

Medical Emergency Preparedness in Office Practice

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Most primary care physicians report at least one emergency presenting to their office per year. Asthma, anaphylaxis, shock, seizures, and cardiac arrest are among the most common adult and childhood emergencies in the office setting. Most offices are not fully prepared for these medical emergencies. Practices can initiate a preparedness program by purchasing emergency equipment and medications that reflect the spectrum of anticipated emergencies in their patient populations, the practitioners' skills, and the distance to the nearest emergency department. Physicians and staff should make every effort to maintain current certification in basic or advanced lifesaving courses. Offices may also wish to create a written emergency protocol that outlines the steps to be followed in the event of a medical office emergency. By preparing for medical emergencies with the correct equipment, education, and protocols, offices can greatly decrease the risk of an unfavorable outcome. (*Am Fam Physician* 2007;75:1679-84, 1686. Copyright © 2007 American Academy of Family Physicians.)

► **Patient Information:** A handout on office emergencies, written by the author of this article, is provided on page 1686

In caring for patients of all ages and providing routine health maintenance and urgent care, family physicians should be prepared to encounter a range of emergencies, from stroke in older patients to meningitis in infants. Adult patients may misinterpret the urgency of their condition or purposefully avoid the emergency department. Parents of critically ill children are often unaware of the severity of their child's illness.

Several surveys have shown that emergency situations are to be expected in an active family practice office.¹⁻⁴ A study of general practitioners in rural Australia found that these physicians saw a median of eight emergencies per year, and that 95 percent had seen at least one emergency in the preceding 12 months.⁵ One recent study found that the average family practice office has 3.8 childhood emergencies each year,² and another study found that 62 percent of family medicine and child care offices saw one or more children who required hospitalization or urgent treatment each week.¹ Many of the studies describing the incidence of office emergencies have also shown that offices were inadequately prepared to manage them,^{1,2,5-8} with factors such as the rarity of emergencies, time and financial constraints, and the proximity of

a hospital cited as reasons that preparedness is neglected.⁶

Medical emergencies that arise in the office are a great source of concern for practitioners and office staff. Proper planning for the unexpected can help alleviate some of this anxiety and improve patient safety within the office. The recommendations throughout this article are based on the opinions of several experts; good evidence on the topic of emergency preparedness is lacking.

Acquisition of Supplies

A good first step in preparing for medical emergencies is the acquisition of emergency supplies. Family physicians should choose emergency medicines and equipment that reflect the spectrum of their office's anticipated emergencies. *Table 1*^{5,7} lists the office emergencies that occur most commonly in primary care and child care offices. Common to both these settings are respiratory distress (asthma), anaphylaxis, shock, seizure, and cardiac arrest. Physicians should consider these conditions when choosing medications, equipment, and additional emergency supplies such as sterile bandages and neck collars.

Equipment choice should also reflect each office's patient population. Offices that care for a large number of patients who are chronically ill or children with special needs

SORT: KEY RECOMMENDATIONS FOR PRACTICE

<i>Clinical recommendation</i>	<i>Evidence rating</i>	<i>References</i>
The choice of emergency medications and equipment should reflect the spectrum of anticipated emergencies in a practice's patient population, the skills of the practitioners, and the distance to the nearest emergency department.	C	9, 23
Office physicians and staff should make every effort to maintain current certification in basic or advanced life support courses.	C	10, 13, 22
Offices should create a written emergency protocol that outlines the steps to be followed in the event of an office emergency.	C	9, 13

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, see page 1605 or <http://www.aafp.org/afpsort.xml>.

may choose to have a more extensive stock of equipment and medication. For example, such an office may choose to purchase intubation equipment and a larger assortment of anticonvulsant and cardiac medications. Offices that care for a large number of patients with heart problems or that are in a remote location may consider purchasing an automatic external defibrillator (AED), because the likelihood of addressing a sudden cardiac arrest is greater or the emergency services' response time could be longer.

The choice of medications and equipment should also be based on the availability and accessibility of skilled and experienced emergency medical providers. In the rural primary care office, physicians may need to do more than just stabilize a critically ill patient. Such offices should consider

purchasing equipment and medications that may be beneficial during a prolonged resuscitation, such as a cardiac monitor, atropine (Atropisol), or intravenous fluids. This is especially pertinent for emergencies in children, because the emergency medical providers who respond may have little experience in treating children and may require significant guidance before leaving the office.

The distance from the office to the nearest emergency department should also be considered in choosing office emergency supplies. As mentioned, rural offices especially need to consider the additional time patients will spend traveling to the closest emergency department. Physicians in such offices may feel it necessary to provide additional treatment in the office before the patient departs with the emergency services. Urban offices located only blocks away from a hospital should not be complacent about emergency equipment; it is well established that early treatment of cardiopulmonary distress greatly increases the chance of a more favorable long-term outcome for the patient.

Most importantly, the decision on how to equip the primary care office should depend on the physicians' and nurses' skills. For medical and legal reasons, no office should stock equipment that cannot be used safely by office staff. Primary care physicians who do not feel compelled to maintain proficiency in advanced airway techniques such as endotracheal intubation may elect not to store a laryngoscope in the office. (However, the physicians in such an office should try to remain proficient in bag-valve-mask ventilation.) Skill level may also dictate the selection of emergency medications. For example, if an

Table 1. Most-Commonly Encountered Office Emergencies

Primary Care⁵	Child Care⁷
Asthma exacerbation	Asthma exacerbation
Psychiatric	Severe respiratory distress (nonasthma)
Seizure	Meningitis/sepsis
Hypoglycemia	Seizure
Anaphylaxis	Apnea
Impaired consciousness	Anaphylaxis
Shock	Shock
Poisoning	Obstructed airway
Drug overdose	Probable epiglottitis
Cardiac arrest	Cardiac arrest

NOTE: Conditions listed in order of incidence. Information from references 5 and 7.

Table 2. Suggested Emergency Supplies for Family Practice Offices**Equipment**

Bag mask ventilator (two sizes, three mask sizes)
 Blood pressure cuff (all sizes)
 Glucose meter
 Intraosseous needle (18 and 16 gauge)
 Intravenous catheter/butterfly needles (24 to 18 gauge)
 Intravenous extension tubing and T-connectors
 Nasal airways (one set)
 Nasogastric tubes
 Nebulizer or metered dose inhaler spacer and face masks
 Non-rebreather (three sizes)
 Oxygen mask (three sizes)
 Oxygen tank and flow meter
 Portable suction device and catheters, or bulb syringe
 Pulse oximeter for child and adult usage
 Resuscitation tape (color-coded)
 Universal precautions (latex-free gloves, mask, eye protection)

Medications

Acetaminophen (rectal suppositories)
 Albuterol (Proventil)
 Aspirin
 Ceftriaxone (Rocephin)
 Corticosteroids, parenteral
 Dextrose 25%
 Diazepam, parenteral (Valium)
 Diphenhydramine, oral and parenteral (Benadryl)
 Epinephrine (1:1,000, 1:10,000)
 Flumazenil (Romazicon)
 Lorazepam, sublingual (Ativan)
 Morphine (MS Contin)
 Naloxone (Narcan)
 Nitroglycerine spray
 Saline, normal

Adapted with permission from Toback S. Prepare your office for a medical emergency. Contemp Pediatr 2002;19:107.

office has no staff member able to place an intravenous catheter, intravenous medications need not be purchased, but the office should strongly consider parenteral medications such as intramuscularly administered corticosteroids, glucagon, or rectal diazepam (Diastat). Offices that have little experience calculating medication doses (especially for

children) should consider prefilled emergency medications such as epinephrine auto-injectors. Lastly, no medication should be made available if office personnel cannot manage the drug's most common side effects, such as the respiratory depression that may result from benzodiazepine use.

Recommendations as to the minimum of emergency equipment necessary for a primary care office vary greatly. Guidelines issued by the American Academy of Pediatrics may help offices to start planning their emergency supplies.^{9,10} No official guidelines for adult emergencies have been written specifically for the family medicine office, although several suggested medication lists have been published.^{3,5,11-13} The list of suggested emergency medications and equipment in *Table 2*¹⁴ is based on published guidelines, with strong consideration of cost and ease of administration. The suggested equipment can be purchased for less than \$1,500, and most of this cost is for equipment that a busy family practice office likely would use frequently, on nonurgent and semi-urgent occasions (e.g., pulse oximeter, oxygen tank, glucose meter, nebulizer). Resuscitation drugs such as epinephrine are fairly inexpensive, whereas products such as prefilled rectal diazepam syringes and auto-injectable epinephrine are more costly.

AUTOMATIC EXTERNAL DEFIBRILLATORS

A new potential addition to office emergency equipment is the AED. This is a significant advance in out-of-hospital resuscitation for adults and children. An AED is able to analyze a cardiac rhythm; recognize a shockable rhythm; and, if necessary, defibrillate the patient with an electrical charge delivered through self-adhesive pads. The relatively inexpensive price (\$800 to \$1,500), ease of use, and proven effectiveness of these devices account for their increased appearance in many public locations, such as commercial aircraft, sporting arenas, and government office buildings.

The decision to purchase an AED for a medical office is a difficult one. Having an AED in a primary care office is not considered to be the standard of care,

Table 3. Considerations When Purchasing an AED

Cost	AEDs vary widely in price, but typically start at about \$800 to \$1,500; both the initial cost of the unit and ongoing replacement costs (for batteries, carrying case, chest pads, and training materials) should be considered
Ease of use	All newer AEDs have voice and visual prompts; some units function with a single button
Liability	Tort law, recent jury verdicts against large businesses, and newly introduced federal legislation suggest that the risks of not having an AED in certain locations might outweigh the risks associated with using one ¹⁷ ; offices that elect to purchase an AED can lower the risks associated with its use by implementing a well-designed AED program
Maintenance and upkeep	Most units come with batteries that will last up to three to five years; chest pads often need to be replaced every two years
Safety	All AEDs are extremely safe and are designed not to deliver a shock when it is not indicated
Self-testing	All AEDs do some form of self-testing; if the unit will rarely be used, a product that does more frequent and extensive self-testing is desirable
Training availability	Some AEDs can be converted into a training tool with an adapter, whereas others require the purchase of an AED trainer unit
Use in children	Some AEDs are certified for use in children as young as 12 months and have child-size chest pads or an attachment that decreases the voltage delivered; these may be preferable in a family practice office

AED = automatic external defibrillator.

Information from reference 17.

Table 4. Recommendations for Offices That Purchase an AED

- Become familiar with the operation of the AED
- Check the AED for any visible problems (e.g., an open case, signs of damage)
- Check to see if the AED has appropriate accessories (e.g., extra electrodes, child electrodes or converter, extra battery, preparatory razors)
- Inform your local emergency medical services provider that your office has an AED available
- Create a schedule to ensure that the "ready for use" indicator (if present) is checked daily and that all maintenance is provided according to the manufacturer's recommendations
- Assign a physician to oversee the office use of the AED
- Require that key staff members maintain CPR and AED training
- Ensure that use of the AED is incorporated into the office emergency protocol and planning
- Ensure that a quality assurance program is in place to review each case in which the AED is applied to a patient

AED = automatic external defibrillator; CPR = cardiopulmonary resuscitation.

and no national guidelines on the subject exist. Some publications have recommended the use of AEDs in family practice offices that are considered at high risk,³ whereas others have stated that a portable cardiac monitor/defibrillator is essential or highly recommended for any office that cares for children.¹¹

Physicians should consider the likelihood of a sudden cardiac arrest occurring in their office when making this decision. Public access defibrillation programs encourage the placement of an AED in a location where it can be expected to be used once every five years.¹⁵ In the future, this figure may change to reflect the falling prices of AEDs. Office staff should also consider how much time would elapse between when the emergency services are called and when they would be able to defibrillate someone in the office (collapse-to-shock interval). Survival rates as high as 90 percent are reported with rapid defibrillation in a medically supervised environment,¹⁶ but the chance of survival decreases by about 10 percent for every minute until a defibrillation shock is received.¹⁵ A target collapse-to-shock interval of less than five minutes is a reasonable goal that should be sought with input from local emergency services providers. Additional considerations are listed in *Table 3*,¹⁷ and recommendations for offices that purchase a device are given in *Table 4*.

Physician and Staff Training

The correct equipment for dealing with emergencies in the office is only useful in experienced hands. The lack of emergency preparedness found in offices extends to staff education. A study conducted in 1989 found that 86 percent of family physicians had received training in basic life support and 25 percent had advanced cardiovascular life support training.¹ A more recent survey showed that only 19 percent of family physicians had been trained in pediatric advanced life support.²

Ideally, all office employees should be trained and regularly retrained in basic life support regardless of their office responsibilities. Medical staff should be strongly

encouraged to maintain skills in either basic life support (nurses and medical assistants) or adult and pediatric advanced life support (physicians, physician assistants, and nurse practitioners), depending on their level of training. The need for consistent reeducation of lifesaving skills despite adequate initial training has been well documented.¹⁸⁻²¹ A list of training resources is given in *Table 5*.

Developing an Emergency Plan

The next step in preparing the office for emergencies is planning. Family medicine offices should take time to create a written emergency protocol that outlines the steps to be followed in the event of an office emergency.^{9,13} The protocol should take into account the emergency skills of each employee and assign each employee specific responsibilities within the office and during the resuscitation. Designating a room for the delivery of emergency care and for storing all emergency equipment is a good start to the planning process. If the office layout makes this difficult, office emergency equipment should be portable (e.g., on a rolling cart, within carrying cases) and stored in a common location. Previous publications have described this process in greater detail.¹⁴ A sample office emergency protocol is listed in *Table 6*.¹⁴

Algorithms describing the treatment sequence for specific medical conditions can be helpful. These protocols typically follow the “airway, breathing, circulation” model of emergency care taught in formal life support classes. Algorithms for adult and childhood cardiac emergencies are available^{10,22} (*Table 5*), as are protocols for specific conditions such as anaphylaxis, psychiatric emergencies, and a variety of childhood emergencies.^{3,23}

Finally, nothing does more to maintain the level of preparedness in an office setting than practicing for emergencies. A “mock code” is an emergency drill in which a manikin is used to simulate a critically ill patient in the office. When properly conducted, such drills allow the office staff the opportunity to practice all steps in the emergency protocol as well as individual lifesaving skills. Often, unanticipated problems with

Table 5. Resources for Life Support Training

American College of Emergency Physicians

Pediatric Emergency Medicine Resource: <http://www.apsonline.com>

American Heart Association

ACLS course: <http://www.heart.org/presenter.jhtml?identifier=3011972>

Algorithms: <http://www.aha-channing-bete.com>

ACLS algorithm emergency cart card set (item 80-1083)

PALS algorithm and flow chart posters (item 80-1413)

Cardiopulmonary resuscitation guidelines: <http://www.americanheart.org/presenter.jhtml?identifier=3035517>

CPR class: <http://www.americanheart.org/presenter.jhtml?identifier=3011764>

PALS online course: <http://www.americanheart.org/presenter.jhtml?identifier=3031539>

ACLS = advanced cardiovascular life support; PALS = pediatric advanced life support; CPR = cardiopulmonary resuscitation

Table 6. Sample Physician Office Emergency Protocol

Staff	Role
Front desk	Identify patient in distress at check-in Periodically assess waiting room for patients in distress Alert waiting patients about potential delay
Medical assistants (runners)	Situate ill patient in designated resuscitation room Alert physicians and nurses of the emergency and the patient's location Bring all emergency equipment to the site of the emergency (if not already in the treatment room) Obtain initial set of vital signs If oxygen saturation is less than 93 percent, start oxygen by face mask Assist in code
Staff nurses	Act as medication nurse or code nurse in resuscitation
Physicians	Respond to call for assistance One physician to act as code team leader One physician to control airway One physician to assist in resuscitation and/or act as float physician
Checkout desk	When necessary, dial 9-1-1, give location and description of the emergency
Additional office staff	Keep flow of patients moving out of office

Adapted with permission from Toback S. Prepare your office for a medical emergency. Contemp Pediatr 2002;19:113.

the protocol or medical equipment can be identified and corrected.^{14,24}

A truly meaningful change in the way that a primary care office prepares itself for a medical emergency requires a change in the attitude of the entire staff. By properly equipping the office, educating staff, and practicing lifesaving skills, physicians can ensure that their patients receive essential care in office emergencies.

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