

Guidelines for paediatric emergency equipment and supplies for a physician's office



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The objective of the present revision was to examine recent evidence behind (and adjust accordingly) the recommendations for emergency equipment and supplies, as well as skills that child health care providers should possess in the outpatient setting. It replaces the previous position statement published in 1999 (1).

METHOD OF STATEMENT DEVELOPMENT

PubMed and the Cochrane Library were searched using combinations of the following terms: cardiac arrest, children, emergency, endotracheal intubation skills, laryngeal mask, equipment, etiology, office, outpatient, primary care, pediatric and paediatric, vascular access and intraosseous. Relevant articles were identified from the bibliographies of the articles selected from the database searches. No studies were found that could establish a causal relationship between equipment availability and outcomes. Thus, recommendations were largely based on consensus achieved by the Canadian Paediatric Society's Community Paediatrics Committee, Allergy Section, Hospital Paediatrics Section and the Paediatric Emergency Section.

Office-based physicians who care for children should have some basic emergency care equipment, supplies and medications available to deal with the infrequent, but life-threatening situations that they may encounter.

The 'recommended' equipment, supplies and medications (listed below) are considered to be optimal to support a child until his or her care is assumed by emergency medical services (EMS). The choice of exactly what to obtain was made with consideration of the following principles:

- the nature of the emergencies most likely to be encountered;
- the nature of the intervention and how difficult it is to acquire and maintain the skills necessary to operate the equipment;
- the value of the intervention; and
- the availability of EMS.

THE NATURE OF THE EMERGENCIES MOST LIKELY TO BE ENCOUNTERED

Canadian data from an urban setting demonstrated that only 1.9% of children suffering an out-of-hospital cardiac

arrest will survive (2). It appears to be most reasonable for outpatient care providers to focus their preparations on pre-arrest emergencies that may affect children. The most common prearrest conditions affecting children are respiratory emergencies and trauma (3).

THE NATURE OF THE INTERVENTION AND HOW DIFFICULT IT IS TO ACQUIRE AND MAINTAIN THE SKILLS NECESSARY TO OPERATE THE EQUIPMENT

Even in high-volume urban centres, among trained EMS personnel, unintentional esophageal intubations occur not infrequently (4). It is unlikely that health care providers, who do not regularly perform endotracheal intubations, will be able to maintain this skill. Inappropriate delays in oxygenation may occur during unsuccessful intubation attempts, and unrecognized esophageal intubation can be catastrophic. Moreover, when endotracheal intubation is compared with self-inflating bag and mask ventilation, the latter has been shown to be the simplest and most successful intervention for gas exchange in simulated models of apnea when used by paramedics (4). A bag and mask approach more rapidly establishes ventilation when compared with laryngeal masks used by critical care nurses (5).

Similarly, vascular access by intravenous catheter placement is difficult to achieve in severely hypovolemic children, and although successful intraosseous access may require less maintenance of skill (6,7), both methods require training and probably ongoing practice to maintain proficiency.

THE VALUE OF THE INTERVENTION

Oxygen by face mask or by bag and valve mask is relatively uncomplicated to administer and may be lifesaving. There does not appear to be an advantage to neurological outcomes among paediatric outpatients who are resuscitated using endotracheal intubation compared with bag and mask ventilation when used by EMS providers in an urban setting (8).

Nebulization of salbutamol for status asthmaticus and of L-epinephrine for children with severe croup (and possibly, outpatients with severe bronchiolitis [9]) may also be lifesaving and requires little training or maintenance of skill.

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TABLE 1
Circulation supplies recommended for physicians' offices

Recommended
Cardiac arrest backboard
Sphygmomanometer (with assorted cuffs)
Intraosseous needles (16 gauge)
Intravenous fluids and tubing
Normal saline (two 500 mL bags)
Desirable
Vascular access
Intravenous butterfly needles (25, 23, 21 gauge)
Indwelling intravenous catheters (24 to 18 gauge)
Normal saline in 5% dextrose (two 500 mL bags)
Extension tubing
Drip chambers (solusets)
Syringes (1 mL, 5 mL, 10 mL) with needles
Tape
Tourniquet (rubber bands, tubing)
T-connectors
Arm boards

Intraosseous infusion is of unknown value when used for prehospital vascular access in urban areas (10). However, when EMS are not likely to be readily available, the value of office-based vascular access skills for the care of a hypovolemic child cannot be overstated.

Given that brief seizures usually have good outcomes, the treatment of seizures with benzodiazepines in the prehospital setting must be a balanced approach, taking into consideration the skill and availability of ventilatory support (should benzodiazepine lead to respiratory depression), the duration of the seizure and the availability of EMS.

Mock 'codes' in the office setting have been shown to decrease provider anxiety, improve confidence, and lead to further training and written office protocols (11,12).

THE AVAILABILITY OF EMS

A physician whose office is further from EMS will need to stock more of the 'desirable' equipment items. Physicians working in remote areas may require more training in paediatric advanced life support and in ongoing maintenance of skills. Often, rural general practitioners participate in local emergency department shifts, and rural paediatricians may participate in on-call coverage for emergency departments and newborn emergencies. It may be more feasible for physicians with these practice opportunities to maintain their acute care skills.

RECOMMENDATIONS

- All physicians caring for children should be knowledgeable and up to date in basic paediatric cardiopulmonary resuscitation. Physicians who are remote from EMS should be up to date in paediatric advanced life support.

TABLE 2
Emergency drugs recommended for physicians' offices

Recommended
Dosing cards or tapes
Epinephrine for anaphylaxis
(1:1000 solution: 0.01 mg=mL/kg to a maximum of 0.3 mg/dose)
Intramuscular route in the vastus lateralis muscle
Salbutamol solution for nebulization: 0.5 mL (of 5 mg/mL solution = 2.5 mg) diluted to 3 mL in saline for infants and toddlers, and 1 mL diluted to 3 mL in saline for older children
Epinephrine (1:1000) for nebulization for airway compromise (eg, croup) 0.5 mL/kg
Compressor with nebulizer and masks of various sizes
Desirable
Epinephrine (1:10,000)
Should be given if intraosseous access is available for paediatric advanced life support. Should not be stocked by non-paediatric advanced life support certified providers if this leads to confusion with 1:1000 concentration
Diazepam (0.1 mg/kg every 5 min, maximum of three doses or 0.3 mg/kg intravenous or 0.5 mg/kg rectally) or lorazepam (0.1 mg/kg intramuscular or intravenous)
Chemstrips and lancets for blood glucose determination
Dextrose (25%: 1 mL/kg to 2 mL/kg and 10%: 2.5 mL/kg to 5 mL/kg)
Dextrose gel
Salbutamol aerosol: three to six puffs

TABLE 3
Trauma and miscellaneous supplies recommended for physicians' offices

Recommended
Stiff neck collars (large and small)
Dressings, bandages, splints
Emergency equipment container (cart box)
Latex-free gloves
Desirable
Nasogastric tubes (10 F, 16 F)
Steristrips, dressings, bandages, splints

- Office-based providers of health care for children should conduct periodic mock codes.
- A written protocol for emergencies should be posted in an easily accessible place, and should include preprinted drug dosages and an emergency telephone list (police, hospital, etc).

Recommended items listed in Tables 1, 2, 3 and 4 should be considered to be the minimum inventory stocked in physicians' offices. Desirable items should be stocked by paediatricians who can maintain proficiency in their use and by physicians who are remote from EMS. All drugs should be kept in a locked emergency equipment container, and their expiry dates should be reviewed regularly.

TABLE 4
Airway supplies recommended for physicians' offices

Recommended

Bag valve mask (self-inflating with reservoir)

Paediatric volume: 100 mL to 700 mL

Adult volume: 700 mL to 1000 mL

Oxygen masks (adults, children and infants)

Oxygen tank and valve with flow meter

Oxygen tubing

Also refer to Table 2 (nebulizer and medications for inhalation)

Desirable

Pulse oximeter

Laryngoscope and blades with endotracheal tubes (various sizes) or laryngeal airway masks (various sizes), the choice depending on the level of expertise

Suction machine and catheters

Oral airways, various sizes

Suction tips (Yankauer)

Spacer device for aerosolized medication (adult, infant)

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The recommendations in this statement do not indicate an exclusive course of treatment or procedure to be followed.

Variations, taking into account individual circumstances, may be appropriate.

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