Before You Go

Information for Ophthalmologists Volunteering in Developing Countries

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The Foundation of the American Academy of Ophthalmology

Committee on International Ophthalmology

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Foreword: Working Effectively in Other Cultures

by Larry Schwab, MD

Physicians who volunteer to work in health care systems other than their own face unique challenges. The challenge of working in an environment where dependable high technology and instrumentation is not available is frequently discussed by volunteers and constitutes a major concern for many. Differences in presentation of familiar problems (cataract, glaucoma, pediatric disease) or unfamiliarity with some "tropical" conditions (trachoma and vitamin A deficiency) may be confusing. Differences in the socioeconomics of medicine and how people access health care also lead to differences between the practice of ophthalmology in North America and in developing countries. These issues are discussed in the essays in this publication. There are, in addition, some special challenges in stepping outside one's culture.

Language and cultural differences

Language may be a barrier. It need not be. No one expects a volunteer ophthalmologist to master a new language in a short visit, but an effort to learn the phrases for greetings and a few basic courtesies will always be appreciated. Learning phrases such as "look up," "look down," and "open your eyes," will go a long way in allowing you to communicate more effectively and be more efficient.

Cultural differences may lead to misunderstandings; volunteer ophthalmologists should make a sincere attempt to understand differences in culture. In all cultures, the following are appropriate:

- Listen politely and carefully
- Offer suggestions and make factual points tactfully
- Avoid criticism of local customs or observances
- Behave gently and be aware of locally offensive body language
- Avoid aggressive behavior; in most cultures this results in loss of credibility
- Be a patient guest; the pace may not be as fast as that to which you are accustomed. The formality of sitting at length in conversation is a time-honored custom in many cultures.

- Be an appreciative guest; many hosts extend a warm and generous welcome. Words of appreciation are always appropriate.

The giver and the receiver

There is a special relationship which volunteers may not have considered, and that is the relationship between the volunteer (giver) and host (recipient).

The giver has something presumed valuable or useful to transmit (e.g. information or goods—books, literature, equipment, or instruments). The recipient is presumed to benefit materially and educationally from this transfer. In this model the receiver is presumed to be grateful to the giver, but this is not always the reality. There may be barriers between the giver and receiver of which neither is aware.

The recipient may feel indebted, inadequate, or envious towards the giver. The giver usually represents a more affluent work environment and technologically more advanced health care system. It is also possible that the giver may develop feelings of superiority or may appear condescending towards the recipient. The giver may assume that he or she knows what is best for the host country in spite of having limited experience in the day-to-day problems faced there. The volunteer may assume that his way is the best way. Unspoken signals to this effect may be subtle but can be very real.

Many of these problems can be overcome if the volunteer remembers that he or she is a guest in another society and probably has as much to learn as to teach.

Personal safety

One should be physically prepared to travel. A passport is usually a requirement and visas obtained prior to departure may be necessary. A travel agent should have this information. Be aware of the possibility of exposure to diseases including cholera, malaria, dengue, TB, and AIDS, and act accordingly. Travel advisories are available from the US State Department. (http://travel.state.gov/travel_warnings.html)

Just as we take certain safety precautions in crowds at home, we must be aware of dangers in certain situations overseas. Pickpocketing, flim flam scams, and armed robbery may be risks, just as they are in North America. Do not drop your sense of protection because you may be in a work-holiday mood.

Go Well

This group of essays has been written specifically to help prepare volunteer ophthalmologists from North America so that they may better understand the problems they encounter as well as gain some perspective on the problems of blindness and low vision in developing countries. Topics were included which address concerns and interests of volunteers. Selection of topics was determined by surveying ophthalmologists included in the American Academy of Ophthalmology's International Volunteer Registry.

We hope these essays will assist you in assisting others.

Making Lasting Changes in Eye Care in Poor Countries

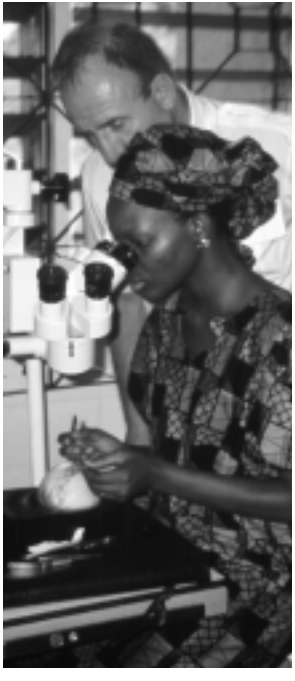
by Susan Lewallen, MD

The dismal conditions under which much of the world's people exist inspire many individuals to want to help. Trips by ophthalmologists from developed countries to the developing countries to provide services are increasingly popular. Visiting a poor country and curing some of the blindness can be a humanitarian act with a real sense of satisfaction for the ophthalmologist and those he or she treats. However, with an estimated 35 million blind (20 million from cataract) in the world, such efforts, unfortunately, have a negligible impact on the prevalence of blindness. Alleviation of the problem will require long-term fundamental changes in the affected societies. This is the purpose of development work — to aid in implementing basic sustainable changes.

What constitutes sustainable change?

Sustainable changes are those which can be sustained by the local population with as little dependence on outside aid (manpower, money, or material) as possible. There are many elements of sustainability and they are closely interrelated.

Building infrastructure: Infrastructure includes all the hidden support systems which must exist in order that the doctor may treat a patient. For example, in order to perform a cataract operation, there must be a room, an operating table and chair, adequate lights, instruments, and perhaps a microscope – that's part of the physical infrastructure which is easy to imagine. But there must also be someone who can fix these things when they break and a system to get new bulbs and replacement parts, including the foreign currency that may be necessary to buy these. There must be someone trained to organize the operating room and keep an inventory of consumable supplies. A record-keeping system is essential to high quality medicine. Finally, there must be patients, which requires some system to inform patients that surgery is available, and a means for patients to get to the operating room at the same time as the surgeon. These "mundane" considerations are often taken for granted by North American doctors because they've always been taken care of, hidden within the complex infrastructure supporting our medical system. The lack of these underpinnings, however, is a major factor in underdevelopment and a major reason why there are still so many blind in the world. A sure recipe for failure is to ignore infrastructure while concentrating only on building up superstructure such as surgical technique.



Empowering the recipients: This is not just political jargon. It really means helping people gain the skills to do for themselves, from doctors, nurses, and administrators to the patients. Technical education is one aspect of empowerment, but it also includes imparting the confidence and skills necessary to organize and make decisions.

Introducing appropriate technology: What's appropriate will vary from place to place, but in general one might define appropriate technology as that level which is necessary to address significant problems in the population and which can be supported primarily at the local level. One of the painful and expensive lessons which has been learned in development is that introduction of inappropriate technology is not only not helpful, but it may actually obstruct development. It will widen the gap between the haves and the have-nots and its maintenance may deplete scarce resources. How does one know what's appropriate? You have to know the local situation well, which takes time, experience, and an open mind.

Working within the system: This may not be easy. The system is likely to have significant inadequacies or you wouldn't need to be there at all. On a global scale, there are umbrella organizations composed of representatives from many of the groups which work in eye care, and you can educate yourselves about these and try to work with groups which cooperate with these. At the regional level, it is important to find out what other groups are working in eye care in the area and explore ways of working together. It is essential to make the proper authorities within the Ministry of Health aware of proposed work and to get their approval for it. It is essential to include people who are within the local system in the planning and decision making.

How can I contribute to the development process as a short term volunteer?

There is no simple answer to this question. It is much easier as a short-term volunteer to participate in disaster relief than in true development. However, one can start by educating oneself about the basic problems, and making a commitment to put efforts into development. This is a new field for most North American ophthalmologists; a willingness to travel with the goal of learning as well as teaching is crucial.

Accept the fact that there are no quick and easy solutions to the problems of underdevelopment. Volunteers work under the auspices of many different organizations. Ask questions about the role you find yourself in: will your efforts contribute to solving the real problems? Evaluate critically whether what you are doing contains the elements of sustainability discussed above and choose to work with organizations which work towards true development.

Suggestions for further reading

Chirambo MC. The role of Western ophthalmologists in dealing with cataract blindness in developing countries. *Documenta Ophthalmologica* 1992;81:349-350.

Thylefors B. The role of international ophthalmology in blindness prevention. *American Journal of Ophthalmology* 1995;119:229-30

Schumacher EF. *Small is Beautiful.* Harper and Row. 1973

Much of the literature in the multidisciplinary field of development studies is classified under economics and political science. There are a number of journals and web sites devoted to development issues.

Barriers Which Keep Patients from Getting Cataract Surgery in Developing Countries

by Paul Courtright, DrPH

Couldn't the cataract problem be solved if there were just more trained cataract surgeons in the developing countries?

Manpower shortage is only one issue. In fact many cataract blind in developing countries do not accept surgery, even when offered. In many instances, patients diagnosed as blind from cataract and scheduled for an appointment fail to come for surgery. It has been documented in countries as diverse as Brazil[1] India[2], and Malawi[3] that 33-92% of the cataract blind do not accept surgery, even when offered.

What are the main reasons that more cataract blind in developing countries do not accept surgery?

Cost of surgery

For the rural poor, many of whom have no disposable income, cataract surgery may cost more than they feel they can afford. Efforts in India and elsewhere to reduce the cost of surgery or provide free surgery to the poorest patients have been effective in increasing the number of patients coming for surgery [4] To the poor patient, there are other costs beyond hospital expenses associated with surgery; these include transportation to the hospital, loss of salary for a guardian to accompany the patient to the hospital, and living expenses for the guardian while the patient is hospitalized. This non-surgical cost has been estimated to be one-fifth of the annual income of a rural Nepali.[5] In India, providing transportation expenses for the patient increased acceptance of cataract surgery.[4] However, in some settings where cataract surgery is provided free of charge and where all expenses associated with hospital stay and transportation are provided, many patients still fail to use surgical services.[6-7] There are innovative and sustainable programs in a number of settings to provide high-quality cataract surgery at low cost.

Distance to hospital

The majority of cataract blind live in rural areas while most ophthalmic surgeons live in large cities. For all medical conditions, it has been documented that use of Western health services is related to proximity of these services.[8] In Malawi, it has been demonstrated that traditional healers who live far from the hospital provide more "treatments" for cataract compared to healers that live closer to the hospitals.[9] In rural areas of Nepal, surgical coverage was highest where there was easy access to major eye centres.[5] People use that which is most available to them first.

Cultural and social constraints

Throughout the developing world, and demonstrated in studies from India[4], Indonesia[10], Nepal[5] and Malawi[6], women are much less likely to have cataract surgery than men, even though epidemiologic research has shown that women have rates of cataract almost 1 1/2 times the rates among men.[11-12] Reasons for the low coverage among women are many: women are less like-

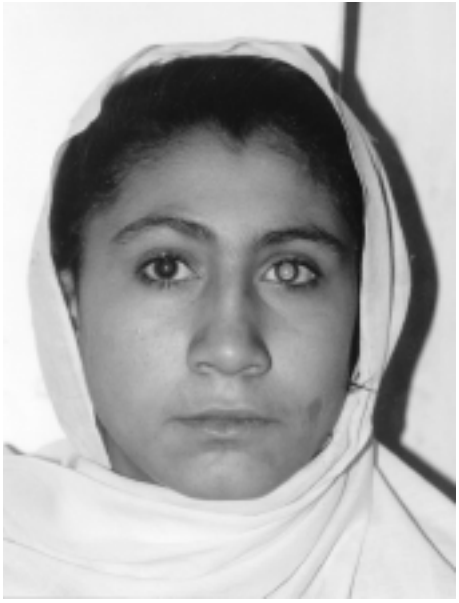
ly to be literate and have access to information about the availability of surgical services; women often do not have sufficient social support within the household to encourage them to seek care.[5] In Malawi, widows are more likely to have surgery than married women while married men are more likely to have surgery than widowers.[6]

Awareness of surgery or trust in outcome

Awareness of the availability of surgery remains a problem in most countries.[13-14] Community-based education about cataract surgery has not been undertaken on a large scale. Due to the limitations imposed by low literacy levels, one of the most effective measures for education about cataract surgery appears to be the use of "aphakic motivators."[4,6,15] Knowing another patient who has had successful cataract surgery has been shown in a number of settings to be the most effective educational tool for encouraging the acceptance of surgery. By contrast, unsuccessful surgery can have a devastating effect on encouraging patients to accept surgery. It has been noted throughout Africa that surgery for glaucoma (in the remaining "good eye") has had negative consequences for the promotion of cataract surgery.[16] Patients, who don't differentiate one intraocular surgery from another, may become dissatisfied with the ophthalmic services when they don't see better after glaucoma surgery. There is strong evidence that the introduction of IOLs can lead to an increase in self-presentation for surgery, even among the rural poor. The challenge is in creating a sustainable infrastructure (such as that at the Aravind Eye Hospital in India) in which IOL implantation can become a routine procedure.

Visual needs differ

Visual needs vary depending upon the social and economic roles of the individual. Many patients do not come forward for surgery because they view their vision loss as a normal part of the aging process.[5] To the elderly, a vision of 20/400 may be considered adequate for self-care and other limited activities.[17] The concept of blindness is interpreted differently in various societies; blindness may be defined as the absence of light perception.[18] Thus, patients wait very late before seeking care.[5,7]



In summary, even with the increase in manpower resources, cataract blindness is expected to increase substantially during the coming 20 years; only by reducing the barriers which keep patients from receiving cataract surgery will blindness decrease.

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Self-Sustaining Cataract Surgical Programs

by David Green, MPH

Why is self sufficiency an important goal?

In developing countries, a large percentage of the population are poor and do not have health insurance. Very often government infrastructure is inadequate to provide high quality, high volume health care services commensurate with the magnitude of the problem. Increasingly, international and local aid organizations, dependent on donations for operating costs, are finding it difficult to obtain financing to maintain operations or expand service delivery. Furthermore, in the long run, the goal is to help countries to become independent from outside aid.

The role of developers is to offer suggestions and guide in a manner that brings forth local solutions to local problems. Those responsible for service delivery must define and set their course of action if the program is truly to be "theirs."

Are there any examples of self-sustaining cataract surgery delivery systems?

Two programs in particular have demonstrated the possibility of achieving financial self-sufficiency while still providing for the poor.

Aravind Eye Hospital in India performs over 100,000 surgeries per year; 40% of the patients pay well above cost, 30% pay just below cost, and 30% are given service at no charge. The institute is able to develop a substantial surplus to fuel its growth and expand services, teaching, and research.

The Lumbini Eye Care Project in Nepal has achieved financial self-sufficiency. Since the introduction of cost recovery in 1994, surgical volume has doubled from 6,000 to 12,000; patients receiving an IOL have increased from 50% to 100%; and the program is now able to be fully self-sustaining from user fees and generate a 40% surplus which it utilizes for growth and free surgery to the very poor.

In addition, Aurolab, a non-profit business trust at Aravind dedicated to producing high-quality intraocular lenses, has demonstrated that sophisticated medical manufacturing can be financially self-sustaining and yet priced to be affordable to the poor.

How have these programs achieved self-sufficiency?

First, the hallmark of the programs described above has been the choice to use profit and production capacity for service delivery to the poor. It is the choice to price the product (high-quality cataract surgery) at the lowest price possible while still allowing for ongoing development. Their goal has been institution building rather than increasing personal income or return on investment for shareholders.

Second, these institutions have employed specific business management principles based on careful investigation of the economics of eye care delivery. These are similar to the predictive modeling that most businesses perform in projecting costs, determining prices, and understanding the market, with special emphasis on quality of services. These may be summarized as follows:

1. Knowing the market

New surveys or review of existing data can be used in the catchment area to determine the following: the income levels of the population (rich, middle, poor, very poor) with the percentage of population that falls into each income bracket; and the epidemiological data on prevalence of eye disease and previous user patterns of eye care. There must be an understanding of the potential for outreach and interaction with various community and social groups.

2. Understanding the local peoples' capacity to pay

The use of multi-tiered pricing has ensured that cataract surgery can be made available to everyone. The general rule of thumb has been to charge patients up to the approximate monthly family income for cataract surgery, which they have been willing and able to pay for high-quality surgery. Different prices are also set according to the level of privacy and comfort in accommodation or according to the use of consumable packaging.

3. Reducing costs while maintaining or introducing high quality

Costs have been reduced by a number of measures. Volume has been increased substantially to reduce the cost per case. Salaries have been fixed instead of fee for service. A high ratio of supporting staff (including paramedical workers) to ophthalmologists has been instituted. Intelligent purchasing of consumables and careful evaluation for more efficient operating procedures has decreased wastage and maximized staff resources. In the settings above, it has proven possible to reduce the cost of cataract surgery to a level commensurate with the average monthly family income of approximately 60% of the population.

Quality has been improved by attention to training and use of routine manual extracapsular surgery with IOL. High quality has created demand for surgery in the population and has helped ensure the high volume.

What are the obstacles to developing self-sustaining systems?

Overall, there must exist the political will to become self-sufficient. (See essay by V. Sheffield.) In some places where a dependent mentality has evolved, this is a large problem.

In addition, there are numerous specific constraints which must be examined and addressed including:

manpower (surgeons, paramedical workers, and managers) and their training requirements; leadership and continuity of the staff; supply and equipment needs (acquisition, inventory control, costs, maximization of material resources); physical structure; and financial controls.

Would these programs work in other places?

We have only described two of the most comprehensive and successful programs. In any site, the obstacles listed above must be considered and locally appropriate solutions to each of these must be found. There are many aspects of developing systems for recovering the cost of cataract surgery. As the idea of local cost recovery, rather than charity from outside sources, becomes more popular, it is likely that other sites will attempt to set up such programs. Each will have to find unique solutions to the problems encountered, but it is hoped that the ideas here may serve as a general guideline.

Cataract Surgery Technique in Non-Industrialized Countries — Appropriate Technology

by Marty Spencer, MD and Baxter McLendon, MD

Will I be able to perform or teach my preferred cataract surgery technique?

Ophthalmic surgeons visiting developing countries should be aware that they will need to tailor their surgical technique to the conditions in which they will be working. Conditions vary widely among different developing countries, and it is not possible to make blanket recommendations regarding appropriate technique. The following points should be considered:

- The reliability of electrical power cannot be taken for granted; brownouts and blackouts are frequent occurrences in many non-industrialized settings.
- A good operating microscope cannot be taken for granted.
- Solutions for irrigation are often difficult to obtain, and the question of sterility is not always possible to answer.
- Anesthetic for injection may be old and less effective.
- Viscoelastic is usually not available
- In developing countries, there is a higher prevalence of hypermature cataracts with dense nuclei and tough capsules which often do not behave like the "immature" cataracts operated at home.
- Technical support is usually scanty or non-existent. In case of mechanical failure, there is usually no backup. In the event of a nuclear fragment being lost in the vitreous, there is rarely access to the expertise or instrumentation to remove it.

The above are technical reasons for exercising caution in the choice of surgical technique. Equally important is to consider the example being set. If the local infrastructure cannot support the technique, then its use or demonstration may be counterproductive, creating a sense of inadequacy and hopelessness. Keep in mind that the objective of work carried out in developing countries is to empower the people there. It is important to be aware of the local level of technologic sophistication. Ideally, any surgery carried out in a developing country will involve surgeons from that country. Teaching means leaving behind more than a few happy patients.

How can I determine which surgical technique is appropriate?

It is crucial to find out before leaving home the conditions under which you will be working, what is available, and the local 'technoculture.' Taking your own equipment and instruments is tempting, but it won't help the local ophthalmologist unless you plan to leave them behind. In general, "appropriate" may be defined as that which can be supported and sustained locally with as little dependence on outside sources as possible.

In most poor places, phacoemulsification will not be appropriate.

If the setting is rural, in a very poor country with poor sanitation and very little infrastructure, even ECCE-IOL may be inappropriate. In such a setting consideration should be given to doing ICCE with or without AC IOL, depending on the availability of an operating microscope. It is inadvisable to demonstrate the use of IOLs if there is no operating microscope, particularly if you have no experience in operating this way yourself! If ICCE appears to be the procedure of choice, it is important that you have experience with this technique yourself and that you find out what instruments are available to perform it.

If there is no possibility of obtaining IOLs after your departure, it will do little good to demonstrate their use. On the other hand, if ICCE is well established, there is a good operating microscope with coaxial illumination, irrigating solution is available or obtainable, and if there is (or you can introduce) a system for obtaining IOLs, training the local surgeons in ECCE would be a priceless gift.

How will the technique I use influence the indications for surgery?

In industrialized countries as recently as twenty years ago, the indications for cataract surgery were far more stringent than they are now. Before the advent of IOLs, monocular aphakia was a considerable handicap. Only in unusual circumstances would one operate on a unilateral cataract which was not dense if the fellow eye had good vision. Similar conditions still exist in many developing countries.

With unpredictable follow-up, limited postoperative glasses and no YAG laser, it is not reasonable to expect the same level of postoperative visual acuity as you may achieve at home. No matter what your skill level, your success rate usually won't be as high as it is in familiar surroundings, particularly at first. In these circumstances, a good principle is to select patients so as to maximize the chances of achieving a significant improvement in vision. This may seem obvious, but if we use guidelines such as many surgeons use in North America, patients may very well be made worse.

It would be arbitrary to set a standard visual acuity as a prerequisite for surgery. It is more appropriate to consider a patient's visual function - his ability to perform tasks related to taking care of himself and earning a living. Actual visual acuity needs for these tasks will vary widely in different places. Visual function assessments are under development and testing; a few commonsense questions about ability to perform work and take care of one's self will reveal a lot. In some situations it may be advisable to operate only on those with bilateral dense cataracts.

Patient selection has implications beyond the outcome for the individual patient. In developing countries, the bottleneck in delivery of service to the cataract blind is often not the availability of the services but of motivating and transporting the cataract blind to the hospital. It has been shown that the most effective means of doing this is through motivation of those in need by those who have obtained good service, i.e., the satisfied customer. Unhappy patients may undo a considerable amount of hard work.

Choose patients carefully, selecting those who are likely to be 'winners' and starting with the easiest cases with the best chance of improvement.

Management of Glaucoma in Developing Countries

by James Standefer, MD

How great is the problem?

Glaucoma afflicts up to 67 million and is at least the third — and possibly the second — leading cause of blindness worldwide. An estimated 5.4-6.7 million are blind from glaucoma. Eighty percent of those with glaucoma live in developing countries. These numbers will probably increase in the future because of increasing longevity in less-developed countries. The volunteer ophthalmologist can expect to encounter glaucoma when serving in developing countries even if the primary purpose of the visit is for cataract surgery.

How does glaucoma in developing countries differ from glaucoma in developed countries?

In most developing countries, people do not get routine eye examinations. Because most glaucoma patients are asymptomatic until a late stage, they usually present blind in one eye and with severe glaucomatous damage in the other. In general, the diagnosis of glaucoma in developing countries is usually made on the basis of elevated intra-ocular pressure; examination of the optic disc and slit lamp examination are often not done, and gonioscopy is rarely performed. Visual field testing is also rarely done (and usually neither appropriate nor needed).

As for treatment, medications are usually unavailable, unaffordable, or not taken. Therefore, filtering surgery is frequently the only option although meaningful follow-up care rarely exists. In countries with few ophthalmologists, patients almost always go untreated; the limited ophthalmological surgical services are understandably directed towards the more productive operation of cataract extraction.

In the past several years, especially in Asia, lasers have become more available (at least at larger centers) and are being used for trabeculoplasty, iridotomy, and gonioplasty. The latter two procedures are especially important in Asia because of the preponderance of angle closure glaucoma (see below).

What types of glaucoma are most common in developing countries?

The type of glaucoma most frequently encountered depends on the location. In Africa and the Caribbean, primary open angle glaucoma (POAG) is the most common type with a prevalence of four to six times greater than in Caucasian populations. Patients of African heritage who have glaucoma also tend to develop the disease at an earlier age, have higher intra-ocular pressures, are less responsive to medical treatment, and have a lower surgical success rate due to excessive scarring.

In Asia, primary angle closure glaucoma (PACG) is more common and comprises about 70% of all glaucoma. The great majority of Asian patients with PACG have the chronic form of the disease which is usually asymptomatic. Therefore, they present much like those with asymptomatic POAG, i.e., blind in one eye and with

advanced disease in the other. Angle closure can be present with or without pupillary block. Many Asians have thick brown irises which can result in peripheral iris crowding and a plateau iris configuration with resulting angle closure not due to pupillary block. Gonioscopy is necessary to determine the cause of angle closure because iridotomy or iridectomy alone is not sufficient treatment for those not due to pupillary block; laser gonioplasty or long-term therapy with weak pilocarpine drops (if these are available and compliance is likely) is also needed.

Glaucoma secondary to exfoliation of the lens capsule is present in almost all areas of the world and is very common in some. Local ophthalmologists may not be aware of the association of exfoliation and glaucoma and the usually very good response to laser. Volunteer surgeons are advised to do a pre-operative slit lamp examination to look for exfoliation because of the association of weak or broken lens zonules and the consequent increase in intra-operative complications.

Should glaucoma patients be given donated drops or prescriptions for glaucoma medication?

In general, for several reasons, it is not advisable to give donated drops to glaucoma patients in rural areas of developing countries. Most of the patients are poor and do not have disposable income for obtaining life-long medication. The medication given usually is not available in local pharmacies. Compliance is very poor in most patients. For one or more of these reasons, the bottle of donated drops is usually the only one the patient will ever possess. In addition, potential surgery is delayed, resulting in further damage until the patient returns (although they frequently don't).

Unfortunately, most of the patients who present with advanced glaucoma in both eyes are doomed to blindness; a sample bottle of drops may only transfer responsibility for the inevitable blindness onto the patient (or to the patient's children who may be asked to buy the drops), resulting in feelings of guilt or resentment.

Should volunteer surgeons perform glaucoma filtering procedures in the host country?

The most common cause of blindness in the world is cataract. If properly screened, most patients who undergo cataract surgery have a marked improvement in visual acuity. This is not true for filtering procedures. It is extremely difficult (even in developed countries) to educate patients about the "insurance" value of glaucoma filtering procedures. Thus, there is a negative impact associated with incisional glaucoma operations. (See essay by P. Courtright.)

Once patients leave the hospital, it is rare for them to return for postoperative visits. Poor patients do not have the money for transportation. Thus, the important postoperative phase of a filtering procedure is often non-existent, which adversely affects the success of the operation.

Therefore, glaucoma filtering surgery should be performed only on carefully selected patients. Good candidates would be those with moderate glaucomatous damage in one or both eyes and, ideally, those who would be most likely to return for postoperative care. If filtering surgery is contemplated for a patient with African heritage, consideration should be given to the use of an antifibrotic agent intra-operatively.

What are the indications for combined (cataract and trabeculectomy) procedures in developing countries?

If the volunteer is of the opinion that a patient with glaucoma and a cataract has vision potential which justifies cataract removal, then a combined operation is appropriate. If the optic disc cannot be visualized because of the cataract, vision loss secondary to glaucoma can often be estimated by confrontation visual fields using finger motion or light projection. Pupillary examination is very important because even in the presence of a mature cataract the pupil reactions are essentially normal unless there is other pathology present. An afferent pupillary defect or sluggish pupillary reactions in a patient with cataract and glaucoma are strongly suggestive of advanced disease and poor vision potential.

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Basics of Trachoma for Volunteers

by Susan Lewallen, MD

Why does a relatively benign infection cause blindness?

Trachoma is still the second- or third-leading cause of blindness in the world. Its cause is conjunctival infection with *C trachomatis*. A single infection with the organism causes a self-limited conjunctivitis, but when individuals are continually reinfected (by other members of the community), the conjunctiva eventually becomes scarred, resulting in entropion and trichiasis which then lead to corneal opacification and blindness. Trachoma blindness clearly ought to be preventable, but preventing it requires changes in basic behaviors which may be very difficult to bring about for economic and social reasons.

C trachomatis is sensitive to many antibiotics, including inexpensive tetracycline ointment. In the 1960s it was believed that trachoma could be eradicated simply by dispensing enough of this ointment. This proved not to be the case, however. For one thing, "simply" dispensing enough tetracycline turned out to be not so simple. There must be sufficient infrastructure (e.g., trained personnel and transportation) in place to dispense the medicine in the often remote areas where it is needed. Compliance with tetracycline twice a day for six weeks also proved problematic. Secondly, unless changes in hygiene accompany the treatment, individuals are simply reinfected several weeks after the antibiotic treatment is finished. Hygiene changes needed include such "simple" measures as keeping children's faces clean and reducing fly populations, but, again, these are not necessarily "simple" changes to put in place if there are no water supplies or latrines and if hygienic practices are not part of the culture. In the next few years, there may be a new long-acting systemic antibiotic available for trachoma control around the world.

Where are the trachoma blind in the world?

Trachoma is a disease of poverty: it can occur wherever there is a lack of water and sanitary practices. It is often associated with high fly densities, but this is not a necessary condition. Trachoma usually affects large parts of communities, not just single members, and it occurs in pockets throughout sub-Saharan Africa, the Middle Eastern countries, Asia, and Latin America.

The prevalence of inflammatory trachoma can drop off dramatically once hygienic practices improve, even without antibiotic treatment; this drop-off has often occurred when basic socioeconomic conditions improve as they have in some of the newly industrializing countries. In these settings, it is important to remember that there will still be a number of adults who have already developed the scarring which leads to entropion and trichiasis, and these adults are still at risk for blindness if the lid condition is not corrected surgically.

Women are blinded by trachoma twice as often as men, because of their greater exposure to children with infection and their reduced opportunity to receive surgical correction once they develop entropion and trichiasis.

What is being done today?

In 1996 the Global Initiative for the Elimination of Trachoma by

2020 (GET 20/20) was developed by the Trachoma Alliance (coordinated by the World Health Organization) (see the chapter on umbrella organizations). The Edna McConnell Clark Foundation has pledged substantial funding for this initiative which recommends implementation of a four-part strategy in order to eradicate trachoma in any area.

The acronym for the elements of the strategy is SAFE, which stands for (1) **S**urgical correction for entropion trichiasis (2) **A**ntibiotic treatment of cases of inflammatory trachoma (3) encouragement of **F**ace washing in children and (4) **E**nvironmental changes which will lead to improved hygiene. Programs to implement this strategy are now being funded in several countries.

A simplified trachoma grading system is accepted and used worldwide and supersedes all other grading schemes (e.g., the McCallan system). A copy can be obtained from the WHO. Of interest to the short-term volunteer in a trachomatous area is a publication (Reacher, Foster, Huber below) describing the recommended technique for repair of trachomatous trichiasis. In areas where programs to prevent trachoma blindness are in place, this procedure is often performed by medical assistants.

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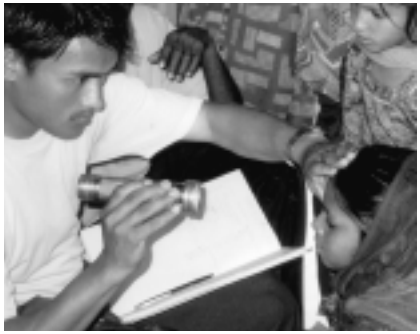
Childhood Blindness in Developing Countries

by Clare Gilbert, FRCOphth



What are the causes of blindness in children in developing countries?

The commonest causes of blindness overall are those which cause corneal scarring, e.g., measles infection, vitamin A deficiency, ophthalmia neonatorum, and use of harmful traditional eye medicines. However, the major causes of blindness in children vary enormously from region to region and country to country, and can vary over time in response to changes in socioeconomic development and health care provision. Approximately half the children in schools for the blind in developing countries are blind from conditions that could have been either entirely prevented (e.g., measles, vitamin A deficiency) or treated to prevent blindness or restore sight (e.g., cataract, glaucoma).

The data presented in tables 1 and 2 were collected by examining children in schools for the blind.

Table 1.
Anatomical site of abnormality causing severe visual impairment and blindness (<20/200 in the better eye) in children in different regions

Main site of abnormality	Latin America 7 countries 830 children		Asia 5 countries 2,235 children		Africa 10 countries 1,407 children	
	N	%	N	%	N	%
Whole globe	105	12.7	528	23.6	132	9.4
Cornea	83	10.0	606	27.1	438	31.1
Lens	64	7.7	266	11.9	133	9.5
Uvea	21	2.5	89	4.0	52	3.7
Retina	341	41.1	514	23.0	337	24.0
Optic nerve	100	12	133	6.0	135	9.6
Glaucoma	82	9.9	77	3.4	98	7.0
Other	34	4.1	22	1.0	82	5.8

The data show that retinal conditions are important in Latin American countries (mainly retinal dystrophies and retinopathy of prematurity) and corneal scarring in African countries. The picture in Asia is mixed, with corneal scarring being the most important, followed by lesions of the whole globe (e.g., microphthalmos) and retinal conditions.

Table 2.
Etiologic categories of severe visual impairment and blindness (<20/200 in the better eye) in children in different regions

Main site of abnormality	Latin America 7 countries 830 children		Asia 5 countries 2,235 children		Africa 10 countries 1,407 children	
	N	%	N	%	N	%
Hereditary	201	24.2	586	26.2	331	23.5
Intrauterine	75	9	45	2.0	40	2.8
Perinatal	167	20.1	68	3.0	101	7.2
Childhood	91	11	582	26.0	441	31.3
Unknown	296	35.7	954	42.7	494	35.1

In all the countries a high proportion of conditions are of unknown aetiology. Hereditary diseases are the most important in Latin America while conditions acquired during childhood are the most important in African countries. In Asian countries the picture is mixed.

What is the magnitude of the problem of childhood blindness and where do we get this information?

There are approximately 1.5 million blind children in the world, 90% of whom live in developing countries. For a variety of reasons there is a paucity of accurate epidemiological data on the prevalence of blindness in children in developing countries. Recently, under the auspices of the WHO, a standardized form for examination and reporting of blindness in children has been developed. This form may be used in population-based surveys or in blind schools and may be used in developing countries with minimal equipment as well as in more technically sophisticated environments. This form allows for classification of causes of blindness in two ways: 1) a descriptive system of the principal anatomical site affected 2) an etiological system based on the time of onset of the condition that led to blindness. The former is useful for situations where information on the underlying cause or age at which the child became blind is difficult to obtain, or where the condition may have multiple possible causes (e.g., microphthalmos which may be due to teratogens, chromosomal or genetic abnormalities, or intrauterine infections). This form has been used in a number of countries to generate data which may be compared.

Table 3.
Estimated prevalence of childhood blindness by region*

Region	<16 population (millions)	Blindness prevalence (per 1000)	Estimated no. of blind children	Distribution by region
Africa	240	1.1	264,000	17.7%
Asia	200	0.9	1,080,000	72.3%
Latin America	130	0.6	78,000	5.2%
Europe/USA/Japan	240	0.3	72,000	4.8%
Totals	1810		1,494,000	100%

*WHO (1992)

There are no data on the incidence of blindness in children. Data from countries where vitamin A deficiency is a major cause of blindness suggest that up to 50% of children die within 1-2 years of becoming blind.

What are the critical factors in avoiding blindness in children?

The term avoidable blindness encompasses the blinding eye conditions where prevention or treatment are possible. The following approaches can be applied to any condition:

Primary prevention:
• prevention of the disease, e.g., measles immunization, nutrition education to prevent vitamin A deficiency

Secondary prevention:
• early treatment to prevent consequences, e.g., antibiotics for ophthalmia neonatorum

Tertiary prevention:
• intervention to restore function or prevent handicap, e.g., cataract surgery on a blind child, corneal grafting

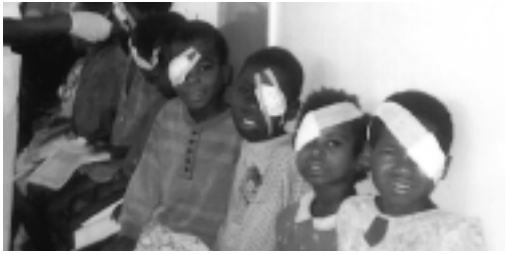


Table 4.

Avoidable causes of severe visual impairment and blindness in children in different region

Main site of abnormality	Latin America 7 countries 830 children		Asia 5 countries 2,235 children		Africa 10 countries 1,407 children	
	N	%	N	%	N	%
Preventable:						
Measles/VAD/TEM	9	1.1	470	21.0	310	22.0
Ophthalmia neonatorum	13	16.0	29	1.3	29	2.1
Retinopathy of prematurity	140	16.9	30	1.3	61	4.3
Toxoplasmosis	33	4.0	9	0.4	2	0.1
Autosomal D	38	4.6	62	2.8	59	4.2
Rubella	31	3.7	27	1.2	30	2.1
Other	20	2.4	86	3.8	35	2.5
Subtotal:	284	34.2	713	31.9	526	37.4
Treatable:						
Cataract	45	5.4	219	9.8	124	8.8
Glaucoma	75	9.0	76	3.4	79	5.6
Other	5	0.6	17	0.8	32	2.3
Subtotal:	125	15.1	312	14.0	235	16.7
Avoidable:	409	49.3	1015	45.4	761	54.1

In Latin America ROP is the single commonest avoidable cause which is occurring as neonatal intensive care units are being introduced. In African and Asian countries, corneal scarring from measles infection, vitamin A deficiency (VAD), and the use of harmful traditional eye medicines is the commonest.

Overall in these regions almost 1/3 of blindness in children could be prevented by good primary health care (i.e., water and sanitation, good nutrition, immunization, etc). Ophthalmic services providing surgery, follow-up, and optical correction could prevent blindness in a further 15%.

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Vitamin A Deficiency

by Alfred Sommer, MSc, MD

Why is it important to recognize vitamin A deficiency?

Mild vitamin A deficiency in children, so mild as to not cause any xerophthalmia, dramatically increases the risk of systemic complications, particularly the severity of infections,[1,9,10,12] anemia (from insufficient iron mobilization),[13-14] and death.[1,2,15-17] In the case of measles, not only does vitamin A treatment of severe cases reduce mortality by 50%,[9,10] but prophylactic improvement of vitamin A nutritional status in preschool-age children can reduce overall childhood mortality by 20-50% or more,[1] saving an estimated one to three million children's lives each year. This is two to six times the number of children that can be prevented from going blind.[18,19] Clinical recognition of even occasional cases of xerophthalmia may be the first evidence of far more prevalent, if milder, deficiency that places large numbers of children at increased risk of life-threatening morbid events.

Overlooking vitamin A deficiency and xerophthalmia robs the ophthalmologist of the opportunity of treating children who will otherwise go blind and/or die. It also deprives health officials of compelling evidence for the existence of vitamin A deficiency in the population, most of which is generally far more prevalent but milder than required to produce the occasional case of xerophthalmia but sufficient to dramatically increase the risk of severe infectious morbidity and mortality.[1,2]

Why is vitamin A deficiency often overlooked?

There are two major reasons that xerophthalmia is frequently unrecognized: the unusual presentation of classical forms of xerophthalmia, and the misplaced belief that vitamin A deficiency and xerophthalmia do not occur in that particular population.[1-3]

Ophthalmologists working in developing countries should become familiar with the appearance of xerophthalmia: night blindness, Bitot's spots, corneal xerosis and ulceration and keratomalacia (extensive corneal "melting," ultimately extending limbus to limbus).[1] Even those adequately trained however, frequently believe these manifestations of vitamin A deficiency occur in a predictable sequence: more severe disease (e.g., corneal ulcers) always being accompanied by milder manifestations (e.g., pre-existing Bitot's spots). Unfortunately, this is not the case. Any sudden deterioration of previously borderline vitamin A status can result in severe corneal melting before the clinical appearance of milder manifestations (conjunctival xerosis, Bitot's spots). This is especially true of measles and diarrhea.[1,4] Half of all measles-associated corneal destruction reflects acute decompensation of vitamin A status.[5] In addition, measles keratoconjunctivitis and secondarily infected corneal ulcers produce intense conjunctival inflammation which can either obscure or reverse epithelial keratinization and the presence of Bitot's spots.[1,6-7]

The etiology of corneal ulceration commonly goes unrecognized because vitamin A deficiency and xerophthalmia are thought not to exist in that particular population. This explains surprise reports of vitamin A-responsive corneal ulceration in American alcoholics and excessive rates of measles mortality and blindness in American children.[1] It also accounts for four cases of unexplained unresponsive corneal ulceration encountered in an eye hospital in Pakistan which subsequently (and dramatically) yielded to oral vitamin A given as "a last resort" (Professor David Khan, personal communication, February 1997).

What can be done about vitamin A deficiency?

Since all forms of xerophthalmia, including measles-associated corneal destruction, respond rapidly and maximally to immediate administration of large oral doses of vitamin A, these should be an essential component of the treatment of corneal ulceration associated with measles.[8] To prevent unnecessary blindness as well as death[1,9-10](see below), large oral doses of vitamin A are an essential component of the treatment of all cases of measles as recommended by WHO, UNICEF, and the American Academy of Pediatrics.[1,11] It is cheap, safe, and (in the presence of vitamin A deficiency) highly effective and far safer and more reliable than awaiting the results of laboratory tests to determine whether vitamin A deficiency is present or not.[1]*

The single most important clue to the existence of vitamin A deficiency and xerophthalmia is a high level of suspicion. If a corneal ulcer is unusual in appearance or responds poorly to traditional treatment, assume it may represent vitamin A deficiency and treat it accordingly.[1,3,20] If "mild" xerophthalmia is encountered in the community at large or corneal ulcers commonly accompany measles or respond rapidly to oral vitamin A, suspect

* The dose for children over one year is 200,000 ICU. immediately, 200,000 ICU. the following day, and 200,000 ICU. one week later. For children six months to one year old this dose is halved.

the problem is probably prevalent. In addition to assessing the vitamin A status in the population at large, initiate treatment of all children (and adults) with measles or chronic diarrhea and in particular, all children with corneal ulcers of uncertain etiology. Discuss the available evidence with local and national health officials. If vitamin A deficiency proves to be prevalent, local, regional, or national intervention programs that improve the vitamin A status of vulnerable segments of society are urgently needed to protect both sight and life.

A number of non governmental organizations (Egos) working in developing countries are involved in programs designed to improve the vitamin A status of populations at risk. Some programs focus on distribution of vitamin A capsules and some on the (more difficult) task of changing dietary practices. There is ongoing research into methods to identify populations at risk. These issues are discussed at regular meetings of the International Vitamin A Consultative Group (IVACG).

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Potential and Problems with Donated Equipment, Supplies, and Medications

by Harry S. Brown, MD

How can we ensure donations serve their purpose?

There is a great need for medical equipment, supplies, and medications in many economically developing countries. Donated medical equipment, supplies, and medicines, can make a tremendous difference to an underserved medical facility. The gift may be a boon, bringing a new or needed capability to the area.

Unfortunately this does not always happen, and sometimes gifts become a burden. In the case of poorly selected equipment, the result is a "medical monument" which serves only to gather dust. Inappropriate or outdated supplies and medications are useless and disappointing to receive. Both are a waste of time and resources and are constant reminders of a failed effort. Appropriate distribution of donations often poses a real logistical challenge.

WHO has developed guidelines to assist donors and recipients which include four core principles:
1) equipment, supplies, or medicines should benefit the recipient to the maximum extent possible;
2) a donation should be given with full respect for the wishes

and authority of the recipient and be supportive of existing government policies and administrative arrangements;
3) there should be no double standards in quality: if the quality of an item is unacceptable in the donor country, it is also unacceptable as a donation; and
4) there should be effective communication between the donor and the recipient: donations should be based on an expressed need and should not be sent unannounced.

WHO suggests the following considerations before making donations of supplies and medications:

1. Evaluating the need for specific items.
2. Can the items be reasonably used before the expiration date?
3. Will the donated supplies be used for the purpose for which they were donated, e.g., charity cases?
4. Who will be responsible for receiving and distributing the supplies?
5. What arrangements are required to meet customs regulations?
6. Who will be responsible for costs of packing and shipping the items?

TECH (Technical Exchange for Christian Healthcare) has developed quality standards for medical equipment for use in the developing world that expand concepts for donors and recipients alike. They suggest that in order for donated medical equipment to be maximally effective a number of factors must be present. These include:

1. A genuine need for the donated equipment.
2. A repair and maintenance capability.
3. Equipment that is complete and in proper working order.
4. Assurance that unit will operate on local electrical power.
5. Operating manuals included and complete.
6. Technical support available.
7. Replacement parts, bulbs, fuses, etc. available.
8. Proprietary supplies available, e.g., special graph paper, rolls, or forms.
9. Before shipping, unit will be checked for function and completeness.
10. Equipment has a reasonable life span.
11. Packing and transportation costs covered.
12. Customs regulations observed.

What harm can donations cause?

In addition to the logistical and practical problems which the above guidelines are designed to prevent, there are some other considerations to making donations. Although donations may help a clinic or eye care service and are welcomed enthusiastically when they arrive, donations are usually received sporadically. This creates great problems in planning services. Imagine trying to run your office or a hospital with undependable, hit-and-miss supplies.

A problem with pharmaceutical donations is the vast number of products with a plethora of brand names which are donated.

Many of these are combination drugs or drugs which may be intended only for minor symptomatic relief. The potential for misuse of this confusing array of eye drops is great.

In general, it is NOT in a clinic or hospital's best interest to rely on donations. Reliance on donations will not help a clinic become self-sustaining, and it makes it very difficult, if not impossible, for administrators and managers to develop expertise in planning realistically for services; lack of managerial expertise is sometimes a critical factor in why services fail in underserved regions.

The reputation of the clinic is not well served by reliance on donations; patients become discouraged when they arrive and are told to return another time when medicine or essential supplies may be available. Sometimes, donations may even undermine local efforts to find solutions or local businesses that could supply the product.

Many organizations send equipment, supplies, and medications to needy recipients around the world. Careful consideration and planning is necessary to ensure that these donations achieve the purposes for which they are intended.

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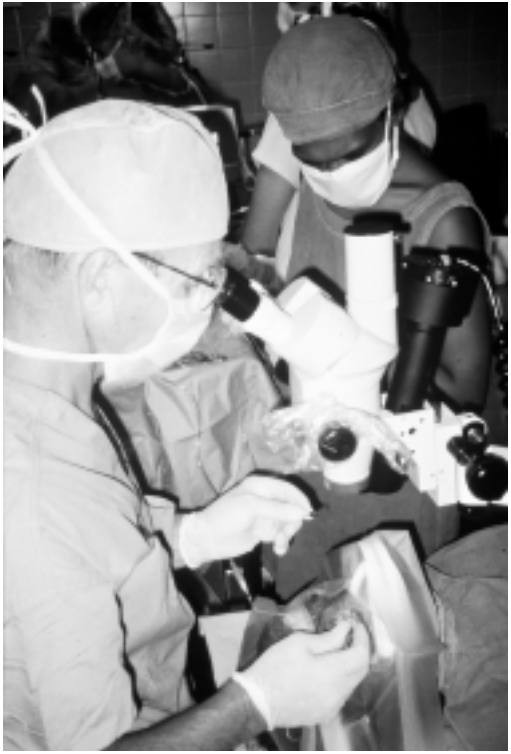


International Organizations Which Fight Blindness

by Victoria Sheffield, COMT

What are "umbrella" organizations and why do they exist?

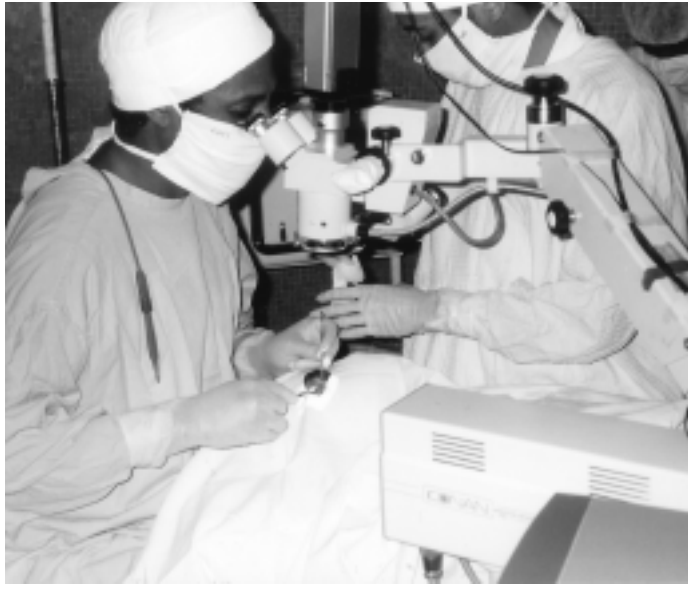
There are many organizations dedicated to preventing blindness in the developing world. These range from small organizations with only a few members who usually work in one specific area to larger philanthropic organizations which may have programs in a number of countries. These organizations are usually referred to as NGOs (nongovernmental organizations) or more recently NGDOs (nongovernmental development organizations.)

There are also "umbrella" organizations which are made up of members representing NGOs and other bodies and which exist for the purpose of coordinating work among these groups. This is important for several reasons:
1. without coordination, the various NGOs may find themselves duplicating efforts, or even working at cross purposes,
2. "umbrella" organizations may have "clout" to help convince governments to change policies and, specifically, to make eye care a priority in the country's health care planning, and
3. coordinating efforts and combining resources may allow some large projects to be carried out.

What are the umbrella organizations working in prevention of blindness?

1. World Health Organization Programme for the Prevention of Blindness

The World Health Organization (WHO) was organized in 1947. One of the first issues addressed by the WHO was the possibility of eradicating trachoma. Applied field research in the 1950s led to national trachoma control campaigns in the 1960s. A resolution in 1972 led to an inventory of global blindness data, which was scarce at the time, and the trachoma unit was expanded



into the WHO Programme for the Prevention of Blindness (PBL) in 1978.

WHO/PBL advises and assists national governments in the development of National Programmes for the Prevention of Blindness. Currently, more than 100 countries have such national programs at different stages of development. The purposes of such national programmes is to define the major problems of blindness for the nation, determine priorities, and mobilize resources to address the problems. The WHO/PBL also collects and publishes available data on the magnitude and causes of blindness around the world.

2. International Association for the Prevention of Blindness (IAPB)

The IAPB was formed in 1975 by Sir John Wilson and its stated purpose is "to promote and sustain a global campaign against all forms of avoidable blindness with emphasis on undeserved communities." In order to address the root cause of any blinding disease, there must be political will to overcome it. This takes commitment from government leaders who are convinced by global direction and local data. Action cannot be taken unless governments and/or the private sector commit financial and human resources to sustainable program development.

The IAPB is an advocate in working with public health authorities. It specifically promotes and supports regional conferences and workshops on prevention of blindness. The IAPB convenes an International General Assembly every four or five years.

3. The Partnership Committee

(formally Partnership Committee of the International Non-Governmental Organizations Dedicated to the Prevention and the Education and Rehabilitation of the Blind)

This group was formed in 1980 and, as of 1997, consisted of thirty-five NGDOs and nine observer organizations (including the AAO, IAPB, WHO/PBL, and the National Eye Institute among others).

Members contribute approximately $80 million annually to blindness prevention activities. Subgroups of the Partnership Committee have produced the "Global Initiative for the Elimination of Avoidable Blindness" which describes the status of blindness today and projections for the year 2020 and details targets for reducing these levels. The major priority of the Partnership over the next twenty-five years is to implement this initiative. Subgroups also fund projects specifically aimed at onchocerciasis control (in collaboration with the WHO/PBL and the World Bank) and trachoma control (Global Elimination of Trachoma by the Year 2020).

Summary

The prevalence and incidence of blindness and low vision will not be decreased in the developing countries until major changes are made in economic, political and sociocultural conditions. Coordinated efforts by the many interested parties have the potential to effect substantial sustainable changes. As a short-term volunteer, you can make an effort to learn all you can about development projects and the National Prevention of Blindness Programme in the country you visit and try to learn how your activities may fit within these structures.

Description of Photographs

Photos were provided courtesy of James Standefer, MD and the International Eye Foundation.

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Children awaiting an eye exam in Nepal.
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James Standefer, MD teaching micro surgery using a grapefruit in Nigeria.
James Standefer, MD

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Young girl identified with congenital cataract in Peshawar, Pakistan.
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Patients, 2 to a bed, at an eye hospital in Hanoi, Vietnam.
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A health worker examines children's eyes in Nepal.
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Post-op children awaiting examination in Lilongwe, Malawi.
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Two pediatric ophthalmic patients in Guatemala City, Guatemala.
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James Standefer, MD performs cataract surgery in the Solomon Islands.
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Dr. Desbele Ghebreghiorgis performs a cataract operation in Asmara, Eritrea.
International Eye Foundation

THE FOUNDATION
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