

# Volunteers in Plastic Surgery Guidelines for Providing Surgical Care for Children in the Less Developed World

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**Background:** A significant need is met by volunteer groups who provide free reconstructive plastic surgery for underserved children in developing countries. However, at present there are no consistent guidelines for volunteer groups in plastic surgery seeking to provide high-quality and safe care.

**Methods:** With these quality and safety standards in mind, in 2006, the Volunteers in Plastic Surgery Committee of the American Society of Plastic Surgeons/Plastic Surgery Educational Foundation undertook a project to develop a detailed set of guidelines for volunteer groups from developed countries seeking to provide plastic surgery services to children in developing countries. To make the guidelines include both surgical and anesthetic needs, they were developed in conjunction with the Society for Pediatric Anesthesia.

**Results:** Guidelines for the delivery of plastic surgery care by volunteer groups to developing countries have been reviewed and approved by the boards of both organizations (the American Society of Plastic Surgeons/Plastic Surgery Educational Foundation and the Society for Pediatric Anesthesia). These include guidelines for the initial site visit, site and patient selection, staff and equipment that should be available, and procedures that can be safely performed based on the site and available facilities. Guidelines for assessment of outcomes, dealing with adverse outcomes, and quality improvement are also provided.

**Conclusions:** Any plastic surgery group undertaking an international mission trip should be able to go to one source to find a detailed discussion of the perceived needs in providing high-quality, safe care for children. The present document was created to satisfy this need. (*Plast. Reconstr. Surg.* 127: 2477, 2011.)

It is essential for groups providing free reconstructive plastic surgery for the poor and underserved in developing countries to provide high-quality care, care that is comparable to that available in their own countries. These needs have most often been recognized in developing missions directed at the care of children with cleft lip–cleft palate. Previous

reports have addressed the objectives of cleft missions and emphasized the importance of creating local support and education for the future<sup>1</sup> and have made an effort to outline how a team can self-evaluate the effectiveness of their work.<sup>2</sup> Standards for volunteer missions are essential to the safe and effective execution of these trips.<sup>3,4</sup> In part because of the high quality of anesthesia care and excellent infrastructure that exist in developed countries, surgeons often underestimate anesthesia requirements in planning volunteer surgical missions. Whereas the standards for anesthesia care in developing countries have been described previously,<sup>5–7</sup> guidelines specifically directed to surgeons have not. On

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*Received for publication June 13, 2010; accepted August 25, 2010.*

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*DOI: 10.1097/PRS.0b013e3182131d2a*

**Disclosure:** *The authors have no financial interest to declare in relation to the content of this article. The article did not require external funding.*

review of the literature, we were not able to find one source that served as a guide to developing a volunteer program specific to the needs of plastic surgeons. Plastic surgeons are critical in organizing international charitable missions in their specialty, and readily available guidelines for the organization of such trips is essential to ongoing safety and patient care. Therefore, we present these guidelines in the present format to give them the greatest visibility for subsequent use by the plastic surgery community traveling to the third world for humanitarian purposes.

Many physicians, nurses, and other health care providers are involved in short-term surgical care of children in the less developed world. Care may involve a variety of procedures ranging from a cleft lip repair to a complex craniofacial reconstruction. Regardless of the type of care, the overriding goal always is the safety of the child. Patient safety can be optimized by careful selection of patients, facilities, procedures, equipment, and staff and by close coordination with host professionals and officials.

With these quality and safety standards in mind, in 2006, the Volunteers in Plastic Surgery Committee of the American Society of Plastic Surgeons/Plastic Surgery Educational Foundation undertook the development of guidelines to ensure quality and safe reconstructive plastic surgery when working in developing countries. This project required the expert input of internationally experienced anesthesiologists. The Society for Pediatric Anesthesia worked with Volunteers in Plastic Surgery in creating these guidelines. The final document has been reviewed and approved by the boards of both organizations.

This document is not intended to represent a standard that must be followed by everyone performing this work in developing countries. Locations, circumstances, and needs may vary greatly depending on the site. Rather, it is intended to provide a framework for providers involved in the care of children in the less developed world. The proposed guidelines are organized to briefly examine various aspects important to mission planning and organization, including the following:

1. Site visit
2. Facilities/site capabilities
3. Patient considerations
4. Procedure considerations
5. Staff needs
6. Equipment needs
7. Outcomes evaluation
8. Quality improvement
9. Adverse outcomes
10. Conclusion

The primary focus of these guidelines is patient safety and quality of care. Other important aspects of international charitable work such as cost, host relations, travel, logistics, and staff safety are not addressed. The ethics of international charitable work is another topic that merits further exploration and is beyond the scope of this article. We plan to address these ethical issues and conflicts that may arise from an ethical perspective in a subsequent document. This document is a general guideline, which can be modified by organizations, individual providers, and hospitals and may be adapted to many different situations, taking into consideration the resources available to the provider and the needs of the individual patient.

### SITE VISIT

Before any mission to a new location, a site visit should be undertaken by either an anesthesiologist or a surgeon with experience working in the developing world and with the organization involved. Sometimes, an invitation to provide service is extended because of a need for training local personnel in the organization of periodic missions, or in the particular surgical and nursing skills of a surgical subspecialty. In other instances, the goal is clearly to provide surgical services where none are otherwise available. The principal goals of the trip—training, education, or provision of service—should be mutually clear to the participants from both the visiting organization and the host site. A clearly articulated understanding of these goals will dictate many aspects of the trip, including resources to be mobilized, the expected level of involvement of visitor and host providers, and the local community's expectations for the outcome. The specific goals of the site visit are several and include the following:

1. Need: Is there a need for the service to be provided? Who requested the services to be provided, and what was the basis for their request?
2. Coordination: Are there other organizations providing the same service at or near the same time?
3. Facility: Does the facility have the space, services, staff, and equipment necessary to provide safe care to the type of patient for which you will be caring?
4. Logistical support: Is there food, housing, and transportation available for the team and for the patients and families?
5. Professional support: Are there members of the local professional community commit-

ted to assist in the care of the patients and provide follow-up care should it be necessary after the team departs?

6. Political support: Is the local government supportive of the work that is planned?
7. Team safety: Is the location safe to visit?

Each of these questions must be addressed fully before the team arrives for the mission so that care can be provided safely and efficiently during the mission and the organization is welcomed back in the future. Every individual and group involved in this type of care must recognize that the impression they leave behind has a profound effect on how future mission groups are viewed. Figure 1 is an example of a site evaluation form. When preparing for a mission, it is important to recognize that what may be appropriate for one site or patient or facility may not be for another. For example, providing care for an infant undergoing a complex craniofacial procedure is vastly different from repairing the cleft lip of a school-age child.

When evaluating patients and facilities and determining need for equipment and personnel, it is sometimes useful to divide patients and procedures into those that are complex and those that are noncomplex. Complex procedures (craniofacial repair) in complex patients (infants) require a different level of professional expertise (surgeon, anesthesiologist, intensivist), and facility (pediatric intensive care unit, blood bank, laboratory) than noncomplex procedures (cleft lip) in noncomplex patients such as American Society of Anesthesiologists Physical Status I patients (Table 1). These examples are very clear. However, the differences are often more subtle but no less important. It is clear that more complex patients and procedures are associated with greater anesthetic and surgical risk. Before taking on additional risk, teams must have sufficient professional expertise, equipment, and facilities. The terms complex and noncomplex are used throughout this document to assist in categorizing patients and facilities to clarify the requirements for the provision of the highest quality and safest care possible.

### FACILITIES/SITES

All facilities should meet basic standards such that there is availability of the equipment and support necessary to care for all patients regardless of whether they are complex or noncomplex. In situations where these standards are not met by

the facility, the team is required to bring with them the supplies and equipment necessary to meet these basic standards. Basic facility requirements include the following:

1. Electrical power that is dependable and continuous. Contingencies for failure should be considered.
2. Working, modern anesthesia machines that have been recently checked and calibrated.
3. Dependable oxygen supply for all care areas, including sufficient backup should the primary source fail.
4. Full-function monitoring for each patient in the operating rooms. Monitors should be capable of providing continuous evaluation of electrocardiography, blood pressure, arterial oxygen saturation, end-tidal carbon dioxide, and temperature. Pulse oximetry should be used, at least initially, for all children in the recovery area. Electrocardiography, noninvasive blood pressure, and pulse oximetry should be immediately available in all care areas.
5. Working suction should be present at each operating room table and in the recovery area and should be immediately available in all other care areas.
6. Basic laboratory and radiology services should be immediately available. Basic laboratory tests include those for hemoglobin and electrolytes.
7. Blood banking. The capability to transfuse either properly cross-matched, type-specific, or O-negative fresh whole blood or packed red blood cells should be available at all hours whenever the possibility of significant blood loss exists.

For organizations or teams intending to care for complex pediatric patients or to perform complex procedures, the following additional services or resources should be available:

1. Fully staffed and equipped pediatric intensive care.
2. Comprehensive on-site laboratory and radiology services.
3. Blood banking services available 24 hours/day.

### PATIENTS

Surgical and anesthetic risk is affected by a variety of factors related to the patient. Separating risk that can be attributed to anesthesia or to surgery is fraught with difficulty, and, for the purposes of this document, of somewhat limited value. All surgical and anesthetic procedures are accompanied by recognized risks. It is essential that all patients be informed of both the possible

**Evaluation Form**

Evaluator Name:	
Telephone:	Email:
Site Visited:	
(City)	(Province)
(Country)	
Date of Visit:	
<b>The following documents may be necessary:</b>	
1. Invitation letter from the local plastic surgeon and/or plastic surgeon society.	
2. Invitation letter from the hospital director.	
3. Invitation from the Ministry of Health (Regional and/or National).	
<b>PHYSICIANS:</b>	
Host Surgeon:	Specialty:
Telephone:	Fax:
Email:	Address:
English skill level:	
Surgeon(s) who will work with us:	
Specialty:	Telephone:
Fax:	Email:
Address:	
English skill level:	
Physician who will be doing patient follow up:	
Specialty:	Telephone:
Fax:	Email:
Address:	
English skill level:	
Telephone:	Fax:
Email:	English skill level:
Pediatrician(s) who will be working with us:	
Telephone:	Fax:
Email:	English skill level:
<b>HOSPITAL INFORMATION:</b>	
Hospital Name:	
Address:	
Public or Private:	University Affiliation:
Treat Adults:	Treat children (age limits):
Hospital administrator or contact:	
Telephone:	Fax:
Email:	
Would patients receive free hospitalization:	
If not, elaborate:	

**Fig. 1.** Evaluation form. *HIV*, human immunodeficiency virus; *HEP B*, hepatitis B; *OR*, operating room; *PACU*, postanesthesia care unit; *ICU*, intensive care unit; *PO*, oral; *IV*, intravenous; *IM*, intramuscular; *I&O*, intake and output.

adverse outcomes and reasonable surgical expectations. Based on the available literature, there are several factors that are widely recognized as contributing to risk. They include the following:

1. Age: Multiple publications using a variety of endpoints have identified age as a significant risk factor in children. Most use either death or cardiac arrest as endpoints and suggest that neo-

Services needed (include numbers if possible):	
Cleft Lip:	Cleft Palate:
Burns:	Hand Surgery:
Other:	
How are patients recruited:	
Are most patients local or from elsewhere:	
Can patients be admitted the night before surgery:	
Local accommodations for those from far away:	
What is the literacy of families (re: post-op instructions):	
Who:	When:
Where:	
Other hospitals in area and type (Pediatric):	
Do these hospitals do cleft/burn work: Charge?	
<b>LOCAL CIRCUMSTANCES:</b>	
Who will coordinate local support:	
Title:	Telephone:
Fax:	Email:
Important local government officials:	
Other community support (e.g. clubs):	
Will help with the following be provided:	
Visas:	Customs:
Transportation from hotel to hospital (how much):	
Local translators for whole trip (2-3):	
Will we have to pay them (how much):	
Do local people speak a language different from the national language (if so what):	When:
Are translators available for this language:	
What time of year is best to come and why:	
Are there national holidays to be avoided:	
Airlines that fly to this site:	
Hotel Name:	
Fax:	Telephone:
Price per double:	Email:
Hot water:	
Reasonable toilets:	
Safe to walk from hotel to hospital at night:	
If needed, is transportation available at night:	
Hotel contact name:	
Telephone:	Fax:
Email:	
Are there adequate restaurants locally:	

**Fig. 1. (Continued)**

2. Coexisting disease: Children with significant heart disease, lung disease, neuromuscular disease, or metabolic or syndromic abnormalities have been repeatedly shown to be at increased risk. Studies using the American Society of Anesthesiologists Physical Status Classification system suggest that risk increases for children with an American Soci-

Is the city physically safe for foreigners:		
Are there local sights for R&R:		
General local assessment:		
<b>HOSPITAL FACILITIES:</b>		
# of hospital beds:		Is the clinic area adequate:
# of rooms:		X-ray available:
Laboratory available:		
HIV Testing?		
HEP B Testing?		
Blood T&C available:		
Hospital ward size:		Pediatric Ward:
Distance from OR/PACU:		
All patients in one ward:		
If no, how many wards?		
Is there a separate pediatric ward:		
Is there transport provided from the ward to the OR:		
Are nurses on duty 24 hours:		
How many nurses?		
What is the approximate nurse/patient ration (esp. at night):		
Is there an M.D. in the hospital at night:		
Pediatrician?		
Does the hospital have an ICU:		
M.D. present?		
Pediatrician present?		
Are the following nurse assessments available:		
Vital signs		Wound:
Pain:		LOC
Respiratory Status:		Neurovascular changes:
Are the following nurse interventions available:		
Monitor IV:		Start IV:
Change IV:		
Administer pain meds:		
Oral:	IV:	IM:
Administer antibiotics:		Suctioning:
Oxygen:		Air positioning:
PO Fluids:		I&O
Is there oxygen available on the ward:		
Are there telephones on the ward:		
Will there be an English speaking nurse or doctor:		
Will they be able to contact the team in the event of an emergency:		
Can cell phones be rented:		
Name of head ward nurse:		Contact Info:
Can supplies be purchased locally:		
IV Fluids:		Sutures:

Fig. 1. (Continued)

- ety of Anesthesiologists Physical Status Classification of 3 or greater (Table 1).
3. Intercurrent illness: Children who are ill, especially those with upper respiratory tract infections, are known to be at increased risk for perioperative respiratory complications. The magnitude of the risk varies depending on factors such as procedure, airway management, and age. Those children with known lower respiratory tract infections and/or a febrile illness are clearly not appropriate candidates for elective procedures.
  4. Poor nutrition: Although studies performed in developed countries typically do not ex-

- amine nutrition as a risk factor, it is widely recognized that nutritional status is a marker for chronic disease in children. Failure to achieve milestones for height, weight, and head circumference appropriate to the setting should be considered a marker of elevated risk, especially in young children. The presence of anemia may also be a marker of poor nutrition and thus associated with increased risk. Hemoglobin values less than 10 g/dl have traditionally been used as a lower limit, although data to support this are lacking.
5. Airway abnormalities: Although congenital and acquired anomalies are known to in-

Narcotics (which ones):	
General hospital assessment:	
<b>OPERATING ROOM</b>	
Head Nurse or OR Director:	
Telephone:	Fax:
Email:	
# of ORs available:	
Will scrub techs be provided for each table:	
Are "flash" autoclaves available:	
How long is the cycle?	
Separate equipment room that can be locked:	
Defibrillator in OR:	
Electrical Power:	
If 220v to 250v, are step-down transformers available:	
Is there a generator for power outages:	
Can we work on Saturday?	
Can lunch be provided for the team each day (cost):	
OR#:	Size (S/M/L):
Table type:	OR light type:
Wall oxygen:	Wall nitrous:
Wall suction:	
Anesthesia Equipment:	
Anesthesia Machine:	
Vaporizer:	Exhaust system:
How many power outlets:	
Will two tables fit in room?	
General assessment of OR:	
PACU:	
Types of beds (e.g., adult w/rails, cribs):	
# of beds:	
Proximity to Ward:	
Wall suction:	
What type of lighting is in the PACU (adequate to start IV):	
<b>PHOTOGRAPH FOR THE REPORT: ELECTRICAL OUTLETS, ANESTHESIA MACHINES, AND ANYTHING ELSE DEEMED UNUSUAL OR PERTINENT</b>	
<b>EDUCATION:</b>	
Local institutions:	
Medical School:	
Contacts for both/either:	
Telephone:	
Email:	
Are there residents (number):	
General surgery:	
Orthopedic Surgery:	

**Fig. 1. (Continued)**

crease risk, those specific to the airway are of particular concern.

6. **Timing:** It is important to recognize that virtually every study of risk has demonstrated that emergency procedures and procedures performed during off hours carry increased risk.

Based on the above considerations, complex anesthesia patients are those pediatric patients who have one or more of the following:

1. Age younger than 1 year.
2. American Society of Anesthesiologists Physical Status of 3 or greater.

3. **Poor nutrition:** Children that are obviously malnourished, in that height, weight, or head circumference is well below that expected for age.
4. A hemoglobin value less than 10 g/dl (greater at altitude).
5. Significant airway anomalies.

**PROCEDURES**

Certain complex surgical lesions are in general not appropriate for mission surgery. Examples include patients with cleft lips and/or palates that are associated with other significant congenital anomalies or complex syndromes known to be

Pediatrics:	
Are lectures desired (with topics):	
Plastic Surgery:	
Nursing:	
Facilities & equipment:	
Lecture room (size):	
Power Point:	
Screen:	
Contacts for education:	
Name:	Speak English:
Specialty:	Email:
Telephone:	Fax:
<b>OVERALL KEY CONTACTS (from above or others):</b>	
Name:	Title:
Speak English:	Email:
Telephone:	Fax:

<b>THE FINAL REPORT SHOULD BE IN A NARRATIVE FORM WITH PERTINENT PHOTOS INCORPORATED INTO THE BODY OF THE TEXT.</b>
<b>ATTACH OR COPY ALL PERTINENT BUSINESS CARDS HERE:</b>

Fig. 1. (Continued)

**Table 1. American Society of Anesthesiologists Physical Status Classification System**

Physical Status	Definition
1	A normal healthy patient
2	A patient with mild systemic disease
3	A patient with severe systemic disease
4	A patient with severe systemic disease that is a constant threat to life
5	A moribund patient who is not expected to survive without the operation
6	A declared brain-dead patient whose organs are being removed for donor purposes

associated with substantially elevated surgical or anesthetic risk, patients who require a tongue flap to close a palatal fistula, pollicization of the thumb, extensive skin grafting where excessive bleeding is likely, microtia requiring rib graft, or entry of the abdominal or thoracic cavity. Those groups intending to perform procedures such as pharyngeal flap surgery or sphincteroplasty and/or microsurgery must ensure that proper personnel, equipment, and facilities are available and that patient selection is appropriate. In addition, taking on procedures that are associated with significant risk of blood loss, such as cleft palate repair, in patients with starting hemoglobin values of less than 10 g/dl is not appropriate for most mission settings. When planning procedures for secondary surgical treatment of patients with velopharyngeal incompetence, consideration should be given to whether speech therapy follow-up is available locally.

### STAFF

Selection of professional staff appropriate for the patient, procedure, and setting is critical to safety and quality of care. As with facilities, there are basic requirements for professional staff that apply regardless of the complexity of the procedure or the patient. All professional staff should have an active license as appropriate to their specified role. Every team should include the following:

1. Surgeon(s):
  - a. Those providing surgical care should be familiar with the planned procedure(s) such that they demonstrate competence in these procedures.
  - b. Surgeons should be board certified/eligible in a surgical specialty or non-U.S. equivalent appropriate to the planned procedure(s).
2. Anesthesiologist(s):
  - a. At least one anesthesiologist should be included as a part of all surgical teams.
  - b. Anesthesiologists should be experienced in the care of children such that he or she cares for children undergoing the same or similar procedures as a significant part of his or her regular practice.
  - c. Anesthesiologists should be board certified/eligible by the American Board of Anesthesiology or its non-U.S. equivalent.
  - d. In general, anesthesiologists should supervise no more than two procedures at any given time. However, a ratio of 3:1 may at times be appropriate.

3. Certified Nurse Anesthetist(s):
  - a. Certified nurse anesthetists can be an integral part of the anesthesia care team and may provide direct anesthesia care under the supervision of an anesthesiologist with the qualifications listed above.
  - b. As with anesthesiologists, certified nurse anesthetists should be appropriately certified and experienced in the care of children undergoing the same or similar procedures.
4. Pediatrician(s):
  - a. Each team should include a pediatrician, family physician, or other physician experienced in perioperative evaluation and care of children undergoing the same or similar procedures.
  - b. Physicians should be board certified/eligible by the American Board of Pediatrics, American Board of Family Physicians, or the non-U.S. equivalent.
5. Nursing:
  - a. Operating room, recovery area, and ward nurses should be experienced in the care of children appropriate to their role as a member of the team. Recommendations for appropriate staffing ratios are included below. Ratios are primarily dependent on the number of operating tables that are to be used. In general, the following are appropriate:
    - i. Surgeons: One for each operating table.
    - ii. Anesthesia providers: One for each operating table plus at least one anesthesiologist free to supervise and assist.
    - iii. At least one free anesthesiologist for every four operating tables such that at least one anesthesiologist is always free to assist in any room, postanesthesia care unit, or ward. If the postanesthesia care unit is not staffed separately with either a pediatric intensivist or anesthesiologist it should, for staffing purposes, be considered an additional room.
    - iv. Pediatrician, family physician, or other experienced perioperative physician: one for each mission.
    - v. Pediatric intensivist for missions involving complex procedures or patients.
    - vi. Postanesthesia care unit nursing: A ratio of one nurse for every two operating tables; a minimum of two postanesthesia care unit nurses.

When planning for missions that involve complex procedures or when patients' staffing

needs are increased, it is suggested that a pediatric anesthesiologist be included as a part of any mission that involves the care of pediatric patients with any one or more of the risk factors listed above. A pediatric anesthesiologist should also be included when procedures that may be considered complex are planned. Missions involving pediatric patients or procedures that may reasonably require postoperative intensive care should include a pediatric intensivist and nurses experienced in pediatric critical care. Consideration should also be given to including a pediatric respiratory therapist if the need for mechanical ventilation is expected.

### EQUIPMENT

Teams performing procedures in the less developed world should expect to provide all of the equipment and supplies needed to perform the intended procedures. Care should be exercised when using supplies or medications purchased in the host country, especially if they are not in English or if they are unfamiliar drugs. In general, the supplies and equipment needed in a developing world hospital are not different from those needed in a modern hospital. As is expected when practicing in more developed countries, medications, disposables, and other items should be single-use items. Items normally disposed of at home should not be reused by the team when caring for children in other countries. Recommended equipment required to care for any child includes but is not limited to the following (items designated by asterisks are essential for those teams caring for complex patients or performing some complex procedures):

- Modern functional anesthesia machine with a calibrated vaporizer (sevoflurane is preferred)
- Functional mechanical ventilator capable of ventilating pediatric patients\*
- Multifunction patient monitors that have the following capabilities:
  - Appropriate laryngoscopes and blades
  - Laryngeal mask airways
  - Continuous multilead electrocardiograph
  - Automated blood pressure
  - Pulse oximetry
  - Temperature
  - End-tidal carbon dioxide
  - Invasive blood pressure monitoring capability\*



- Airway equipment including:
  - Appropriate laryngoscopes and blades
  - Laryngeal mask airways
  - Self-inflating bag-valve-mask in all care areas
  - Emergency cricothyroidotomy kit
  - Fiberoptic bronchoscope
- Emergency medications
  - Pressors (e.g., dopamine, epinephrine, vasopressin)
  - Antidysrhythmics (e.g., lidocaine, esmolol, adenosine, verapamil, digoxin, amiodarone)
  - Atropine
  - Succinylcholine
  - Dantrolene
  - Sodium bicarbonate
  - Calcium gluconate
  - Diphenhydramine
  - Dexamethasone
  - Naloxone
  - Furosemide
  - Magnesium sulfate
  - Broad-spectrum antibiotics (ceftriaxone, gentamicin)
- HIV starter kit
- Emergency vascular access
  - Intraosseous needles
  - Central venous line kits
  - Arterial line kit\*
- Other items
  - Medication infusion pumps\*
  - Defibrillator
  - Portable pulse oximetry
  - Stat laboratory (I-stat)\*
  - Portable oxygen supply

### OUTCOMES

Trip planning should anticipate the need for follow-up of patients postoperatively to monitor surgical outcome, address surgical complications, and track all perioperative complications. This would best comprise a physician and at least one medical support professional that are present with the team and that understand postoperative management. Personnel located in the local region with appropriate skills for following up postoperative care should be identified and trained to report all postoperative outcomes to the sponsoring agency's medical supervisors.

### QUALITY IMPROVEMENT

It is strongly recommended that every organization develop a means of collecting quality im-

provement data. Data that should be monitored might include the following:

1. Critical events, such as cardiac arrest, respiratory failure, and death; unanticipated escalation in level of care (postoperative ventilatory support, intensive care unit-equivalent care), unanticipated need for transfusion, life-threatening emergencies, or return to the operating room to manage complications.
2. Anesthesia quality markers, such as unanticipated difficult intubation, laryngospasm requiring reintubation, postanesthesia care unit reintubation, bronchospasm, cancellation after induction of anesthesia, and others.
3. Specific surgical complications, such as wound infection, dehiscence, and others.

### ADVERSE OUTCOMES

Organizations should have an understanding of how adverse outcomes will be managed that reflects cultural issues, the political climate of the local facility and medical staff, and honest and thorough medical care. Examples of adverse outcomes would include death, serious injury, medical evacuation, or unanticipated intensive care unit care. It is suggested that a written plan for managing these situations be formulated by each organization.

### ENDORSEMENTS

Once completed, these guidelines were circulated to many societies and organizations that conduct reconstructive plastic surgery in developing countries. Specifically, they were reviewed and endorsed by the boards of the American Society of Plastic Surgeons, the Plastic Surgery Educational Foundation, the Society for Pediatric Anesthesia, the American Cleft Palate–Craniofacial Association, the American Society of Maxillofacial Surgeons, the European Society of Plastic Reconstructive and Aesthetic Surgery, and the American Association for Hand Surgery. Interplast, Operation Smile International, and Smile Train have also endorsed the guidelines.

### CONCLUSIONS

The recommendations contained within this document are guidelines and therefore not intended to be comprehensive requirements and do not represent a “how-to” manual for those wishing to participate in this type of practice. Rather, the guidelines are an attempt to provide accepted criteria to which both teams and hosts may refer when undertaking care for children in

a cooperative arrangement. Safety should always be the primary concern of all who participate in this immensely rewarding work.

It is hoped that these guidelines will serve the common goal of the safest care possible for every child. The long-term goal of this endeavor is to provide these guidelines so that anyone undertaking an international mission trip might be able to go to one source to find a detailed discussion of the perceived needs in providing high-quality, safe care. It is also the authors' desire for this document to be reviewed by other national organizations involved in performing this important work with the idea that they too might approve and support the widespread acceptance and distribution of these guidelines.

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#### ACKNOWLEDGMENTS

The authors thank George A. Gregory, M.D., of the Department of Anesthesia and Perioperative Care, Univer-

sity of California, San Francisco, and Quentin A. Fisher, M.D., of the Department of Anesthesia, Georgetown University Hospital, Washington, D.C., for contributions in providing safety guidelines for anesthetic management.

#### REFERENCES

1. Yeow VK, Lee ST, Lambrecht TJ, et al. International Task Force on Volunteer Cleft Missions. *J Craniofac Surg.* 2002;13:18–25.
2. Eberlin KR, Zaleski KL, Snyder HD, Hamdan US; Medical Missions for Children. Quality assurance guidelines for surgical outreach programs: A 20-year experience. *Cleft Palate Craniofac J.* 2008;45:246–255.
3. Maki J, Qualls M, White B, Kleefield S, Crone R. Health impact assessment and short-term medical missions: A method study to evaluate quality of care. *BMC Health Serv Res.* 2008;8:121.
4. Smoot ED III, Johnson M, Graham DR, Draper GA. Operating safely in an underdeveloped country. *Cleft Palate Craniofac J.* 1992;29:444–450.
5. Fisher QA, Politis GD, Tobias JD, Proctor LT, Samandari-Stevenson R, Samuels P. Pediatric anesthesia for voluntary services abroad. *Anesth Analg.* 2002;95:336–350.
6. Fisher QA, Nichols D, Stewart FC, Finley GA, Magee WP Jr, Nelson K. Assessing pediatric anesthesia practices for volunteer medical services abroad. *Anesthesiology* 2001;95:1315–1322.
7. Politis GD, Schneider WJ, Van Beek AL, et al. Guidelines for pediatric perioperative care during short term plastic reconstructive surgical projects in less developed nations. *Anesth Analg.* 2011;112:183–190.

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The *Journal* seeks to publish historical photographs that pertain to plastic and reconstructive surgery. We are interested in the following subject areas:

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- Meetings/gatherings of plastic surgeons
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- Early surgical instruments and devices

Please send your *high-resolution* photographs, along with a brief picture caption, via email to the Journal Editorial Office (ds\_prs@plasticsurgery.org). Photographs will be chosen and published at the Editor-in-Chief's discretion.