Guidelines for Pediatric Equipment and Supplies for Emergency Departments

Although these guidelines were developed by individual experts solicited from national organizations, they do not represent the official policy of any of these organizations. The consensus group hopes that health care providers will find these guidelines helpful in providing high-quality pediatric emergency care to their communities.

**Author names and affiliations are listed in the Appendix.*

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

[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* January 1998;31: 54-57.]

Appropriate care for ill and injured pediatric patients cannot be given if EDs are not adequately equipped. This was highlighted in The Institute of Medicine Report on Emergency Medical Services for Children, which recommends that hospital emergency departments have available and maintain equipment and supplies appropriate for the emergency care of children.[1] Although guidelines for equipment and supplies for EDs have been published by national organizations, in pediatric emergency textbooks, and by state Emergency Medical Services for Children (EMSC) projects, there is no consensus on what constitutes minimum equipment and supplies to care for pediatric patients in the ED setting.

Guidelines for pediatric equipment and supplies for EDs were developed by a consensus process by a group of individuals representing the following organizations and agencies:

The Committee on Pediatric Emergency Medicine of American Academy of Pediatrics
The Section on Surgery of the American Academy of Pediatrics
The American Association of Respiratory Care
The American College of Emergency Physicians
The American College of Surgeons
The American Hospital Association
The Ambulatory Pediatric Association
The Emergency Nurses Association
Kaiser Permanente Health System
The National Association of Children's Hospitals and Related Institutions
The National EMSC Resource Alliance
The National Rural Health Association

METHODS

The committee was presented with a template of seven published lists of pediatric ED equipment and supplies. These included lists from the American Academy of Pediatrics, The American College of Emergency Physicians, the Emergency Nurses Association, The Los Angeles County Emergency Department Approved for Pediatrics Program, The California Emergency Medical Services Authority, San Luis Obispo County EMSC Grant, and *The Textbook of Pediatric Emergency Medicine*.[2-8] These served as a basis for beginning discussion on the guidelines.

Committee members were asked to determine whether individual equipment or supply items were deemed essential, desirable, or not needed in the care of pediatric patients in the ED. They were also given the opportunity to add any item that they believed was necessary but was not on any of the published lists. The results were tabulated, and areas of agreement and disagreement were presented to the committee. Items that had 90% or greater agreement were placed on the list. Those with less than 90% agreement were discussed by the committee, and consensus was reached on their inclusion or exclusion in the guidelines.

RESULTS

All committee members (100%) responded to the questionnaires, and 12 of 13 members (92%) took part in the final telephone conference call. The one member who was not part of the conference call submitted written comments that were shared with the group.

The committee decided that the list should represent minimum equipment and supplies and should not reflect what is needed in pediatric tertiary care facilities. Routine equipment and supplies, such as oxygen blenders, tape, dressings, and so on, found in all EDs for care of adults and children were not included in the guidelines. It was also agreed that the only drugs included on the list should be those used in cardiopulmonary resuscitation, and that these drugs should reflect the American Heart Association Pediatric Guidelines (Table). Members agreed that more extensive drug lists that include antibiotics and so on depend on the scope of practice of the staff of the ED and the pharmacy and therapeutics committee of the community hospital. An example drug list was published in *Pediatrics in Review* as a reference for office practice and is similar to the type of complete pediatric formulary that might be stocked in an ED. This sample list can be modified to meet the needs of individual institutions.[9]

A total of 53 items from the original template were rated as essential by more than 90% of the committee members. Twenty-one items were deemed essential by 100% of the respondents. Thirty-one items had less than 90% agreement and were discussed by the committee. Two items (intracranial bolt tray and central venous pressure monitoring equipment) received no votes as essential items.

For the purposes of these guidelines, "essential" means that the item is necessary and should be in the ED. A "desirable" item is worth having and may improve care; however, its use depends on policy, cost, and scope of practice of the staff. All items on the list except one, medical photography capability, were considered essential (Figure).

The organization and storage of pediatric equipment and supplies is not specifically addressed because this issue is determined by the organization of the ED. It is recommended that pediatric equipment and supplies be organized separately and be easily retrievable, either in a specific pediatric cart, pack, or section in the ED.

The equipment and supply guidelines offered in this report represent a minimum list. An ED may choose to modify this list to meet the severity level of the patient population. EDs with a high volume of ill and injured pediatric patients

Table.
Pediatric resuscitation medications.

Drug Name	How Supplied	Quantity Per Container
Atropine	Prefilled syringe	10 mL (.1 mg/mL)
		5 mL (.1 mg/mL)
Adenosine	Vial	1 mL (1 mg/mL)
Bretylium	Prefilled syringe	10 mL (50 mg/mL)
	Ampule	10 mL (50 mg/mL)
	Vial	20 mL (50 mg/mL)
Calcium chloride	Prefilled syringe	10 mL (100 mg/mL=27.1 mg elemental calcium)
Dextrose (25% and 50%)	Prefilled syringe	10 mL
Dopamine	Vial	5 mL (40 mg/mL)
		10 mL (40 mg/mL)
Dobutamine	Vial	10 mL (25 mg/mL)
		20 mL (12.5 mg/mL)
Epinephrine 1:1000	Prefilled syringe	1 mL, 2 mL
	Vial	30 mL (1 mg/mL)
Epinephrine 1:10,000	Prefilled syringe	10 mL (.1 mg/mL)
		3 mL (.1 mg/mL)
Isoproterenol	Vial	5 mL (.2 mg/mL)
Lidocaine	Prefilled syringe	5 mg/mL, 10 mg/mL, 15 mg/mL, 20 mg/mL
	Vial	40 mg/mL, 100 mg/mL, 200 mg/mL
	Ampule	5 mL (20 mg/mL)
Naloxone	Vial	1 mL, 10 mL (.4 mg/mL)
		2 mL (1 mg/mL)
Sodium bicarbonate	Prefilled syringe	50 mL (8.4%) (1 mEq/mL)
		10 mL (8.4%) (1 mEq.mL)
		10 mL (4.2%) (.5 mEq/mL)

may need additional items not on this list. When purchasing equipment and supplies, consideration should be given to the growing problem of latex sensitization of both patients and health care workers. The use of non-latex materials and devices for both routine and special pediatric procedures is encouraged.[10,11] ED health care providers must be trained in the use of all equipment and supplies an individual ED decides to have available for pediatric emergency care.

Figure.
Guidelines for minimum equipment and supplies for care of pediatric patients in EDs.

Essential equipment and supplies
Monitoring
Cardiorespiratory monitor with strip recorder
Defibrillator (0-400 J capability) with pediatric and adult paddles (4.5 cm and 8 cm)
Pediatric and adult monitor electrodes
Pulse oximeter with sensors sizes newborn through adult
Thermometer/rectal probe*
Sphygmomanometer
Doppler blood pressure device
Blood pressure cuffs (neonatal, infant, child, adult, and thigh sizes)
Method to monitor endotracheal tube and placement†
Vascular Access
Butterfly needles (19- to 25-gauge)
Catheter-over-needle devices (14- to 24-gauge)
Infusion device‡
Tubing for above
Intraosseous needles (16- and 18-gauge)§
Arm boards (infant, child, and adult sizes)
Intravenous fluid/blood warmers
Umbilical vein catheters (sizes 3.5 Fr and 5 Fr)‖
Seldinger technique vascular access kit (with pediatric sizes 3, 4, 5 Fr catheters)
Airway management
Clear oxygen masks (preterm, infant, child, and adult sizes)
Non-rebreathing masks (infant, child, and adult sizes)
Oral airways (sizes 00-5)
Nasopharyngeal airways (12 to 30 Fr)
Bag-valve-mask resuscitator, self-inflating (450 and 1000 mL sizes)
Nasal cannulae (infant, child, and adult sizes)
Endotracheal tubes: uncuffed (sizes 2.5 to 8.5) and cuffed (sizes 5.5 to 9)
Stylets (pediatric and adult sizes)
Laryngoscope handle (pediatric and adult)
Laryngoscope blades, curved (sizes 2 and 3) and straight (sizes 0 to 3)
Magill forceps (pediatric and adult)
Nasogastric tubes (sizes 6 to 14 Fr)
Suction catheters: flexible (sizes 5 to 16 Fr) and Yankauer suction tip
Chest tubes (sizes 8 to 40 Fr)
Tracheostomy tubes (sizes 00 to 6)¶

*Suitable for hypothermic and hyperthermic measurements with temperature capability from 25° to 44° C.
†May be satisfied by a disposable $ETco_2$ detector, bulb, or feeding tube methods for endotracheal tube placement.
‡To regulate rate and volume.
§May be satisfied by standard bone marrow aspiration needles, 13- or 15-gauge.
‖Available within the hospital.
¶Ensure availability of pediatric sizes within the hospital.

During a pediatric resuscitation is not the time to discover where certain items are located or how they are used. It may be helpful to have "mock codes" for the staff to allow the team to find and use pediatric equipment and supplies.[12,13]

Financial factors are also important in determining the type of equipment and supplies available for pediatric patients. The guidelines take into consideration the costs to small community and rural hospitals that may have a low pediatric census. These institutions may need to form buying cooperatives or develop other strategies to purchase supplies that are not frequently used.

All institutions that choose to offer emergency services to the community must consider the special needs of children. Reduction in morbidity and mortality rates by prop-

Figure, *continued*.
Guidelines for minimum equipment and supplies for care of pediatric patients in EDs.

Resuscitation medications (see Table)
Medication chart, tape, or other system to ensure ready access to information on proper per kilogram doses for resuscitation drugs and equipment sizes#
Miscellaneous
Infant and standard scales
Infant formula and oral rehydrating solutions
Heating source**
Towel rolls/blanket rolls or equivalent
Pediatric restraining devices
Resuscitation board
Sterile linen††
Specialized pediatric trays
Tube thoracotomy with water seal drainage capability
Lumbar puncture (spinal needle sizes 20-, 22-, and 25-gauge)
Urinary catheterization with pediatric Foley catheters (sizes 5 to 16 Fr)
Obstetric pack
Newborn kit
  Umbilical vessel cannulation supplies
  Meconium aspirator
Venous cutdown
Surgical airway kit‡‡
Fracture management
Cervical immobilization equipment (sizes child to adult)§§
Extremity splints
Femur splints (child and adult sizes)
Desirable equipment and supplies
Medical photography capability

#System for estimating medication doses and supplies may use the length-based method with color codes, or other predetermined weight (kilogram)/dose method.
**May be met by infrared lamps or overhead warmer.
††Available within hospital for burn care.
‡‡May include any of the following items: tracheostomy tray, cricothyrotomy tray, ETJV (needle jet).[2]
§§Many types of cervical immobilization devices are available. These include wedges and collars. The type of device chosen depends on local preference and policies and procedures. Whatever device is chosen should be stocked in sizes to fit infants, children, adolescents, and adults. The use of sandbags to meet this requirement is discouraged because they may cause injury if the patient has to be turned.

erly equipping an ED improves outcomes and reduces the global costs to the community, state, and the nation.

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