

Opportunities and Improvisations: A Pediatric Surgeon's Suggestions for Successful Short-Term Surgical Volunteer Work in Resource-Poor Areas

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Published online: 12 February 2010
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Abstract There is a paucity of trained pediatric surgeons in resource-poor areas, and many children never receive care for debilitating problems that could readily be managed by surgeons with proper training, supplies, and instrumentation. This article, written from the perspective of a surgeon who has been both the recipient of and the provider of volunteer surgical services, is intended to encourage surgeons in technologically advanced locations to volunteer in underserved areas and to assist them in the implementation of such endeavors. Concepts are presented with an emphasis on pediatric surgery, but most are relevant for volunteers in all surgical specialties. Volunteer paradigms include, but are not limited to, the “surgical brigade” model, where a large group of health care professionals take all needed equipment and supplies for the duration of their stint, and the “minimalist” model, where a single volunteer works with local personnel using locally available equipment. For a successful volunteer endeavor the host needs to have a perceived need for the volunteer’s services, and the volunteer must be flexible in adapting to meet overwhelming needs with limited resources. It is suggested that appropriate technology, such as the inexpensive anal stimulator presented herein, should be employed whenever possible. With proper planning, realistic expectations, and a cooperative and helpful attitude, volunteer trips can be rewarding experiences for both volunteers and host physicians and lead to lasting relationships that improve children’s lives globally.

Presented at the 43rd World Congress of Surgery, International Society of Surgery, Adelaide, Australia, September 8, 2009.

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Introduction

As the technological gap between the “developed” and the “underdeveloped” worlds widens, interest in surgical volunteerism is increasing [1–3]. Organizations such as the American College of Surgeons (through Operation Giving Back) assist surgeons in technologically advanced areas to volunteer effectively in underserved areas. Because of the paucity of trained pediatric surgeons in underserved areas many children never receive care for debilitating problems that could readily be managed by surgeons with proper training, supplies, and instrumentation [4]. The major purpose of this article is to assist pediatric surgeons in the planning and implementation of effective volunteer trips to underserved areas. Most concepts presented, however, are relevant for volunteers in all surgical disciplines. The author, who worked full-time as a general and pediatric surgeon in Africa for 12 years, now resides in the USA and regularly volunteers for short-term stints as a pediatric surgeon in Nigeria, Uganda, Ethiopia, Afghanistan, Mongolia, Kosovo, and Albania. This article is therefore written from the perspective of one who has been the overseas host for visiting surgical volunteers and one who is a volunteer himself.

Definition of terms

During the past half century sociologists and surgeon-authors have struggled to find an appropriate name for places in the world that are surgically underserved. Initially surgery in these areas was called “tropical surgery” or “missionary surgery,” because many underserved areas were in the tropics, and many hospitals were operated by religious mission groups. More recent terms include

surgery in the Third World, developing world, or less developed countries. All of these latter descriptions, however, imply that with a map and a marker one can easily distinguish developed from underdeveloped areas, but this is not the case in many developing countries, where a state-of-the-art hospital may stand within a few hundred yards of a hospital that lacks running water or electricity. An advanced facility would thus be physically available, but not financially accessible to most people in that locale [5, 6]. Throughout this article the term “resource-poor areas” (RPAs) will refer to places where technology, supplies, and trained personnel are inadequate. “Advanced locations” will refer to locales where standards of care at least approach those in the more developed areas of the world. There are no absolute measures that differentiate the two; but when there are flies throughout the operating room because of inadequate screens on the windows, and when operations have to be performed in the daylight hours because the sun is the best available operating light, one can be relatively certain that she/he is in a RPA.

Topics of interest to all surgeons

How to go on a volunteer endeavor

Because the term “mission” has a religious (and sometimes negative) connotation, this term will be avoided, as volunteers of any or no religious belief can make a major impact on the lives of children suffering from maladies that can be readily treated by a competent, concerned pediatric surgeon. For an extensive review of the theory and practice of humanitarian surgical endeavors the reader is referred to an article by Pezzella [7], and for specific details on taking an international “vacation in scrubs” the reader is referred to an article by Tarpley et al. [8].

Although several paradigms for short-term volunteer endeavors exist, two on opposite ends of the spectrum will be presented here. The “surgical brigade” model [9] involves a self-sustaining group of personnel carrying all equipment and supplies needed for the duration of their project. The team monopolizes an operating theater in a RPA hospital and strives to temporarily maintain advanced operative standards using the volunteer team’s personnel, equipment, and supplies. Many operative procedures are performed in a short period, and many children receive direct benefit. This approach, which is well-suited for cleft lip/palate, cardiac, and eye surgery groups, provides an opportunity for volunteers who would not otherwise be able to serve in RPA hospitals. The major disadvantage is the expense involved. Even if equipment and supplies are donated, the cost of transporting equipment, supplies, and personnel is great. Large groups can overwhelm RPA

hospitals as operating rooms normally used by RPA surgeons are taken over by the volunteers. Visiting teams can become so involved with performing cases that teaching local personnel is a low priority; and when the volunteer team has returned home, no one in the RPA may be willing to assume care of the patients who often are labeled as “the visiting doctor’s patients, not mine.”

At the opposite end of the spectrum is a “minimalist” method that involves a single volunteer determined to fit into the local operative system using only the equipment and supplies available in the RPA hospital. This less-expensive method allows the volunteer more time for teaching and interacting with the local doctors who normally perform pediatric operations. The local doctors may be formally trained pediatric surgeons; general surgeons who, by default, are pediatric surgeons; or, in locales without formally trained surgeons, general practitioners. A visiting pediatric surgeon who is willing to teach can, in a short time, make sustainable, positive changes in the pediatric surgical care for future children in the RPA hospital. The minimalist usually performs fewer cases than the brigade, but the indirect benefit from teaching the local doctors is often greater, and local doctors involved with the operative procedures will more readily assume long-term responsibility for the patients. The minimalist method does, however, have disadvantages, especially for a volunteer who has not previously worked in a RPA hospital. Basic surgical instruments are often inadequate; drainage catheters and sutures for pediatric cases may not be available; operating lights are dim; and functional suction machines are often nonexistent. As a result the visiting minimalist can easily become disillusioned with the logistics and never again participate as a volunteer.

There is no perfect paradigm, and a synthesis of methods maximizes the chances of success for the volunteer, the local doctors, and most importantly, for the children who benefit from the volunteer’s services.

An operating room (OR) nurse or technician and an anesthesiologist are valuable colleagues to accompany a volunteer surgeon. In some locales the OR personnel do not speak English, and trying to obtain instruments and supplies intraoperatively, when they may not even exist, is frustrating. An OR nurse or technician from “home” is invaluable in making the OR run smoothly, since she/he can understand what the surgeon needs and go searching in storage areas for what is needed or something that can be used as a substitute. This also offers the visiting nurse/technician a great opportunity for gently making suggestions to improve local procedures. Anesthesia is often the major rate-limiting factor in the number of operative procedures that can be accomplished during a volunteer stint. In many hospitals the only anesthesia providers are nurse “anesthetists,” some with formal training and others with

informal, on-the-job training at best. Anesthesia departments in RPAs, often numerically understaffed, are expected to provide anesthesia for several services simultaneously. The volunteer surgeon therefore must take an active role both in the technical part of the operation and in overseeing anesthesia activities. A volunteer anesthesia provider who is willing to work with local anesthesia providers is a key to the success of a volunteer surgical endeavor.

Where to go and how long to stay

The American College of Surgeons and numerous humanitarian organizations try to match volunteers with RPA hospitals that request volunteer services (Table 1). There is no central coordinating group for volunteer pediatric surgeons, as there are for certain other specialties, but the Global Paediatric Surgery Network, currently being organized for this purpose, will be functional by May 2010. A volunteer surgeon should communicate directly with the host surgeon(s) before traveling to the location. It is essential to learn whether the host truly has a need for the volunteer's skill set, and exactly what the host's expectations are for the volunteer. The volunteer should also find out what kinds of cases to expect, while understanding that many cases cannot be anticipated. Remote RPA hospitals usually need surgeons for basic cases, while the needs in university hospitals are more specific, more complicated, and often involve redo operations. Electronic communication is available in most RPAs, and clinical data can be

transmitted so that the volunteer will know what equipment and supplies to bring. The minimum time recommended for a successful volunteer stint is 2 weeks, with stints of a month or longer even better.

What to expect when you get there

Expect to find wonderful doctors and other hospital personnel who have eagerly awaited your arrival. Expect multitudes of children needing you and your expertise to improve their lives. Expect wards that are overflowing with inpatients, and outpatient clinics so crowded that you have to step over patients to get through the clinic door. Be ready to make critical decisions as to which patients you can help and which ones you cannot help. You may have to decide whether to do a single 6-h case or several shorter cases, because you will not have time to help everybody. These become very difficult decisions with significant repercussions for children with major problems. Expect that the metronome of the RPA hospital will not be on as rapid a setting as the one in your home hospital. In some instances if you can get the first case started by 9 a.m. that is a good day, and if you can talk your crew into staying past 3 p.m. it is truly an accomplishment. Attempts at reforming the system usually result in frustration for the visiting surgeon who must learn to work within the existing system. Expect numerous opportunities for teaching basic procedures to residents and young faculty, and understand that techniques that are taught will be perpetuated for decades to come. The emphasis should be on teaching reproducible, technologically appropriate procedures.

Table 1 Organizations serving as surgical volunteer enablers

American College of Surgeons (ACS)
Operation Giving Back www.operationgivingback.facs.org
CTO—Change the Outcome, Cincinnati Children's Hospital www.cincinnatichildrens.org/svc/alpha/c/colorectal/helping/missions.htm
Doctors without Borders/Médecins sans Frontières www.doctorswithoutborders.org
Global Paediatric Surgery Network www.GlobalPaediatricSurgery.org
Health Volunteers Overseas www.hvousa.org
Journal of the American Medical Association (JAMA)
CareerNet Networking for Physicians: Volunteer Opportunities www.jamacareernet.ama-assn.org
Society of International Humanitarian Surgeons www.humanitariansurgery.org
World Surgical Foundation www.worldsurgicalfoundation.org

Specific considerations for pediatric surgeons

Types of cases

Children with Hirschsprung's disease and anorectal malformations abound in RPAs, and surgeons without formal training in these procedures are understandably reluctant to do anything more than a colostomy. Colostomies are often performed by a junior doctor in the middle of the night; and children with colostomies, both good and bad (Fig. 1), wait for months or years for a definitive procedure. Some anorectal procedures are performed well by local surgeons with formal or informal training, but some are performed by doctors without adequate training or equipment, and the result is often nothing more than a perineal colostomy (Fig. 2). A major impact volunteer pediatric surgeons can make in RPAs is in the training of local doctors to perform good anorectal operations and to properly care for children postoperatively, especially emphasizing proper anal dilations. For Hirschsprung's disease an endorectal pull-through

Fig. 1 Four-year old boy with Hirschsprung's disease who waited more than 3 years for a surgeon to perform a pull-through. **a** Prolapsed loop colostomy. **b** An ingenious colostomy suspension bag hand-made by the mother to keep the child from tripping on his colostomy



Fig. 2 **a** Appearance of perineum after a posterior sagittal anorectoplasty performed by a doctor with minimal training and without an anal stimulator. **b** Appearance after repeat operation performed by a volunteer pediatric surgeon with an anal stimulator

procedure is probably preferable to a Duhamel procedure, because surgical staplers are not available in many RPA hospitals. If the visiting surgeon brings a limited number of staplers, the local surgeon will have difficulty performing a good procedure after the visitor has gone. Colorectal anomalies, although the most common, are not the only problems the volunteer will encounter. The continuous flow of children with operative problems related to all areas of the body results in few boring days for the visiting pediatric surgeon.

Equipment and supplies

Because the baggage charge on international flights is over \$100 per bag, the pediatric surgeon must carefully select what equipment and supplies to bring. Scrub clothes, hats, masks, shoe covers, and sterile gloves are a must for many RPA locations. Basic sutures are advisable because few pediatric sutures and needles will be locally available,

especially for anorectoplasties and hypospadias repairs. A basic instrument set (including at least 3 needle holders of various sizes, 10 functional hemostats, an assortment of tissue forceps, Allis clamps, malleable retractors, anal dilators, and small self-retaining retractors) is invaluable. Instruments should be clearly marked to separate the visitor's instruments from local instruments. Flash autoclaves are not usually available, and the best method for sterilization between cases is cleaning the instruments with soap and water and soaking them in a solution such as Steris® or methyl alcohol. An electrocautery is nearly essential for delicate pediatric operations. The volunteer should bring appropriate-sized grounding pads and handpieces including needle tips. Neither the pads nor handpieces should undergo disposal but should be used multiple times until they are non-functional. The pads do not need resterilization, but the handpieces can be soaked in a sterilizing solution. (Keep the end of the wire that goes into the cautery unit from soaking.) If the RPA hospital does not have an electrocautery, it is well worth the expense of bringing one. Most RPAs have 240 V current, and therefore a compatible unit or a step-down transformer is essential. A pulse oximeter is a must for a volunteer in a RPA, and it is advisable to bring fresh pediatric finger probes because the ones being used are probably very old, adult-sized ones.

Improvisations and helpful hints

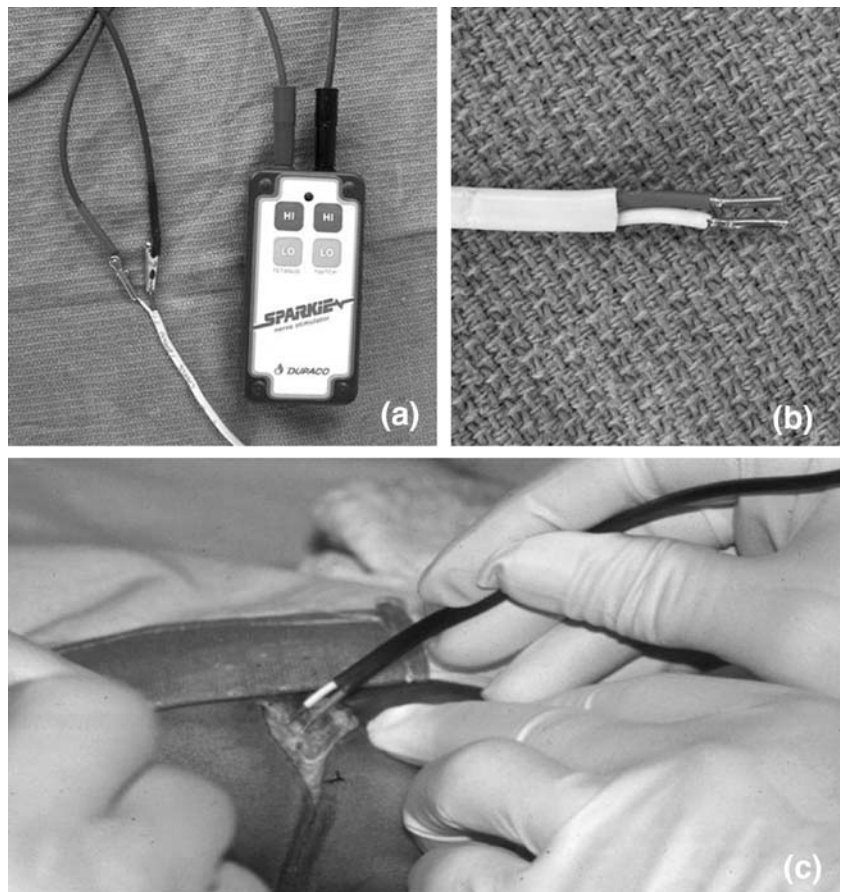
Functional operating lights are scarce in RPAs, and operating headlights are expensive and cumbersome to transport. An acceptable substitute is an LED headlight purchased from a sporting goods store (Fig. 3). Although this is not a perfect substitute, it is better than most RPA overhead lights. Because muscle stimulators used in the repair of anorectal malformations are prohibitively expensive (\$6,000), many RPA pediatric surgeons use the electrocautery as a stimulator; but the cautery, even on low settings, damages delicate tissue. A less-expensive



Fig. 3 Light emitting diode (LED) headlight purchased for \$30 at a sporting goods store

anesthesia nerve stimulator (Fig. 4) can be substituted. Manufacturers often donate these units for RPAs, but even if they don't, the cost is less than \$100. An insulated double-strand wire (thermostat wire is perfect) can be

Fig. 4 Improvised anal stimulator. **a** Wires attached to alligator clips of the nerve stimulator. **b** Opposite end of wire used as a handpiece. **c** Improvised stimulator in use



purchased inexpensively from any hardware store and transformed into a handpiece. At one end the two insulated solid wires are separated and the insulation removed from each for 1 cm. These bare wires are attached to the alligator clip adaptors of the nerve stimulator (Fig. 4a). The two insulated wires on the opposite end are separated for a distance of 2 cm and the insulation removed from each of the wires for 1 cm (Fig. 4b). The stimulator is placed on “continuous tetany” and the separated wires used as a handpiece (Fig. 4c). The improvised stimulator functions adequately and can be left behind for future use by RPA surgeons. The best postoperative anal dilator in RPAs is the appropriately sized finger of the mother, but a wax candle can be substituted.

Bowel preps are a major problem in most RPAs. Children undergoing operation have often been impacted for months, and preoperative ward preparation is inadequate. An on-the-table preparation is the best method for removing stool. After induction of anesthesia the child is placed (from the chest distally) inside a heavy duty garbage bag, with the bed in reverse Trendelenburg position. The surgeon digitally removes as much of the impaction as possible and then irrigates the colon copiously with warm saline, squeezing the abdomen and repeating the digital

exam to manually remove the stool. The irrigation, squeezing, and digital disimpaction sequence is repeated as many times as necessary. Although neither quick nor easy, it is effective in evacuating the bowel. The volunteer should bring several 60-ml catheter-tip syringes for disimpactions. They can be used multiple times before the rubber seals fail.

Because of a general lack of water, RPA children may not have clean skin upon arrival at the operating room. An effective method for decreasing skin flora is to give the parent soap, water, and a cloth in the preoperative area to bathe the child before operating room entry. The operating table skin preparation is then more effective in preventing wound infections.

Helpful do's and don't's

Do remember that you are a guest in someone else's home, hospital, and culture. Learn and respect the overt and covert rules of their home, hospital, and culture.

Do understand that everything "they" do is not wrong, and don't try to make changes until you are certain that the method in use really is wrong.

Don't try to make sweeping reforms during a short-term volunteer stint. The systems that are in place have been established over years and will not be changed in a matter of days. Learn to make gentle changes slowly, because these are the only changes that will last after you are gone.

Don't blame your hosts for the inadequacies that they have to deal with daily.

Don't tell your hosts how much you have forfeited in expenses and loss of practice income to come to teach them how to be better surgeons. Treat them as colleagues.

Do keep a written record of the procedures that you perform, and encourage your host to send follow-up reports—both the good and the bad.

Do plan subsequent trips to the same locale. Each trip you make will be better than the last because you will know what to expect and you will be able to see that at least some (but not all) of the changes you instituted have survived. Keep a diary of each trip with critical contact information. Make notes as to supplies/equipment to bring on subsequent trips. The more often you visit a place the more

your hosts will know that you are truly interested in helping them.

Do relax and take along a sense of humor and patience. Things do not happen as you have planned in RPAs. Be flexible and willing to change plans as needed. Always take a good book to redeem your time during the inevitable delays throughout your trip.

Do remember your primary goal is not to develop functional systems, but to treat children in need of your care and to train health care personnel so that they can continue to provide your quality of care long after you have departed.

Conclusions

Volunteer surgeons can make significant contributions in resource-poor areas. With proper planning, realistic expectations, and a cooperative and helpful attitude, volunteer trips can be rewarding experiences for both volunteers and host physicians and may lead to lasting relationships that will improve the lives of children around the world.

References

1. Casey KM (2007) The global impact of surgical volunteerism. *Surg Clin North Am* 87:949–960
2. Chu KM (2009) Surgery in rural Zambia: the rewards and challenges of treating patients in a resource-poor setting. *Bull Am Coll Surg* 94:22–28
3. Duda RB, Hill AG (2007) Surgery in developing countries: should surgery have a role in population-based health care? *Bull Am Coll Surg* 92:12–18
4. Bickler SW, Rode H (2002) Surgical services for children in developing countries. *Bull WHO* 80:829–835
5. Nwariaku FE (2009) Mind the gap: workforce disparities and global health. *J Surg Res* 154:204–311
6. Farmer PE, Kim JY (2008) Surgery and global health: a view from beyond the OR. *World J Surg* 32:533–536
7. Pezzella AT (2006) Volunteerism and humanitarian efforts in surgery. *Current Prob Surg* 43:837–932
8. Tarpley J, Tarpley M, Meier D et al (2007) Operating in the global theater. *Surg Rounds* 30:509–518
9. Wolfberg A (2006) Volunteering overseas—lessons from surgical brigades. *N Engl J Med* 354:443–445