airway management

- Portable oxygen regulators and canisters
- Clear oxygen masks (standard and nonrebreathing—neonatal, infant, child, and adult)
- Oropharyngeal airways (sizes 0–5)
- Nasopharyngeal airways (12F through 30F)
- Bag-valve-mask resuscitator, self-inflating (450- and 1000-mL sizes)
- Nasal cannulae (child and adult)
- Endotracheal tubes: uncuffed (2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, and 6.0 mm) and cuffed (6.5, 7.0, 7.5, 8.0, and 9.0 mm)
- Stylets (infant, pediatric, and adult)
- Laryngoscope handle (pediatric and adult)
- Laryngoscope blades: straight or Miller (0, 1, 2, and 3) and Macintosh (2 and 3)
- Magill forceps (pediatric and adult)
- Nasogastric/feeding tubes (5F through 18F)
- Suction catheters—flexible (6F, 8F, 10F, 12F, 14F, and 16F)
- Yankauer suction tip
- Bulb syringe
- Chest tubes (8F through 40F)§
- Laryngeal mask airway|| (sizes 1, 1.5, 2, 2.5, 3, 4, and 5)

Vascular access

- Butterfly needles (19–25 gauge)
- Catheter-over-needle devices (14–24 gauge)
- Rate limiting infusion device and tubing§¶
- Intraosseous needles (may be satisfied by standard bone needle aspiration needles)
- Arm boards||
- Intravenous fluid and blood warmers§
- Umbilical vein catheters§# (size 5F feeding tube may be used)
- Seldinger technique vascular access kit§

Miscellaneous

- Infant and standard scales
- Infant formula and oral rehydrating solutions§
- Heating source (may be met by infrared lamps or overhead warmer)§
- Towel rolls, blanket rolls, or equivalent
- Pediatric restraining devices
- Resuscitation board
- Sterile linen**
- Length-based resuscitation tape or precalculated drug or equipment list based on weight

Specialized pediatric trays

- Tube thoracotomy with water seal drainage capability§
- Lumbar puncture
- Pediatric urinary catheters
- Obstetric pack
- Newborn kit§
- Umbilical vessel cannulation supplies§
- Venous cutdown§
- Needle cricothyrotomy tray
- Surgical airway kit (may include a tracheostomy tray or a surgical cricothyrotomy tray)§

Fracture management

- Cervical immobilization equipment§††
- Extremity splints§
- Femur splints§

Medical photography capability

* Adapted from Committee on Pediatric Equipment and Supplies for Emergency Departments, National Emergency Medical Services for Children Resource Alliance.⁹

† Suitable for hypothermic and hyperthermic measurements with temperature capability from 25°C to 44°C.

‡ May be satisfied by a disposable CO₂ detector of appropriate size for infants and children. For children 5 years or older who are ≥20 kg in body weight, an esophageal detection bulb or syringe may be used additionally.

§ Equipment that is essential but may be shared with the nursery, pediatric ward, or other inpatient service and is readily available to the ED.

|| Equipment or supplies that are desirable but not essential.

¶ To regulate rate and volume.

Ensure availability of pediatric sizes within the hospital.

** Available within hospital for burn care.

†† Many types of cervical immobilization devices are available, including wedges and collars. The type of device chosen depends on local preferences and policies and procedures. Chosen device should be stocked in sizes to fit infants, children, adolescents, and adults. Use of sandbags to meet this requirement is discouraged, because they may cause injury if the patient has to be turned.

VI. GUIDELINES FOR EQUIPMENT, SUPPLIES, AND MEDICATIONS FOR CHILDREN IN THE ED

- A. Necessary medications, equipment, and supplies are listed in Table 1. Each hospital must develop a method for storage and provide accessibility of medications and equipment for children. The method used must ensure that the health care practitioner can easily identify appropriate dosages of medication based on the patient's weight and choose appropriately sized equipment. Length-based systems or precalculated drug systems should be used to avoid calculation errors of medications delivered.
- B. All equipment and supplies are listed in Table 2 and include age-appropriate and size-appropriate equipment for use for children of all ages and sizes from premature infants through adolescents.
- C. Quality indicators ensure regular periodic review of drugs and equipment, monitoring of expiration dates of items, and replacement of used items.

For periodic updates of this statement, including medications and equipment, see the American Academy of Pediatrics Web site (<http://www.aap.org>) or the American College of Emergency Physicians Web site (<http://www.acep.org>).

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REFERENCES

1. Weiss HB, Mathers LJ, Forjuoh SN, Kinnane JM. *Child and Adolescent Emergency Department Visit Data Book*. Pittsburgh, PA: Center for Violence and Injury Control, Allegheny University of the Health Sciences; 1997
2. Athey J, Dean JM, Ball J, et al. Ability of hospitals to care for pediatric emergency patients. *Pediatr Emerg Care*. 2001; In press
3. Institute of Medicine, Committee on Pediatric Emergency Medical Services. In: Durch JS, Lohr KN, eds. *Institute of Medicine Report: Emergency Medical Services for Children*. Washington, DC: National Academy Press; 1993
4. Seidel JS, Gausche M. Standards for emergency departments. In: Dieckmann RA, ed. *Pediatric Emergency Care Systems: Planning and Management*. Baltimore, MD: Williams & Wilkins; 1992;267–278
5. American Medical Association, Commission on Emergency Medical Services. Pediatric emergencies. An excerpt from "Guidelines for Categorization of Hospital Emergency Capabilities." *Pediatrics*. 1990;85:879–887
6. American College of Emergency Physicians. Emergency care guidelines. *Ann Emerg Med*. 1997;29:564–571
7. American Academy of Pediatrics, Committee on Pediatric Emergency Medicine. Guidelines for pediatric emergency care facilities. *Pediatrics*. 1995;96:526–537
8. American College of Emergency Physicians. Pediatric equipment guidelines. *Ann Emerg Med*. 1995;25:307–309
9. National Emergency Medical Services for Children Resource Alliance, Committee on Pediatric Equipment and Supplies for Emergency. Guidelines for pediatric equipment and supplies for emergency departments. *Ann Emerg Med*. 1998;31:54–57
10. *Administration, Personnel, and Policy Guidelines for the Care of Pediatric Patients in the Emergency Department*. Sacramento, CA: California Emergency Medical Services Authority; EMSC Project, Final Report, 1994
11. The Comprehensive Omnibus Budget Reconciliation Act of 1986, Emergency Medical Treatment and Active Labor Act. 42 USC §1395dd (1988 Suppl II 1990)