

# Specialty Care Systems: A Pioneering Vision For Global Health

Specialty care systems hold great promise for expanding access to care in developing countries.

**by Aman Bhandari, Sandra Dratler, Kristiana Raube, and R.D. Thulasiraj**

**ABSTRACT:** Successful health-sector reform in developing countries is built on sustainable service delivery models that meet reform goals while addressing community needs. When government efforts fall short, innovative private-sector solutions can offer more-efficient alternatives that provide care to impoverished populations. We identify organizations that use elements of a focused care approach to overcome barriers to delivering care in low-resource settings. Using the experience of the Aravind Eye Care System, we describe the essential elements of the specialty care model, its replication across countries, and the challenges to extending this model beyond eye care. [*Health Affairs* 27, no. 4 (2008): 964–976; 10.1377/hlthaff.27.4.964]

**T**HE CALL FOR HEALTH SYSTEM REFORM, driven by increasing costs, rising expectations, shifting demographics, limited capacity to pay, and skepticism of conventional ideas is heard around the world.<sup>1</sup> Failure of government systems and the traditional nongovernmental organization (NGO) community to fully address the health needs of the poorest of the poor has increasingly prompted the private sector to fill the gap. Alternative approaches have resulted in innovative and sustainable service models that meet reform goals while serving community needs. One such example, the “focused factory” or specialty care model, may provide important elements for expanding access to care and improving care delivery in developing countries. There are a growing number of cases, particularly in the global eye care community, of successful application of the specialty care model in low-resource settings.

Specialty care hospitals and clinics are generally characterized by their focus on a particular medical condition or disease area, or by the provision of specific medi-

---

*Aman Bhandari (amanbhandari@gmail.com) is a researcher at the Centers for Medicare and Medicaid Services in Baltimore, Maryland. Sandra Dratler is a lecturer in the School of Public Health, University of California (UC), Berkeley. Kristiana Raube is an adjunct professor in the Haas School of Business at UC Berkeley. R.D. Thulasiraj is executive director of the Lions Aravind Institute of Community Ophthalmology in Madurai, Tamil Nadu, India.*

cal and surgical procedures.<sup>2</sup> These focused, largely physician-owned centers have the potential for greater patient volume and, as a result improved outcomes, better quality of care and lower costs. They are also characterized by their focus on consistent management goals, core competencies, and an efficient specialized workforce.

In this paper we explore four key features of the specialty care model in developing countries, which, when successfully implemented, have resulted in expanded access to care: (1) implementation of management systems that emphasize standardization and continuous improvement; (2) the ability to attract and train a specialized workforce; (3) access to low-cost technologies; and (4) generation of patient volume. First, we describe how these elements have been used to expand access to care in a variety of settings outside of eye care. We then describe how the specialty care model has been applied by the global eye care community, and specifically by the Aravind Eye Care System, a pioneer of this model in India. Finally, we discuss the replication of this model and its challenges and limitations in other settings and for other conditions.

### **Promising Solutions For Expanding Access To Care**

■ **CFW Shops and clinics in Kenya.** There are limited examples of specialty care hospitals that deliver services to impoverished populations in developing countries; however, the features that define these organizations can provide important insights. The HealthStore Foundation's Child and Family Wellness (CFW) Shops and clinics in Kenya are an example of an organization whose success can be traced to the four key features (management systems, human resources, technology access, and volume). Although not a typical specialty care entity, CFW clinics focus on providing basic health services, and CFW Shops focus on providing access to affordable essential drugs (for malaria, diarrhea, respiratory infections, and parasites) for poor populations.<sup>3</sup>

The HealthStore Foundation's management strategy of franchising and standardization, similar to a Subway (sandwich store) franchise, is one of the most important aspects of the CFW Shops system; quarterly reporting, frequent inspections, and rigorous standardized training have helped build and maintain a trusted brand name. The CFW human resources strategy responds to the problem of labor-force shortages by recruiting retired nurses; its ability to offer nurses and community health workers a living wage and the opportunity to operate clinics and stores helps attract these workers.

To promote accessibility for patients, the locations of stores and clinics are carefully selected for proximity to the communities served. Moreover, with more than sixty-eight outlets (forty-five shops, twenty-three clinics) in Kenya that served almost half a million patients in 2006, the CFW network leverages its size to negotiate lower-cost medical supplies. In 2008 it plans to expand operations into Rwanda and to more than 200 shops and 1.5 million patients. The CFW project has expanded access to care and addressed health system barriers for problems

such as medical supply shortages, inconsistent quality, poor training, and proximity to care by implementing elements of a focused care system.

■ **LifeSpring.** Another example is the LifeSpring Hospital system, a new private venture in India. These hospitals, started in 2005, provide low-income urban mothers and children with access to reproductive and pediatric health care (for example, pre- and postnatal care, delivery, family planning, immunizations, and diagnostic services).<sup>4</sup> The hospital chain operates with investment from a joint venture between the Acumen Fund, a social venture fund, and Hindustan Latex (HLL), a family planning, health care, and medical supply maker and also the largest manufacturer of condoms worldwide. LifeSpring offers its services at 30–50 percent of the local market rates (for example, US\$35 for normal delivery, compared to US\$120 elsewhere). Its goal is to provide outpatient care to more than one million patients over the next five years. LifeSpring uses structured management systems via standardized quality protocols, hospital infection control procedures, and continuous quality improvement measures to improve outcomes and efficiency and to reduce costs. This model is influenced by both of its investment partners, which have business experience in this area and, in the case of HLL, a wide distribution network, with products sold in more than 500,000 retail outlets and 100,000 villages in India.<sup>5</sup> Through key partnerships, LifeSpring hopes that with increased volume, it will be able to obtain less costly technology and medical supplies. Additionally, it is working to form partnerships with nursing colleges to create a pipeline of staff for its hospitals, thereby reducing critical labor-force shortages. To increase its volume, LifeSpring has approached state governments and mobile health clinics to identify low-income patients. LifeSpring's goal is to become financially self-sustaining within the next few years through the cross-subsidization of higher-paying patients for private and semiprivate rooms as a way to increase revenues.

■ **Other examples.** There are examples of organizations that have adopted only some of the four elements described above. The Socjo Foundation, for instance, has adopted a franchising management system to deploy thousands of women in communities as social entrepreneurs who diagnose low vision and sell low-cost eyeglasses. Jaipur Foot, in India, indigenously manufactures prosthetic limbs at lower cost compared to those in the United States, with more appropriate design for local settings. Similar to the CFW system, Mi Farmacita in Mexico uses a classic franchising management model to expand pharmacy store operations for low-income clientele beyond the fifty-seven shops in fifteen Mexican states it had in 2007. The Medicine Shoppe in India is piloting low-cost health centers, with plans to open 600 locations over five years catering to low-income populations. In addition, the Medicine Shoppe is training community health workers to conduct community outreach and basic diagnosis.

All of these examples have expanded access in one form or another to low-income populations via a combination of strong management systems and local ownership, in conjunction with partnerships with larger, more established orga-

nizations and the ability to attract a labor force and provide low-cost medical supplies.

## Applying The Specialty Care Model To Eye Care: The Case Of Aravind

The past two decades have seen the successful implementation of specialty eye care hospital systems in low- and middle-income countries, including India and China. Many of these focused eye care hospitals have been modeled after the Aravind Eye Care System, which is perhaps the most successful example of a specialty care system for impoverished populations. We use the Aravind case to illustrate how it addressed barriers to delivering care in resource-poor settings.

■ **Incidence of blindness in developing countries.** Higher incidence of blindness, lack of health care services, and poor infrastructure are some of the factors that contribute to the disproportionately high rates of blindness in developing countries, which represent 90 percent of global cases. Cataracts, a clouding of the eye's lens that impairs passage of light to the retina, represent the single largest cause of preventable blindness worldwide and can be removed by a quick and straightforward operation that requires little postoperative care. Cataracts are responsible for the majority of blindness in India (approximately 63 percent), and it is estimated that more than six million operations are needed per year to tackle their rising incidence.<sup>6</sup>

■ **Aravind's beginnings.** In the 1970s, Govindappa Venkataswamy (known as Dr. V) saw that government efforts could not meet the growing backlog of cataract cases; he created an alternative model for delivering eye care, known today as the Aravind Eye Care System. Dr. V opened the first Aravind hospital in Madurai (in the state of Tamil Nadu) in 1976 with eleven beds, relying on family members as staff to reduce costs. As of 2008, Aravind has a combined total of 3,950 beds at five hospitals and examines more than two million patients annually—explosive growth since its early years (Exhibit 1). Revenue generated by paying patients is used to support the services provided at low or no cost to poor patients. In 2006 the Aravind system provided more than 2.3 million outpatient visits, of which 47 percent were provided at reduced prices based on ability to pay; approximately 270,000 surgeries were performed, of which 59 percent were at low or no charge (Exhibit 1).

■ **The Aravind mission.** In addition to features such as cross-subsidization and organizational efficiency, the hallmark of the Aravind organization has been the relentless pursuit of its mission to provide care to the poorest of the poor and to eradicate reversible blindness. Over three decades, using the four elements outlined above, Aravind has been able to scale up and reduce the cost of cataract surgery to under \$20, with outcomes equivalent to those in developed countries.<sup>7</sup>

■ **Aravind's management systems.** Early in Aravind's history, Dr. V constantly searched to improve the quality of care and increase the capacity to deliver care, drawing early inspiration from visits to the United States and seeing how the McDonald's fast-food chain provided affordable, consistent product quality through

**EXHIBIT 1**  
**Aravind Eye Care System: Historical Visits And Surgeries, Selected Years 1980–2005**

Year	Outpatient visits (direct and camp)			Surgeries		
	Total free	Paying	Total	Total free	Paying	Total
1980	65,344	31,334	96,678	5,427	2,511	7,938
1985	153,037	89,441	242,478	17,586	7,194	24,780
1990	338,407	227,243	565,650	31,162	17,896	49,058
1995	414,817	327,768	742,585	59,535	36,138	95,673
2000	763,888	567,105	1,330,993	134,498	58,267	192,765
2005	792,346	928,700	1,721,046	153,030	92,977	246,007
Total	13,128,483	11,251,644	24,767,761	1,934,101	1,111,049	3,089,155

**SOURCE:** Aravind Eye Care System.

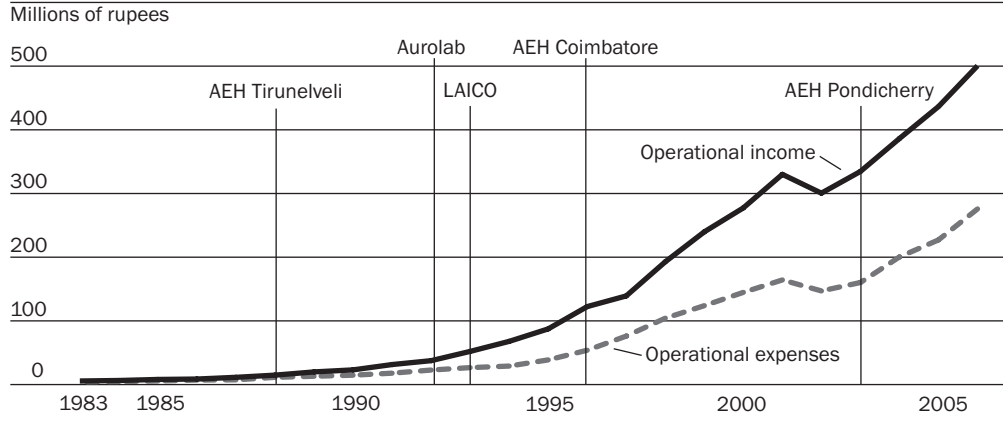
highly efficient systems replicated at each restaurant.<sup>8</sup> Efficient models of care were installed in the hospitals from the beginning by employing a highly specialized workforce and using standardized management and clinical care processes.<sup>9</sup>

An example of this is Aravind’s “serial production” model. In a single operating theater, when one patient is being operated on, the next is being prepared on the adjacent table. After completing one surgery, the physician remains in his or her seat and swings the operating microscope to the adjacent table to begin the next procedure; no effort is wasted on unnecessary, potentially time-consuming tasks (such as instrument and patient preparation) that can be done by trained paramedical staff.<sup>10</sup> As of 2008, an Aravind surgeon performs an average of 2,000 or more surgeries per year, measured against the Indian national average of 250.<sup>11</sup> Of the 12,000 surgical ophthalmologists in India, approximately 1 percent work for Aravind, where they conduct 5 percent of India’s ophthalmic surgeries. Similar to aspects of the Toyota “lean” methodology being adopted by U.S. health systems, no interaction or process is overlooked. Even matters such as patient registration are extremely efficient at Aravind, taking only one minute to register each patient.<sup>12</sup> This drive toward efficiency has resulted in not only effective coordination of care and patient management, but also an annual financial surplus that has been used to fuel Aravind’s growth without seeking outside funding for major capital investments (Exhibit 2).

In 1992, Aravind further formalized its focus on operational efficiency by establishing another arm of its system, the Lions Aravind Institute of Community Ophthalmology (LAICO), to improve the planning, efficiency, and effectiveness of all eye hospitals in India and beyond and to benchmark its own progress. LAICO’s core activities include training, consulting, research, and advocacy. It plays a leading role in supporting the replication of Aravind systems for eye hospitals globally.

■ **Building volume through community outreach.** Aravind has used aggressive community outreach to reach patients, reduce costs, and realize economies of scale.

**EXHIBIT 2**  
**Key Milestones, Income, And Expenses Of The Aravind Eye Care System In India, 1983–2006**



**SOURCE:** Aravind Eye Care System.

**NOTES:** AEH is Aravind Eye Hospital. Aurolab is a nonprofit manufacturing organization. LAICO is Lions Aravind Institute for Community Ophthalmology. As of April 2008, there were 49 rupees to the U.S. dollar.

One of Aravind's early innovations was the use of eye screening camps, which increased not only volume but also patient education and brand recognition. By partnering with local organizations that advertise the camps and recruit villagers, Aravind staff examine potential patients in these full-day screening camps. The trust they have developed over the years is illustrated by villagers' willingness to take a bus from the screening camp to the Aravind hospital (which can be up to twelve hours away). Between January 2006 and March 2007, Aravind conducted 1,793 camps, where staff screened 505,621 villagers, of whom 112,825 received surgery. Staffing of the screening eye camps is based on workload (small, medium, and large) as determined by a predefined set of expected patients. At any one camp, one to four doctors, along with a patient counselor, optician, optician technician, and camp organizer, are present.<sup>13</sup> This type of hub-and-spoke model went against the traditional and accepted practice of taking the entire surgical operation into the field and performing surgeries on site. The Aravind management recognized that eye camp/on-site surgeries created a bottleneck in serving as many patients as possible and that compromises had to be made with on-site surgeries that negatively affected patient outcomes in the field.

■ **Human resources and training.** Another key factor contributing to Aravind's success is its focus on training its workforce in the "Aravind way" and instilling its mission and culture throughout all levels of the organization. The goal of service (to humanity) and serving as many people as possible is the linchpin of the "Aravind way" and is what drives the commitment to continuous improvement and efficiency.

Aravind has built a wide range of clinical and nonclinical training programs, such as fellowship programs for physicians, project management courses for hos-

pital administrators, and instrument maintenance courses for lay personnel, all of which have drawn trainees from around the world.<sup>14</sup>

One of its key successes in developing a workforce is perhaps best illustrated by its paramedical staff program. Initially, Aravind hired registered nurses for the hospital but soon found it too costly and difficult to find and retain an adequate supply, so it created a paramedical “sisters” program. The brainchild of Dr. Govindappa Natchiar, sister of Dr. V and cofounder of Aravind, the paramedical program recruits young women from the villages of Tamil Nadu to serve in a variety of roles within Aravind, from housekeeping to nursing to manufacturing. These women are approximately eighteen years old and have completed some high school. After general training, the “sisters” are directed into different specialties according to their strengths and abilities and complete a total of two years of training. Turnover of the “sisters” is an expected feature of the program, because these young women typically serve for three to four years beyond the initial training period with Aravind until they are married. The paramedical program has been so successful that “sisters” now travel all over India and abroad to train others in setting up similar programs. The paramedical program’s success has been built upon a steady workforce drawn essentially from the population in its service areas. In addition to being more cost-effective than using highly educated professional nurses, the “sisters” have a familiarity with the local culture and social norms that allows them to better relate to patients, improving service delivery.

■ **Technology development.** A major barrier to widespread cataract surgery in the early 1990s was the unavailability of inexpensive intraocular lenses, used to perform cataract operations, that yielded a much better quality of vision and had become the standard of care in the developed world. For Aravind, the cost of imported lenses was prohibitive, and reliance on a nonsustainable donor model for the supply of critical medical goods was no longer a viable option. Aravind addressed this technology gap and reduced its dependency on donations of intraocular lenses by building and operating its own manufacturing plant, known as Aurolab, a globally unique organization.<sup>15</sup> Remarkably, as a nonprofit, Aurolab became the first indigenous manufacturer of synthetic lenses and paved the way for the private for-profit sector in this area in India. Collaboration between Aravind and two key partner organizations resulted in the creation of a manufacturing plant that reduced the price of the lenses from \$200 to less than \$10, a significant breakthrough. Today Aurolab produces affordable lenses, sutures, surgical blades, pharmaceuticals, and other consumables. Aurolab intraocular lenses are used in more than 100 countries, exported through various NGO partners and distribution channels, which make up 10 percent of the global market for intraocular lenses. The existence of Aurolab allowed Aravind to develop appropriate technologies and control the supply of medical goods, which helped address a fundamental barrier to health care delivery.

■ **Exporting the eye care model.** As a testament to the potential for successful model replication, Aravind has helped other eye care organizations increase their

cataract surgery volume through training and consulting services. Between 1997 and early 2008, 231 eye hospitals (188 in India and 43 elsewhere) have worked with Aravind to adopt elements of its system. Some—for example, in Bangladesh and Tanzania—have focused on strengthening specific processes, while others have adopted the model in its totality. At the end of the two-year LAICO capacity-building process (the complete cycle of the consultancy initiative), a study of sixty-nine hospitals showed a sizable increase in their performance, resource use and throughput, and increased cost recovery (revenue generated through patient fees versus spending) (Exhibit 3). LAICO's capacity-building services focus on core concepts in eye care: demand generation, quality, resource use, and sustainability. This process is followed systematically: a multidisciplinary team of LAICO consultants undertakes situation assessment and gap analysis, conducts a strategic planning workshop, and derives an implementable business plan with the eye care facility. Generally there are four to five hospitals participating in such workshops, which enriches learning. Consultants conduct follow-up visits after six to eight months, and LAICO receives monthly progress reports and provides off-site support to the hospitals.

*India.* In Chitrakoot, India, for example, the Sadguru Netra Chikitsalaya (SNC) eye facility conducted 25,000 surgeries a year before 2002, predominantly without the use of intraocular lenses and completely supported by donor funding. Subsequent to the inputs from Aravind and its partner organizations, this hospital performed more than 50,000 state-of-art cataract surgeries and became financially self-sufficient.<sup>16</sup> Additionally, the SNC started using intraocular lenses for the majority of surgeries, which attracted more paying patients and limited doctor turnover. This transformation, achieved in a little over three years, has opened subspecialty services and helped the SNC facility become an attractive place for ophthalmologists and other professionals to work.

*China.* In China, the He Eye Care System has used Aravind as a role model since 2001. The He Eye Hospital was founded in 1995 as the first nonprofit eye hospital in China. After ten years in operation, it has grown to four owned hospitals and

---

**EXHIBIT 3**  
**Impact Of Lions Aravind Institute Of Community Ophthalmology (LAICO) Capacity-Building Process For Sixty-Nine Hospitals**

---

Impact on	One-year performance		
	Preintervention	Postintervention	Percent increase
Cataract surgeries	87,050	134,282	54
Cost recovery via user fees	58%	90%	55
Surgeries per ophthalmologist	496	721	45
Surgeries per bed	34	40	18

**SOURCE:** Aravind Eye Care System.

two managed eye departments within government hospitals. The hospital's founder, Wei He, envisions a comprehensive eye care system that covers clinical service, education and training, research, public eye care, and eye products manufacturing; this Aravind-like model has led to financial sustainability and continued growth. Staff from He have taken management courses at Aravind; along with the open model of sharing among the global eye care community, especially through entities such as Vision 2020, Aravind has demonstrated that efficient, high-volume, and high-quality eye care can be delivered in various settings where there is a commitment to providing access to the broader community.<sup>17</sup> Recently, as one example of exchange, the Aravind staff visited He to specifically improve community outreach, information technology (IT) system development, and management, and in 2006 a dozen He staff trained at LAICO in Madurai.

### **Challenges To Replicating The Specialty Eye Care Model**

Beyond management systems, access to a highly specialized workforce and generating demand can be a challenge to implementing the specialty care model. At the core of the Aravind model's efficient delivery of surgical eye care is a highly trained cadre of physicians and mid-level personnel willing to become proficient within a narrow scope of activities that combine to form the full delivery system. At Aravind, this cadre is recruited from the local area and intensively trained in their specialization; however, in rural India, lower population density and lower levels of education can make this difficult. In countries such as Egypt and China, eye care systems seeking to adapt the specialty eye care model have found resistance from the medical establishment to the use of mid-level personnel in place of professional clinical staff. In response, the He Eye Care System opened the He College of Ophthalmology and Visual Sciences in 2007 to provide medical and management training for eye care services as a means to assure a highly trained workforce for the Chinese context.

■ **Achieving economies of scale.** As Aravind matured, it capitalized on economies of scale driven by high patient volumes, which are most easily obtained by locating services in urban areas or settings where people are willing to travel to eye camps, vision centers, or kiosks. Geography, cultural norms, and organizational capacity (developing the ability to have adequate logistics planning and busing, for example) all affect the ability to acquire large patient volumes. For Aravind, the hub-and-spoke model was the most effective way of reaching patients, but efforts in locations such as the Himalayas and Nepal have had to develop the ability to perform high-quality surgeries in remote locations because of mountainous terrain and transportation challenges.<sup>18</sup> In China, the population may be less willing to travel long distances to a central facility because they are accustomed to village-based services. In parts of Africa, the population is much less dense than in China and India, requiring many more screening camps with much lower attendance at each.

■ **Patient education problems.** Additionally, other countries face patient edu-

cation problems that Aravind faced early on: the widespread perception that cataracts are untreatable and the refusal of treatment out of fear. Aravind performed intensive community outreach and education to deal with these problems.<sup>19</sup> Aravind's practices for generating high patient volumes likely require modification and adaptation to suit local conditions.

■ **Obtaining appropriate technology at low cost.** Appropriate technology at low cost can be extremely challenging to source or develop depending on location. For example, the He Eye Care System has established its own biotech incubator as a joint venture with the provincial government. Yet even though this cutting-edge innovation is taking place, the high cost of intraocular lenses in China leads to a cost per cataract surgery that is twelve times more than in other Asian countries.<sup>20</sup> The He Eye Care System has explored establishing its own manufacturing arm like Aurolab, but it has found that regulation of intellectual property rights, clinical trial mandates, and long government approval processes increased costs to the level of costly imported lenses. In general, the cost of lenses and cataract surgery is much higher in other regions (cataract surgery costs approximately US\$20 in South Asia, US\$90 in Africa, US\$175 in Latin America, and US\$1,700 in the United Kingdom and the United States).<sup>21</sup> Other countries may also face high-cost regulatory hurdles and importation restrictions that will clearly affect the cost of critical medical supplies and the ability of a particular system to offer lower-cost state-of-the-art care.<sup>22</sup>

## Challenges Beyond Eye Care

It may be difficult to deploy an entire traditional specialty care hospital system that is focused on impoverished communities for more complex conditions, such as comprehensive cardiac or diabetes care.<sup>23</sup> In contrast to chronic diseases that require multiple interventions, cataract surgeries offer a finite intervention with a tremendous clinical and social payoff. The surgery itself can be completed relatively quickly, with little blood loss, and it does not require extensive follow-up or rehabilitation. This leads to an ability to complete multiple procedures quickly and efficiently. In addition, because blindness affects poor and rich alike, there is a ripe opportunity to cross-subsidize the costs from rich to poor.

■ **Applying the model to hearing loss.** Project Impact, a U.S. nonprofit, is an example of attempting to apply the Aravind model to hearing loss. With help from Aravind's manufacturing arm, Aurolab, Project Impact began manufacturing lower-cost hearing aids a few years ago. Like blindness, hearing loss affects both rich and poor and is largely untreated. The World Health Organization (WHO) estimates that 250 million people worldwide could benefit from a hearing aid. Project Impact reduced hearing aid costs to below US\$60 per ear, compared to US\$1,500 per ear in the United States. Although it is difficult to compare a very early-stage endeavor with Aravind's thirty-year enterprise, some important differences can be highlighted. Tackling hearing loss means facing the challenge of dealing with high levels of stigma from wearing a fitted piece, a dearth of audiologists and advocacy organi-

zations, constant service needed for the hearing aids, periodic visits for adjustment (which introduces major problems of transportation and lost income), suboptimal technology design for harsher conditions (such as heat, dust, noise, and infrequent power supply), still relatively high per unit costs, and lack of awareness about potential treatments.<sup>24</sup>

■ **Other examples of overcoming the barriers.** This example is a useful illustration of how other health conditions might differ from the case of eye care and demonstrates the importance of being able to implement appropriate management systems, build volume, obtain medical supplies, and tap into a labor force. Sourcing appropriate technologies for developing countries along with delivering care is challenging, to say the least, but it has been done.<sup>25</sup> The conventional wisdom for organizations serving the poorest of the poor is that delivering state-of-the-art technology and health/pharmaceutical care is impossible because of a variety of barriers. However, there are increasing examples of early and established organizations such as Partners in Health for the case of HIV/AIDS and others mentioned in this paper that have expanded access to care in low-resource settings.<sup>26</sup>

### **Applying The Specialty Care Model To Developing Countries**

Countries such as India and China face a double burden of infectious and chronic diseases. The changing dynamics of demographics, disease burden, and economic growth is further complicated by the shortage of trained personnel, inadequate health care facilities, and insufficient investment in the health system infrastructure. Given these forces, the examples we have discussed may hold great relevance for the future of health care delivery in the developing world. Health care systems should look to incorporate lessons from such organizations and to incorporate indicators of other high-performing health systems (quality, access, efficiency, and the capacity to innovate and improve).<sup>27</sup>

By developing a core competency—expanding access in a focused area of care—organizations in developing countries can marshal needed resources. Being a specialty care system has made it easier for organizations such as Aravind to standardize management and clinical processes, train a specialized paraprofessional workforce, pursue lower-cost technology, and build volume with focused community outreach and education.

The organizations outlined above are largely defined by their ability to implement efficient management systems that have been influenced or supported by international partner organizations. Often, foundation and NGO funding for human resources in health care tends to focus on fostering clinical capabilities instead of management capabilities. Management expertise is just as important as clinical expertise in developing efficient systems that can expand access to care. Providing support for the development and training of managers thus should be a priority.

Local organizations, foundations, NGOs, and governments should also continue to partner to investigate creative funding mechanisms (for example, via fran-

chising, microfinance, or stimulating local ownership), acquire technology/medical supplies, engage in advocacy for regulatory repeal where regulation poses a major barrier, research the best community outreach and social marketing methods, and share knowledge about how to transfer best practices and systems. The organizations we have discussed have benefited greatly from such partnerships. However, these partnerships benefit all and have been far from one-sided. For example, the HealthStore Foundation and its CFW Shops have partnered with Proctor and Gamble to distribute its water purifying product, PUR; also, with various partners (ExxonMobil Foundation, the WHO, and the Kenyan Ministry of Health), they are conducting implementation research on the distribution of antimalaria medicine.

**T**HE ORGANIZATIONS WE HAVE DISCUSSED and the elements of their models provide promising solutions for addressing various barriers facing countries with poor health care infrastructures. However, this is but one method, and there is a tremendous need for coordinated and integrated systems of care along with workforce development projects. More thought needs to be given to the lessons learned from these successful examples, and further study is needed to determine how focused care models can also be applied to expand access to care. Approaches from the field that are sustainable and scalable are still limited, and examining real-world solutions is worth additional investigation.<sup>28</sup>

*The authors gratefully acknowledge the support of the University of California, Berkeley, UNIDO–Management of Technology Fellowship, which partially funded some of this work. They also acknowledge Mahad Ibrahim and Jaspal Sandhu for their contributions to the initial analysis; the Aravind staff for their support; and Vicki Fung along with the anonymous reviewers for their valuable contributions to the revision of the manuscript. The views expressed in this paper are those of the authors and not necessarily those of the U.S. Department of Health and Human Services.*

#### NOTES

1. M.J. Roberts et al., *Getting Health Reform Right: A Guide to Improving Performance and Equity* (New York: Oxford University Press, 2004).
2. J.E. Schneider et al., "Economic and Policy Analysis of Specialty Hospitals," Health Economics Consulting Group White Paper, February 2005, <http://physicianhospitals.com/var/files/news/news2645.pdf> (accessed 1 April 2008).
3. M. Fertig and H. Tzaras, "Healthstore's Franchise Approach to Healthcare," What Works Case Study for the World Resources Institute (Washington: World Resources Institute, November 2005).
4. Acumen Fund, "Hospitals for Maternal and Pediatric Care," 2007, <http://www.acumenfund.org/investment/lifespring.html> (accessed 17 April 2008); and LifeSpring Hospital home page, <http://www.lifespringhospitals.com>.
5. See the Hindustan Latex Limited home page, <http://www.hindlatex.com>.
6. G.V. Murthy et al., "Current Estimates of Blindness in India," *British Journal of Ophthalmology* 89, no. 3 (2005): 257–260; and R.B. Vajpayee et al., "Epidemiology of Cataract in India: Combating Plans and Strategies," *Ophthalmic Research* 31, no. 2 (1999): 86–92.
7. C.K. Prahalad, *The Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits* (Philadelphia: Wharton School Publishing, University of Pennsylvania, 2004).

8. S. Miller, "McSurgery: A Man Who Saved 2.4 Million Eyes: Ophthalmologist in India Revamped Care for the Poor," *Wall Street Journal*, 5 August 2006.
9. T. Young et al., "Using Industrial Processes to Improve Patient Care," *British Medical Journal* 328, no. 7437 (2004): 162–164.
10. R.D. Thulasiraj and V. Srinivasan, "Care of Instruments and Equipment: A Success Story," *Community Eye Health* 20, no. 61 (2007): 16.
11. Lions Aravind Institute for Community Ophthalmology, "Quality Cataract Surgery Series: Introduction to High Quality, Large Volume, Sustainable Cataract Surgery Programmes," February 2001, <http://laico.org/v2020resource/files/Intromod.pdf> (accessed 21 April 2008).
12. Prahalad, *The Fortune at the Bottom of the Pyramid*, 274.
13. For more information, see Aravind Eye Care System, "A Trip to an Eye Camp," <http://aravind.org/community/trip.asp> (accessed 17 April 2008). Also see R.D. Thulasiraj and R.M. Sundram, "Optical Services through Outreach in South India: A Case Study from Aravind Eye Hospitals," *Community Eye Health* 19, no. 58 (2006): 29–30.
14. A full list of courses and course content is available on Aravind's education home page, <http://aravind.org/education/homepage.htm> (accessed 17 April 2008).
15. M. Ibrahim et al., "Making Sight Affordable (Part I): Aurolab Pioneers Production of Low-Cost Technology for Cataract Surgery," *Innovations: Technology/Governance/Globalization* 1, no. 3 (2006): 25–41.
16. SNC staff took courses at Aravind in various areas such as community outreach and social marketing. Along with Aravind partner organizations, ORBIS International and the Seva Foundation, SNC dramatically improved its financial recovery, stabilized previously erratic demand, improved quality, and reduced staff turnover.
17. Vision 2020 is the global consortium of NGOs, government agencies, and institutions whose mission is to "eliminate the main causes of avoidable blindness by the year 2020 by facilitating the planning, development and implementation of sustainable national eye care programmes." More information is available on the Vision 2020 home page, <http://www.v2020.org>.
18. G. Tabin, "The Cataract Blindness Challenge," *Innovations: Technology/Governance/Globalization* 2, no. 4 (2007): 53–57.
19. S. Aravind, A. Haripriya, and B.S.S. Taranum, "Cataract Surgery and Intraocular Lens Manufacturing in India," *Current Opinion in Ophthalmology* 19, no. 1 (2008): 60–65.
20. Project ORBIS International, "China Country Situation Analysis: A Long Range Strategic Plan Document of ORBIS International China Program" (Shanghai: ORBIS, July 2002).
21. Ibrahim et al., "Making Sight Affordable (Part I)."
22. These issues apply more to developed nations such as the United States than to developing nations. In addition to the substantial costs for drug and device approval, U.S. labor, facility, and administrative costs would far exceed any financial gains from having low-price intraocular lenses. However, the drive to provide high-level customer service and continual improvement are pieces of the model that can be exported.
23. Recently there has been growth in specialty care cardiac hospitals in various parts of Asia. These systems operate for profit and are focused on the wealthy elite in their host countries and also cater to the medical tourism market. They are not focused on low-income communities. However, it is conceivable that they could provide charity care in subsidiary facilities that do cater to low-income patients.
24. J.S. Sandhu et al., "Appropriate Design of Medical Technologies for Emerging Regions: The Case of Aurolab" (Proceedings of the ASME International Mechanical Engineering Congress and Exposition, Orlando, Florida, November 2005).
25. M.J. Free, "Achieving Appropriate Design and Widespread Use of Health Care Technologies in the Developing World: Overcoming Obstacles That Impede the Adaptation and Diffusion of Priority Technologies for Primary Health Care," *International Journal of Gynaecology and Obstetrics* 85, no. 1 Supp. (2004): S3–S13.
26. P. Farmer et al., "Community-Based Approaches to HIV Treatment in Resource-Poor Settings," *Lancet* 358, no. 9279 (2001): 404–409.
27. Public Policy Committee of the American College of Physicians, "Achieving a High-Performance Health Care System with Universal Access," *Annals of Internal Medicine* 148, no. 1 (2008): 55–75.
28. C.A. Gardner, T. Acharya, and D. Yach, "Technological and Social Innovation: A Unifying New Paradigm for Global Health," *Health Affairs* 26, no. 4 (2007): 1052–1061.