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Guidelines and checklists for short-term missions in global pediatric surgery: Recommendations from the American Academy of Pediatrics Delivery of Surgical Care Global Health Subcommittee, American Pediatric Surgical Association Global Pediatric Surgery Committee, Society for Pediatric Anesthesia Committee on International Education and Service, and American Pediatric Surgical Nurses Association, Inc. Global Health Special Interest Group



Marilyn Butler ^a, Elizabeth Drum ^b, Faye M. Evans ^c, Tamara Fitzgerald ^d, Jason Fraser ^e, Ai-Xuan Holterman ^f, Howard Jen ^g, J. Matthew Kynes ^h, Jenny Kreiss ⁱ, Craig D. McClain ^c, Mark Newton ^h, Benedict Nwomeh ^j, James O'Neill ^k, Doruk Ozgediz ^{l,*}, George Politis ^m, Henry Rice ^d, David Rothstein ⁿ, Julie Sanchez ^o, Mark Singleton ^p, Francine S. Yudkowitz ^q

^a Division of Pediatric Surgery, Department of Surgery, Oregon Health & Science University

^b Department of Anesthesiology & Critical Care Medicine, The Children's Hospital of Philadelphia, University of Pennsylvania

^c Department of Anesthesiology, Perioperative and Pain Medicine, Boston Children's Hospital, Harvard Medical School

^d Division of Pediatric Surgery, Duke University

^e Department of Pediatric Surgery, Children's Mercy Hospital, Kansas City

^f Division of Pediatric Surgery, University of Illinois College of Medicine at Peoria

^g Division of Pediatric Surgery, University of California, Los Angeles

^h Department of Anesthesia, Vanderbilt Children's Hospital, Vanderbilt University

ⁱ Division of Pediatric Surgery, Seattle Children's Hospital

^j Department of Pediatric Surgery, Nationwide Children's Hospital, Columbus, OH

^k Department of Pediatric Surgery, Vanderbilt University

^l Section of Pediatric Surgery, Yale University

^m Department of Anesthesiology, University of Virginia Health System

ⁿ Division of Pediatric Surgery, Children's Hospital of Buffalo

^o Division of Pediatric Surgery, University of Texas at Austin

^p Department of Anesthesiology, Perioperative and Pain Medicine, Stanford University School of Medicine, Department of Anesthesia and Perioperative Care, University of California San Francisco

^q Department of Anesthesia, The Mount Sinai Hospital

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ABSTRACT

Introduction: Pediatric surgeons, anesthesia providers, and nurses from North America and other high-income countries (HICs) are increasingly engaged in resource-limited areas, with short-term missions (STMs) as the most common form of involvement. However, consensus recommendations currently do not exist for STMs in pediatric general surgery and associated perioperative care.

Methods: The American Academy of Pediatrics (AAP) Delivery of Surgical Care Subcommittee and American Pediatric Surgical Association (APSA) Global Pediatric Surgery Committee, with the American Pediatric Surgical Nurses Association, Inc. (APSNA) Global Health Special Interest Group, and the Society for Pediatric Anesthesia (SPA) Committee on International Education and Service generated consensus recommendations for STMs based on extensive experience with STMs.

Results: Three distinct, but related areas were identified: 1) Broad goals of surgical partnerships between HICs and low and middle-income countries (LMICs). A previous set of guidelines published by the Global Paediatric Surgery Network Collaborative (GPSN), was endorsed by all groups; 2) Guidelines for the conduct of STMs were developed, including planning, in-country perioperative patient care, post-trip follow-up, and sustainability; 3) travel and safety considerations critical to STM success were enumerated.

* Corresponding author at: Yale School of Medicine, New Haven, CT 06520.

E-mail address: Doruk.Ozgediz@yale.edu (D. Ozgediz).

Conclusion: A diverse group of stakeholders developed these guidelines for STMs in LMICs. These guidelines may be a useful tool to ensure safe, responsible, and ethical STMs given increasing engagement of HIC providers in this work.

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Children's surgical and perioperative care providers from North America and other high-income countries (HICs) are increasingly engaged on a global scale in resource-limited areas, with short-term missions (STMs) as the most common form of involvement. While many cadres are involved in care provision, this work will focus primarily on pediatric surgeons, anesthesia providers, and nurses. Many surgical specialties have developed their own guidelines for successful STMs, with recommendations from HIC and low and middle-income country (LMIC) perspectives and groups within children's and adult surgery [1–15]. However, no consensus recommendations currently exist for pediatric general surgery and associated perioperative care.

1. Methods

The American Academy of Pediatrics (AAP) Delivery of Surgical Care Global Health Subcommittee and American Pediatric Surgical

Association (APSA) Global Pediatric Surgery Committee, with the American Pediatric Surgical Nurses Association, Inc. (APSNA) Global Health Special Interest Group, generated consensus recommendations based on extensive experience with STMs. These groups also collaborated with the Society for Pediatric Anesthesia (SPA) Committee on International Education and Service for more detailed input for safe anesthesia and perioperative care.

2. Results

Through an iterative process, three distinct, but related areas were identified for consideration:

- 1) Overarching, broad goals of surgical partnerships between HICs and LMICs. A previous set of guidelines developed by the Global Paediatric Surgery Network Collaborative (GPSN), representing a broad

group of pediatric surgeons from both HICs and LMICs (Butler et al. 2015) has been published. [16] Although more recent global surgery partnership recommendations have been made since that publication, we continue to endorse the GPSN guidelines as being the most applicable for pediatric surgical collaborations and STMs [17]. These guidelines include needs assessments, acknowledgement of roles and mutual benefits, and logistical aspects.

- 2) Guidelines for the conduct of STMs, broadly encompassing the planning stages, in-country perioperative patient care, post-trip follow-up, and need for sustainability.
- 3) Important travel and safety considerations that are frequently overlooked and which are important to ensure mission success.

Given the broad support for the existing GPSN guidelines, the remainder of this manuscript specifically details our recommendations in areas 2) and 3) along with a list of relevant resources [18–29]. Appendix 1 includes a checklist for each of the sections mentioned above for easy reference.

3. Guidelines for STMs

3.1. Personal motivations and goals

- Consider your own personal motivations.
- Make a determination to go as an individual or part of a team, based on the needs and expectations of the host.
- When working with an established organization, become familiar with its existing programs and expectations. Contact prior volunteers for advice. If you will be traveling alone, contact the surgical, anesthesia, and nursing leads in the country you will be visiting.

3.2. Initial planning

- Identify the purpose of your trip (service and/or education), and set realistic goals in collaboration with your hosts. Discuss surgical safety and quality, and acknowledge that high standards will be followed. Overemphasizing case volume may detract from teaching, sustainable change, and patient safety, and remember that a worthy goal is development of long-term relationships.
- Discuss the inclusion of workshops to benefit other health care professionals in addition to the operative team, such as a nursing education program to meet the self-identified learning needs of host nurses. If the local request is for clinical service only, consider whether this fits with your goals.
- Go when and where you are needed. Work with local hosts to determine convenient dates to minimize disruption of local hospital work flow. Avoid dates that conflict with local holidays. Discuss with the host team if other individuals or groups have recently visited, as a rapid sequence of groups can overwhelm the resources of the facility. Keep in mind that local operative capacity is generally limited in scope.
- For team-based mission trips, assign surgery, anesthesia, and nursing leaders. Identify a local contact person for each of these areas, and exchange contact information for pretrip planning.
- Work with local partners in surgery, anesthesia, and nursing to determine the appropriate volume and type of operative cases to be performed, as well as appropriate patient age ranges. Discuss the possibility of pretrip consultation (via email or teleconference) to discuss the feasibility by case type, especially if assistance with more complex cases is requested.
- Obtain appropriate licensing and liability insurance if not covered otherwise, and ensure your malpractice insurance will cover your activity.
- Find out if a letter from the collaborating hospital or institution, as well as the government, will be required to facilitate the trip.

3.3. Pretrip assessment (consider making checklists)

Determine the availability of local resources and feasibility of the mission by discussing with local team leaders and when possible consulting with other clinicians who have recently worked at the facility. A **premission site visit** is indispensable and the scope of the first trip should be carefully **limited**.

3.3.1. Hospital infrastructure

- **Electricity:** Determine the power source and if it is dependable. Assess if there is a backup generator, what type of fuel it uses, and whether it is functioning and has been tested. Ask about surge protection and if electrical devices have battery back-up.
- **Water source:** Determine if the water source is clean, dependable, and if there is back-up water storage.
- **Oxygen capacity:** Assess the oxygen supply source (central supply versus tanks). Ensure an adequate number of tanks and regulators for the tank system. Oxygen is needed in the operating room (OR), Post-Anesthesia Care Unit (PACU) and hospital ward. Check the supply of masks, tubing, humidification capability and oxygen monitors.
- **Operating Room Capacity:** Determine the number of functioning operating rooms available to the mission team, and ensure that this use does not interfere with ongoing work of the local surgeons.
- **PACU:** Assess the proximity to the operating rooms, as well as the number of beds, availability of functional oxygen, suction, and monitoring equipment. Assess the availability of equipment and supplies, particularly for pediatric patients.
- **Staffed Postop Beds:** Be aware that ward beds available for postoperative care may be limited.
- **Security, Transportation, Language:** Assess the availability of in-country drivers, security personnel, and local translators (if needed).

3.3.2. General operating room equipment

- Determine what equipment and supplies are needed on site.
- Consider the following suggested equipment assessment:
 - Appropriate instruments and appropriate sutures, neonatal size consumables such as chest tubes, Foley catheters, and feeding tubes
 - Autoclave process, including the capacity to sterilize instruments between cases.
 - Availability and reliability of electrocautery and grounding pads
 - Availability of fluoroscopy/x-ray
 - Availability of functioning endoscopy equipment
 - Availability of casting supplies
 - Availability of dilators, muscle stimulators
- Consider innovative solutions (without compromising safety) in situations where equipment is unavailable such as:
 - Utilizing an anesthesia nerve stimulator and thermostat wire when a surgical muscle stimulator is not available
 - Using a battery-operated light-emitting diode (LED) camping headlight
- If there is a need for specialized equipment, clarify how these items will be used to comply with international guidelines for donation, and evaluate the local capacity for equipment maintenance.
- Assess local policies on donations: Many institutions and governments do not allow donations of expired supplies (including electrocautery tips, gowns, gloves, medications, and sutures). Some require 6 months minimum validity from time of entry. Other facilities “sterilize” and reuse expired and disposable supplies.

3.3.3. Specific anesthesia considerations

3.3.3.1. Equipment and Supplies.

- Consider bringing equipment and supplies that are deemed “essential” and might not be available or in limited supply at the host site. Ensure they are compatible with what is available at the facility, and

consider leaving equipment as a donation (discuss this in advance with your hospital) and replacing local supplies to avoid depletion of host resources. Do not leave anything for which maintenance would be prohibitively expensive.

- **Monitors:** Assure that continuous evaluation of electrocardiography, noninvasive blood pressure, arterial oxygen saturation, end-tidal carbon dioxide, and temperature is available in each functional operating room and PACU. If not available locally, the team should plan to bring its own portable monitors and precordial stethoscopes. Electrocardiography, noninvasive blood pressure, and pulse oximetry should be immediately available in all other care areas.
- **Anesthesia equipment:** Assess the type and functional status of the anesthesia machines. (Obtaining a picture of the anesthesia machines may be helpful in the planning.) It is not uncommon for groups to bring their own simple machines as a backup. Determine the mechanism used to fill vaporizers, especially if you are planning on bringing inhaled anesthetic agents with you.
- In addition to the anesthesia machine, assess:
 - Availability of functional defibrillator including power supply and battery operation
 - Immediate availability of working suction, which may be shared, if necessary intraoperatively, by surgery and anesthesia teams
 - Availability of fresh CO₂ absorbent
- **Layout:** Assess the layout of the OR area for security and number of operating rooms, and proximity of PACU. There may be limited areas for preoperative preparation, postoperative care, and family waiting. If possible, designate a lounge for resting and refreshments. If supplies are brought, locate a secure area for storage.
- Determine availability of the following supplies and consider bringing what is not obtainable:
 - **Airway:** Endotracheal tubes (ETTs) of various sizes, masks, oral/nasopharyngeal airways, laryngeal mask airways (LMAs), laryngoscopes with appropriately sized blades, suction catheters and tubing, and nasogastric tubes.
 - **Intravenous access (IV):** Cannulas, tape, adhesive film dressings, IV administration sets (eg. Volutrol, Buretrol etc.) for adults and pediatrics, fluids (determine what types and volumes are available), and various sized syringes and needles.
 - Regional and neuraxial needles, if necessary.
- **Medications:**
 - Assess the ability to source controlled and noncontrolled medications at the facility or in a local pharmacy. Bringing unexpired controlled and uncontrolled substances in your hand luggage is possible with special authorization by both home and host countries but can lead to prolonged detention by customs agents. *Do not bring expired medications.* Many countries require a minimum validity period of 6 months from time of entry for medicines, as mentioned earlier for supplies, and this should be clarified. Also, clarify local practice for reconciling controlled drugs, and adhere to these rules. Disposal costs of expired items may be levied against the host institution and these costs may require reimbursement.
 - Determine availability of the following medications: Resuscitation drugs such as vasopressors, IV and volatile anesthetics, local anesthetics, neuromuscular blockers including succinylcholine, reversal agents, antiemetics, antibiotics, narcotics, benzodiazepines, nonopioid analgesics, and antagonists. Required additional medications may depend on the type of surgery planned (eg., antifibrinolytics for scoliosis repair). Consider bringing dantrolene if no local source is available, and intralipid if bupivacaine is being brought or used. Some providers routinely bring vials of local anesthetic to assist with postoperative analgesia especially if local supply is limited.

3.3.3.2. Anesthesia-related human resources.

- Clarify whether visiting anesthesia team members will be providing anesthesia care, assisting local providers, teaching local providers or some combination thereof.

- Assess the number and availability of local anesthesia providers (physicians and nonphysicians), PACU nurses, OR managers, anesthesia technicians, cleaners for ORs and anesthesia equipment, translators, porters, High Dependency Units (HDU) and Pediatric Intensive Care Unit (PICU) nursing, and pediatricians (floor and PICU).
- Ascertain standards for context-appropriate documentation including preoperative anesthesia assessment, anesthesia consent, required preoperative lab testing, intraoperative record keeping, and PACU orders. Determine or establish the policies for having clean operating rooms available for the first case of the day if emergency cases have been done at night. Determine or establish the protocol and checklist for the preoperative “time out”.

3.3.4. Laboratory services

- At a minimum, laboratory services should be able to provide hemoglobin and electrolyte assessment.
 - Confirm availability of lab testing to facilitate planned surgeries (e.g., arterial blood gases)
 - If operating on infants <3 months, assure that perioperative serum glucose monitoring is available.
- **Blood Bank:** Locate the nearest blood bank. Determine what blood products are routinely stored and whether supply will be adequate.
- **Radiology:** Determine what services are routinely available.
- **Pathology:** Assess the capacity for frozen sections or specialized staining for complex diagnoses (e.g. Hirschsprung’s disease and tumors). Determine alternatives if necessary.
- Assess the availability of rapid HIV testing (preferably testing for both the HIV antibody and p24 antigen). Ensure that postexposure HIV prophylaxis is available, or bring such medications with you.

3.3.5. Facilities for perioperative care

- Determine whether there is capacity to admit patients preoperatively.
- Determine what is the postoperative capacity of the hospital.
- Be aware that there might be limited monitoring, nursing, and medical personnel to care for patients in the recovery room and on the wards.
- **Neonates:** Determine whether appropriate specialty staff is available for perioperative care. Assess the capabilities for monitoring and mechanical ventilation of newborns. Consider transfer options if necessary.
- **Intensive Care and Step-Down Unit Capability:** Determine whether appropriate specialty staff is available for perioperative care. Assure that appropriate-level intensive care units with monitors and ventilators are available for patients that might remain intubated postoperatively.
- **Nutrition:** Determine whether meals are provided for patients and if food is available for purchase. Determine whether parenteral nutrition is available.
- **Availability of ancillary care:** Evaluate local capacity for treatment of diseases that require multi-modal therapy with the involvement of other specialists (e.g. chemotherapy, radiation therapy, physical therapy), and if not available, identify where this care can be obtained.
- **Follow-up:** Determine who will care for the patients and address complications after the mission has ended.

3.3.6. Specific nursing considerations

- Pretrip, consider the pre- and postoperative nursing needs of the selected population and cases planned. Consider availability of thermometers, wound dressings, irrigation supplies, ostomy bags.
- Make separate supply lists for inpatient and outpatient needs.
- Consider personal protective equipment (eg. gloves, hand wipes).
- Consider nursing documentation needs, as host-language forms may not be useful to visiting team nurses. Develop and bring postop assessment forms, clinic visit notes.
- Consider reliable identification of patients. Host country may not have or use ID bands and bed assignments can be fluid.

- Consider assignment of visiting team nurses to both ICU and ward.
- Connect with the host head nurse to determine the best time and place for host nursing education.
- If visiting nurse teaching of host nurses is planned, consider laminated pictorial education materials. Have interpretation available if needed.
- Request 1–2 host nurses work directly with visiting nurses for hands-on learning of specific skills, i.e. rectal irrigations, ostomy care. Pair-up from the start for best transfer of nursing skills.
- Request as much interpretation as possible, especially if visiting nurses are planning to do patient/family education. Laminated pictorial education sheets are very helpful.

3.3.7. Miscellaneous

- Assess local communication capability (e.g. availability and locations of telephone and internet access).

3.4. Mission volunteers

- Ensure that team leaders (surgery, anesthesia, nursing, equipment management) work together for premission planning.
- Determine sources of funding for mission, including travel and lodging. Most trips for volunteers are self-funded.
- Clarify roles for all participants. If trainees (medical students/residents) will be participating in your trip, several points should be considered:
 - i. A well-planned, ethical short-term experience can be a transformative educational event for trainees
 - ii. Their abilities should be appropriately utilized to ensure quality patient care. Trainees can make substantial positive contributions to many elements of a successful short-term mission. However, patients in these settings are not meant to provide added experience for trainees.
 - iii. If you work in a setting with local trainees or students, priority should be given to their education (local trainees should not have to 'compete' for their training opportunities with visiting trainees). Visiting and local trainees can also work closely together in a way that can maximize mutual benefit.
 - iv. Clear setting of expectations and careful planning can maximize benefit to trainees and host communities.
- Provide a list of participants, roles, and contact information to all team members.
- Urge participants to arrange their call schedules and vacation time well in advance to avoid last minute withdrawals from the trip.
- Perform predeparture preparation for all participants, with emphasis on cultural sensitivity and ethics of short-term missions.
- Identify an individual responsible for media: Photographs and videos can be helpful tools for story-telling and fundraising efforts, but patient privacy must be respected. Permission for photos should be written and the anticipated use of such photos/videos clearly documented and explained to the patient/family. A hard or soft copy should be kept by the visiting team. Verbal consent for a picture by a visiting healthcare provider of a patient is often given for fear of offending the visitor who is providing a service to the family/patient. These practices are ethically necessary and will avoid harm that might occur through irresponsible sharing of patient information.
- Discuss with the host team whether they are interested in local media support for the activity (TV, radio, or newspaper). This can bolster the public image of the local team.
- Consider a professional conduct agreement for your volunteers.

3.5. Patient selection

- Work with local physicians to preliminarily screen patients before arrival. It is often best to schedule a screening clinic on the day prior to the first operative day. Cases should be selected based on the visiting team's surgical and anesthetic skill. Operations that are beyond the

competency level or outside the scope of practice of the team's surgical and anesthesia providers should not be done.

- To assure that underlying surgical and anesthetic comorbidities are identified and addressed, all surgical candidates should receive anesthetic and surgical clearance.
 - On arrival in country, the team's surgeons, anesthesiologists, and pediatricians should evaluate all locally screened patients.
 - The local physicians' records should be reviewed to identify patients with high anesthesia or surgical risks (for example, infants, American Society of Anesthesiologists (ASA) classification III or greater, evidence of poor nutrition, hemoglobin < 10 g/dL, or significant airway anomalies).
 - A history and physical should be performed by team members to identify any change in physical status and to further review congenital abnormalities, cardiac, respiratory and gastrointestinal symptoms. Chronic conditions such as malnutrition, malaria with anemia, and respiratory illnesses are common and can compromise surgical outcomes. Families might not fully disclose comorbidities, for fear that their children might "miss the chance" for surgery.
 - Contraindications for surgery need to be carefully identified (presence of congenital heart disease, a difficult airway or significant comorbidity including nutritional deficiency, upper respiratory infection or febrile illness on the day of surgery, need for specialty medications, supplies, or blood, etc.).
 - Assessment of postoperative care needs: patient selection should ideally not be based only on those patients with the "best possible" postoperative course, but for more complex patients, on a realistic expectation of complications given the local healthcare context.
 - Ensure that anesthesia, nursing, and surgical providers each have veto power for cases that are deemed inappropriate owing to comorbidity, complexity, or resource limitations.
- Determine what studies are essential prior to surgery, how they will be obtained, and whether funding for these tests is available. Recognize that if no outside funding is available, patients will often be responsible for the costs of additional tests. Some surgeons have found it useful to bring small vials of contrast material specifically for colostograms/enemas in preparation for colorectal cases.
- Develop a system to determine which patients are selected for surgery. Plan with the local team how to manage those children who cannot be treated during the trip. The visiting team usually provides medical care at no personal cost to the patients. Clarify with the local team if there are additional hidden medical fees to patients and how those costs are covered. If some of those families have traveled long distances, their costs might need reimbursement, although this is not ordinarily the responsibility of the volunteer team.
- As the team plans the case order, consider first performing low-risk cases to evaluate local capacity. Consider scheduling infants early in the day to prevent prolonged NPO times. If complex cases are planned, consider performing those operations relatively early in the trip so that the visiting team is present to address postoperative complications.
- Do not overwhelm the local resources and workforce. Consider that the number of operations that can be performed will be influenced by the case duration and complexity, availability of operating rooms, duration of operative day, turnover time, availability of supplies (drapes, gowns, instruments), and sterilization processing.
- Be prepared to continue screening throughout your visit, as demand might rise as the community learns about the availability of increased surgical services.
- Provide a forum for team members to express concerns over individual cases. A policy should be considered that allows any team member to question or cancel a planned operation.
- Be prepared to make difficult choices. For example, is it better to perform several low-risk hernia repairs that benefit many patients rather than a high-risk neonatal case with a low chance of success but a high risk of morbidity if left untreated? These decisions are best made as a

group with guidance from the host institution and physicians. Involve the family in a culturally appropriate manner.

3.6. Surgical considerations

3.6.1. Preoperative care

- Ensure that patients are hydrated preoperatively. Many have traveled for days and may have had little to drink.
- Bathe all children preoperatively, if possible, and/or thoroughly clean the operative field with soap and water prior to the formal surgical preparation of the skin.
- Consider performing rectal irrigations and bowel preps in the operating room on the day of surgery.
- Immediately prior to surgery, review the consent form and ensure the surgical site is marked.

3.6.2. Intraoperative care

- Adhere to the WHO Surgical Safety Checklist. A time-out is particularly important in a new and foreign environment. Preoperative antibiotics should be on the checklist and administered prior to incision when indicated.
- Be honest: If a mistake is made, acknowledge it. Honesty will help maintain trust.
- Manage expectations and be flexible.
- Anticipate instrument and consumable needs for every case and minimize resource utilization.
- Be prepared to assist the anesthesia providers (e.g. obtaining IV access or managing a difficult airway).
- Consider the operation to be a learning opportunity for everyone, and emphasize bilateral exchange of experience and knowledge.
- Provide a detailed postoperative note. Include findings and information necessary for the next provider. Drawings are helpful, particularly when the country's primary language is not English. Leave your name and contact information if the findings are unusual or a mistake is made. The next visiting surgeon might need to contact you.
- Combine visiting and host teams to allow bidirectional exchange and true collaboration. Be open to learning from your host colleagues, who are usually skilled at providing care with limited resources.

3.6.3. Special considerations for laparoscopy

- Become familiar with available equipment, which might be old or of poor quality.
 - CO₂ insufflation pressures might not read or function properly; close monitoring is critical.
 - Often there is a single monitor that cannot be moved.
 - Operating room tables cannot always be moved for optimal positioning.
 - Air filters, trocars, instruments, and disposables may be unavailable or inappropriate sizes.
 - Equipment such as clips, staplers, and retrieval bags may not be available.
 - Most children are not obese. Long trocars will probably not be needed.
- Use resource-appropriate best practices without lowering your practice standards. Work with surgical instruments available to the local hospitals if you can, unless you plan to donate your advanced instruments.
- Consider teaching the Fundamentals of Laparoscopy (FLS) course or other didactic workshops to supplement learning in the operating room.
- Laparoscopic industry support may be available for equipment donation, if solicited in advance.

3.7. Anesthesia considerations

3.7.1. Preoperative

- Review available medications, supplies and equipment. Realize that because of potential differences in medication, supplies and

equipment, things might take longer and not be as “smooth” as at home. Some practices might need to be modified based on limited availability of supplies. Make sure to allow adequate time to set up and prepare all areas.

- Develop a communication plan between anesthesia, surgery, and nursing for assigning and confirming the order of cases each day and assuring that all team members are ready before inducing anesthesia. This should include the use of a checklist to address anesthesia, surgical and nursing concerns, preoperative antibiotic administration if indicated, and postoperative care considerations.
- Ensure adequate numbers of anesthesia providers — ideally one for each operating table plus at least one anesthesiologist or nurse anesthetist to supervise every four operating tables and the PACU.
- Confirm whether patient NPO status is appropriate.
 - Careful attention should be given to preoperative instructions to families, in their native language.
 - Consider leaving space on the daily schedule for an add-on or emergency situations. Consider what time patients will arrive for surgery and implications for hydration needs. Will they be admitted the evening before surgery, will everyone arrive first thing in the morning, or will they arrive throughout the day?
 - Consider need for active hydration, especially for younger children, either IV or orally, at defined times by pre-arranged mechanism.
- A plan for preop sedation should be considered, including what medications are available, where the sedation will be given and by whom, what monitoring will be needed, etc.

3.7.2. Intraoperative anesthesia care

- Maintain perioperative nursing and intraoperative anesthetic records.
- Review intraoperative emergency procedures including how to provide advanced life support and resuscitation.

3.7.3. Immediate postanesthesia care

- Consider a standardized protocol for PACU observation, monitoring and orders including a pain and nausea management plan.
- Involve surgeons in postoperative care plans. A team approach is the best way to establish policies for post-anesthesia care.
- Discuss potential PACU emergency procedures including the need to return to the operating room for a complication.

3.7.4. Other considerations

- Consider bringing small transport monitors, ETCO₂ monitors, pulse oximeters and probes, suction tubing, pediatric nasogastric tubes, and IV sets.
- Consider leaving equipment as a donation (discuss this in advance with your hospital) and remember not to bring anything for which maintenance would be prohibitively expensive.
- Be aware that the skills of translators might be limited with regard to medical terminology.

3.8. Surgical postoperative care

- Consider preprinted orders using local medication names.
- Consider preprinted wound care instructions.
- Round in the morning and afternoon as joint activities with the local staff.
- Establish an on-call team if numbers allow for surgery, anesthesia, and nursing.
- Establish a process for overnight care.
- Establish a process to open an operating room at night for a complication or emergency.
- Prior to the visit, determine if the nursing team is adequately staffed and if additional local nurses need to be recruited and compensated.
- Discuss availability of postoperative analgesia prior to surgery. Acetaminophen (paracetamol) and ibuprofen are generally inexpensive and efficacious.

- Emphasize the importance of good communication when care is transferred from the operating room to the postoperative care unit.

3.9. Follow-up

- Establish a process for postoperative follow-up with the host team.
 - Who will be taking sutures out? Casts off? Drains out?
 - Who will do anal dilations? Consider disposable dilators, parental digital dilation or the use of candle sticks.
 - Who will provide care for complications?
 - Who will be responsible for cost?
 - Who will follow up with pathology specimens? If traveling with biological samples they must be packaged and declared and could be confiscated by customs.
- Have clear policies to address surgical mortalities and morbidities during and after your visit.

3.10. Debrief within the team and with the host institution

3.10.1. At the end of each day

- Identify successes and areas for improvement, and encourage active participation in improving issues as they arise.
- Be flexible — something will not go as planned.
- Take care of each other; even the most seasoned travelers will experience illness, sadness, exhaustion, or unexpected emotions.
- Encourage everyone to make an active “reentry plan” when returning home.

3.10.2. At the end of the mission

- Review challenges, complications, and accomplishments.
- Assess if mission goals were accomplished.
- Evaluate if there was a transfer of knowledge and skills.
- Evaluate case complexity and volume.
- Assess whether supplies and personnel were adequate.
- List items, staffing, and processes that could be improved.
- Establish goals for future trips.
- Communicate with hosts, donors, and hospital administration.
- Share photos with the host team and for teaching and promotional purposes.
- Consider ways to promote global health such as editorial pieces, blogs, or social media.
- For repeat trips, consider evaluation tools such as cost-effectiveness, capacity building, patient satisfaction, and baseline pediatric volume. Explore opportunities for research and scholarship as emphasized in recent publications [30,31]. Local ethical approval is needed for research projects and authorship should be joint between local and international authors.

3.11. Sustainability

- Partnership with local training programs and certifying organizations has been the most successful long-term strategy. Provide support for development of local surgeons, anesthesia providers, and nurses. Donate books and journals and solicit online medical sources of information.
- Commit to the same site for 3–5 years, with a structured agenda and clear metrics on program development. Set clear expectations between parties to assess progress.
- Identify systems issues that could interfere with the success of your trip and the safety of patients.
- Identify why children in the host community cannot get surgical care.
- Prioritize collaboration with local physicians and health care providers. Insist that local providers be present during your team's visit and that they do not use the time of your visit for vacation or private practice. Consider inviting other teams to provide support between your team's visits.

- Aim for a program that advances and does not undermine the local capacity. Do not promote local patients' perceptions that foreign providers' skills are better. Avoid situations where local patients are treated only by the visiting team or where visiting providers inadvertently undermine the livelihoods of local providers.
- Avoid creating a dependency on foreign health care. Instead, aspire to build capacity by educating and empowering the local health care providers.
- Reinvest into the local economic health care system. Remember that local health care providers cannot compete with free health care.
- Consider a stipend or “fee for service” for local translators, physicians and nurses to care for the postoperative patients. Long-term relationships and clear mutual expectations can also help to avoid undisclosed extra income for local providers (ie under the table payments)
- Buy medications or supplies from local pharmacies or hospitals. Note that names and concentrations might differ.
- Discuss with the local team whether to consider a pay-fee scale for patients. This will bring money back into the local program.
- Explore mechanisms for grants or philanthropy to support ongoing activity.

4. Personal travel and safety tips

4.1. Travel logistics

- Apply for passports and visas well ahead of your planned visit. A visa can take several months to 1 year to process. Your passport expiration must extend 6 months beyond your return date.
- Coordinate airline ticket reservations several months in advance, especially for regional flights.
- Reconfirm your flight with the airline 72 hours before your travel date, although this is not always required for international flights. Airlines often have weight restrictions, usually a limit of 2 bags each weighing no more than 50 lb for international flights and less for regional flights. Check with the airline when making your reservation.
- Register your team and dates of your trip with your State Department (step.state.gov for U.S. residents).
- Preweigh your bags. Solicit a letter from your host's hospital administration in the local language stating that your team was invited to do a charity mission and is bringing supplies for donation. This may minimize duty fees and delays in customs.
- To help with customs clearance, have an inventory of all items. Tag all bags with an owner and a destination. It is useful to have a common colored tie on all team baggage.
- Assign specific team members responsibilities for packing medications. Consider dividing medications into several bags rather than a single bag.
- Consider packing items in cardboard boxes or compressible duffel bags to avoid baggage charges on your return.
- Arrange hotel accommodations, meals, and transportation prior to arriving in country. Discuss payments for these services with local hosts if appropriate.
- Make copies of your passports, credit cards, visa, medical licenses, travel insurance and medical insurance information. It is practical to have hard copies of maps and contact information (you might not have Wi-Fi). Save copies of important documents on an online filing service (e.g., Dropbox, Google Drive, etc.).

4.2. Health tips and safety measures

- Consider purchasing traveler's insurance that includes medical emergencies, disasters, evacuation, and repatriation plans.
- Consult with a travel clinic for the recommended immunizations as well as appropriate antibiotics to bring. (www.cdc.gov for country-specific recommendations)

- Verify whether a Yellow Fever Certification of Vaccination Card is required for entry into the country you will be visiting or the country through which you might be transiting.
- Always use universal precautions.
- Leave jewelry at home and wear an inexpensive watch.
- If you are the victim of a crime, do not resist, and surrender your possessions (bag, wallet, phone, even car), as confrontation may put yourself in danger. Avoid eye contact, as this may be perceived as threatening.
- Use common sense to avoid petty crimes and use automated teller machines (ATMs) only in busy areas, preferably in a bank or shopping area.
- Drink bottled, boiled, or filtered water. Avoid tap water, ice, salads, uncooked vegetables, and fruits without a peel. Fresh produce may be made safe for consumption by soaking in a cap-full of bleach in a large pan of clean water for 3–5 min.
- Have the hotel official business card with you to aid the taxi driver; often the taxi driver will not recognize the English pronunciation or address for the hotel.
- Lock passports, airline tickets and wallets in safety boxes in your hotel room. Alternatively, consider a waist or neck pouch to keep your passport, credit cards and important documents with you at all times (hotel safes may not be reliable in all locales)
- Bring sunscreen and mosquito spray.
- Consider bringing tissues, toilet paper, soap, and a towel for your personal use.
- Bring a team First Aid kit, including Band-Aids, antibiotics (oral and topical), pain medications, diphenhydramine, ondansetron, steroids, epinephrine pen, Pepto-Bismol, Imodium, and malarial treatment. If traveling to a malaria-endemic area, consider taking malaria prophylaxis.
- Provide the team leader with your relevant medical history, current medications, allergies and a copy of your medical insurance card.
- Develop a plan for a needle stick injury: Consider taking an HIV Test Kit (this can be purchased on Amazon) and prophylaxis medications if not available locally.
- Always use the buddy system when leaving the hotel or hospital, especially at night.
- Document the blood types of team members.

4.3. Packing

- Take a carry-on bag with a set of clothes, scrubs, medications, and valuables in the event your checked bags are lost.
- Bring one set of nice clothing and shoes (be respectful of cultural customs).
- Bring your own medications and an extra pair of contacts or eyeglasses.
- Research the local weather.
- Bring your own scrubs, OR shoes, eye protection, surgical loupes, masks, OR shoe covers, OR hats, nonsterile and sterile gloves of your size, and a white coat.
- Consider bringing relevant gifts for your hosts and their families such as books, stethoscopes, magnifying loupes, stickers, crayons, or coloring books. Avoid donating candy.
- Bring appropriate outlet adapters and or voltage/current transformers for electrical appliances.

4.4. Money and credit cards

- Notify your credit card companies and banks of your travel dates.
- Take crisp, new bills in a variety of denominations.
- Exchange money at your home bank several weeks in advance or get cash from the ATMs on arrival (usually a better rate).
- Consider obtaining a credit card that does not impose a surcharge for foreign transactions.

4.5. Mobile phones/internet access/voltage

- Consider using Wi-Fi Hotspots, local SIM cards, or broadband sticks for laptops.
- Consider purchasing an inexpensive phone or local subscriber identification module (SIM) card if you have an unlocked phone for communication with local team members
- Contact your phone carrier in advance for purchasing an international phone package or to unlock your phone to use an inexpensive local SIM card.
- Use Skype, Facebook or WhatsApp over Wi-Fi to avoid expensive phone charges.
- Do not leave your phones in the open or unattended in public spaces.

4.6. Cultural sensitivity

- Research the host country cultural customs.
- Remember that you are a guest and that you represent your institution.
- Build personal relationships. Your success depends on long-term partnership.
- Do not be afraid to try local foods but be judicious.
- Do not complain. Do not criticize. Be patient and flexible. Things might not always be on time or to your expectations. Avoid judgments and learn to be sensitive to alternative management approaches.

5. Conclusion

Pediatric surgeons, anesthesia, and nursing providers are increasing their global engagement, with STMs in resource-limited areas as the most common form of involvement. Guidelines for global engagement from our professional organizations, specifically for short-term missions in pediatric general surgery, have not been previously published. The guidelines presented here are the result of collaboration between global health committee members in North American pediatric surgery, anesthesia, and nursing professional organizations. This set of recommendations includes a comprehensive approach to planning, execution, and follow-up of short-term missions, as well as guidelines to ensure the safety of both patients and providers. It is our hope that the article will serve as a useful preparation and practice guide for providers seeking to begin or continue their global work in resource-limited areas. We welcome participation from other professional associations to further the development of these guidelines and assess their impact.

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Contributors

APSA Global Pediatric Surgery Committee: Marilyn Butler, Tamara Fitzgerald, Ai-Xuan Holterman, Benedict Nwomeh, James O'Neill, Doruk Ozgediz, Julie Sanchez.

AAP Surgical Section Delivery of Surgical Care Global health subcommittee: Jason Fraser, Howard Jen, Henry Rice, David Rothstein.

Society for Pediatric Anesthesia Committee on International Education and Service: Faye M. Evans (Chair), Elizabeth Drum, J. Matthew Kynes, Craig D. McClain, Mark Newton, George Politis, Mark Singleton, Francine S. Yudkowitz.

APNSA Global Health Special Interest Group: Jenny Kreiss.

References

- [1] Schneider WJ, Politis GD, Gosain AK, et al. Volunteers in plastic surgery guidelines for providing surgical care for children in the less developed world. *Plast Reconstr Surg* 2011;127(6):2477–86.
- [2] Meier DE, Fitzgerald TN, Axt JR. A practical guide for short-term pediatric surgery global volunteers. *J Pediatr Surg* 2016;51(8):1380–4.

- [3] Welling DR, Ryan JM, Burris DG, et al. Seven sins of humanitarian medicine. *World J Surg* 2010;34(3):466–70.
- [4] Nthumba PM. "blitz surgery": redefining surgical needs, training, and practice in sub-Saharan Africa. *World J Surg* 2010;34(3):433–7.
- [5] Ibrahim GM, Bernstein M. Models of neurosurgery international aid and their potential ethical pitfalls. *Virtual Mentor* 2015;17(1):49–55.
- [6] Caldron PH, Impens A, Pavlova M, et al. A systematic review of social, economic and diplomatic aspects of short-term medical missions. *BMC Health Serv Res* 2015;15:380.
- [7] Boston M, Horlbeck D. Humanitarian surgical missions: planning for success. *Otolaryngol Head Neck Surg* 2015;153(3):320–5.
- [8] Metzler IS, Nguyen HT, Hagander L, et al. Surgical outcomes and cultural perceptions in international hypospadias care. *J Urol* 2014;192(2):524–9.
- [9] Como AF. Paediatric and congenital cardiac surgery in emerging economies: surgical 'safari' versus educational programmes. *Interact Cardiovasc Thorac Surg* 2016;23(1):163–7.
- [10] Merin O. Evolution of surgical humanitarian missions. In: Roth R, Frost E, Gevirtz C, Atcheson C, editors. *The role of anesthesiology in global health: a comprehensive guide*. Geneva: Springer; 2015.
- [11] Walick L. Pediatrics in the austere environment. *Curr Orthop Pract* 2015;26(5):502–8.
- [12] Albright AL. Reflections on developing pediatric neurosurgery in sub-Saharan Africa. *J Neurosurg Pediatr* 2016;18(1):127–38.
- [13] Rozier MD, Lasker JN, Compton B. Short-term volunteer health trips: aligning host community preferences and organizer practices. *Glob Health Action* 2017;10(1):1267957.
- [14] Evans FM, Nabukenya MT. Con: pure service delivery is no longer needed in global surgical missions. *Can J Anaesth* 2017;64(4):353–7.
- [15] Roy N. Global surgery: a view from the south. *J Pediatr Surg* 2017;52(2):203–6.
- [16] Butler MW, Ozgediz D, Poenaru D, et al. The Global Paediatric Surgery Network: a model of subspecialty collaboration within global surgery. *World J Surg* 2015;39(2):335–42.
- [17] Ng Kamstra J, Greenberg S, Abdullah F, et al. Global surgery 2030: a roadmap for high income country actors. *BMJ Global Health* 2016;1:e000011.
- [18] Resources for Global Health. American council of academic plastic surgeons. <http://acaplasticsurgeons.org/global-health/>; 2017. Accessed date: 7 April 2017.
- [19] Global Outreach. American Society of Anesthesiologist (ASA) global humanitarian outreach. <http://www.asahq.org/GHO>; 2017.
- [20] CDC travel page. <https://wwwnc.cdc.gov/travel>, Accessed date: 8 April 2017.
- [21] G4 Alliance. <http://www.theg4alliance.org>, Accessed date: 9 April 2017.
- [22] Global Initiative for Childrens Surgery. <http://www.globalchildrensurgery.org>, Accessed date: 9 April 2017.
- [23] Global Partners in Anesthesia and Surgery. <http://www.globalchildrensurgery.org>, Accessed date: 9 April 2017.
- [24] Global Paediatric Surgery Network. <http://www.globalpaediatricsurgery.org>, Accessed date: 7 April 2017.
- [25] Operation Giving Back. www.operationgivingback.org, Accessed date: 7 April 2017.
- [26] Society of Pediatric Anesthesia (SPA) Committee on International Education and Service. <http://spacies.pedsanesthesia.org>, Accessed date: 7 April 2017.
- [27] World Health Organization essential and emergency surgical care. <http://www.who.int/surgery/en/>, Accessed date: 7 April 2017.
- [28] World Surgical Foundation. www.worldsurgicalfoundation.org, Accessed date: 7 April 2017.
- [29] Guidelines for health care equipment donations. http://www.who.int/medical_devices/publications/en/Donation_Guidelines.pdf, Accessed date: 7 April 2017.
- [30] Greenberg SL, Ng-Kamstra JS, Ameh EA, et al. An investment in knowledge: research in global pediatric surgery for the 21st century. *Semin Pediatr Surg* 2016;25(1):51–60.
- [31] Ozgediz D, Langer M, Kisa P, et al. Pediatric surgery as an essential component of global child health. *Semin Pediatr Surg* 2016;25(1):3–9.