



Replicating Indian Eye Care Innovations in Mexico: The Founding and Expansion of salaUno



International Partnership *for* Innovative Healthcare Delivery

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Executive Summary

Inspired by C.K. Prahalad's *The Fortune at the Bottom of the Pyramid*, Javier Okhuysen and Carlos Orellana co-founded salaUno (SU), a Mexico City-based eye care center. Launched in 2011, salaUno's model draws heavily from the decades of experience of the Aravind Eye Care System (AECS) and LV Prasad Eye Institute (LVPEI) in India. The founding and subsequent expansion of salaUno in Mexico created an observation point of the challenges of replicating a successful health innovation from one culture (India) and contextualizing it to another (Mexico). Within two months of operation, SU had positive cash flow, which supported initial optimism for SU's vision of opening and operating 10 surgical centers by 2016. Mukesh Singhal, an MBA intern with the International Partnership for Innovative Healthcare Delivery (IPIHD), visited eye care centers in India and Mexico in July and August 2012 to conduct the primary research for a descriptive case study of the replication of a low-cost, high-quality, high-volume eye care model in Mexico.

Drawing upon best practices from AECS, and to a lesser extent LVPEI, SU is emulating key success factors with the expectation of achieving more quickly the impressive results realized in India. Through a review of SU's development and the care delivery models of AECS and LVPEI, IPIHD intern Mukesh Singhal identified six principles that SU has adopted in their early efforts.

1. Charismatic leadership inspires staff and creates an organizational culture with a commitment to lean production, continuous process improvement, and patient-centered care.
2. SU's compelling vision, "eliminating needless blindness," applies to all income levels. SU is committed to serving everyone with the same high quality of care, regardless of ability to pay. This goal is achieved through a cross-subsidization structure in which additional amenities, including upscale waiting rooms and reduced wait times, are offered to patients able and willing to pay for such services. Revenue generated by paying patients helps to cover the cost of care provided to those who cannot pay.
3. High volumes are required to cover the high fixed costs of eye care surgery. India and Mexico are both markets with high unmet eye care needs. However, significant outreach to patients is required to generate adequate numbers for consultation and a resulting fraction who, upon positive diagnosis, seek treatment.
4. Standardization of processes reduces training time, eliminates wasted steps and allows workers to focus on a limited, specific set of tasks with associated quality measures and continuous improvement approaches. Standardization enables economies of scale, which further reduce costs.
5. Right-skilling reorganizes roles and responsibilities whereby each worker is trained for specific knowledge, skills, and abilities. Tasks that can be reorganized away from a highly paid surgery or ophthalmology role, without sacrificing quality, are shifted to other roles.
6. The Indian models emphasize mentoring and teaching: the less experienced learn from the more senior, allowing continuous movement to higher-skilled roles upon mastery of the preceding level. Patients are triaged such that less experienced workers take lower-intensity, lower-complexity cases and increase their capabilities over time toward more complex cases.

SU faces several challenges on the path to realizing its vision of “eliminating needless blindness”¹ :

- Balancing fidelity to the AECS-proven approaches with the demand to contextualize those approaches to Mexico
- Achieving a sufficient volume of diagnoses and treatments to fulfill the business model requirements
- Gaining staff acceptance of lean processes, new roles, and right-skilling coupled with ever-increasing volumes
- Doing well by doing good: pursuing social welfare goals in a for-profit organizational structure

SU creates an observation point for gauging the challenges of adapting a proven innovation to a new context. It may also contribute insights to the emerging phenomena of “reverse innovation” in health care, where innovations developed for a low-income country can be adapted for an unmet need in other countries, including high-income countries.

Acronyms

AECS	Aravind Eye Care System
CF	Cinépolis Foundation, which grew out of the Cinépolis movie theater chain, supports eye surgeries in an alliance with SU
EE	Enabling environment; can also be described as “innovation ecosystem”
HIC	High-income country
ICCE	Intracapsular cataract extraction, a procedure that uses large corneal incisions to remove the defective natural lens in the eye
IOL	Intraocular lens (manmade)
IPIHD	International Partnership for Innovative Healthcare Delivery
LAICO	Lions Aravind Institute of Community Ophthalmology Institute
LIC	Low-income country
LVPEI	LV Prasad Eye Institute
PEC	Pyramid of Eye Care model
PHACO	Phacoemulsification, a surgical technique in which the natural eye lens is emulsified with an ultrasonic hand piece and aspirated from the eye, then replaced with an IOL
SP	Seguro Popular, a government insurance program targeting Mexico’s informal (non-taxable) workers
SU	salaUno

¹ salaUno internal training materials describing “5 pillars”, 2011.

Global Perspective on Eye Care: Pioneer Indian Innovators

Blindness, poverty and eye care

Loss of eyesight is linked to significant income loss; the impairment often reduces or eliminates the ability to earn a livelihood and support a family. Independence is lost, and ongoing care is required for the activities of daily living. The WHO estimates that more than 285 million individuals across the globe are visually impaired and that more than 39 million are blind.² The capacity to treat blindness with proven effective treatments has not kept pace with the incidence of blindness; thus, the estimates of global blindness continue to grow (see Table 1),^{3,4} Seventy-six percent of cases of visual impairment and 50% of cases of blindness—affecting more than 210 million and 19 million people, respectively—are avoidable through preventive measures. Cataract surgery, a simple surgical procedure, could relieve blindness in 50% of global cases.⁵ Countries in the developing world face many obstacles, including overpopulation, poverty, mass illiteracy, limited resources, and insufficient numbers and maldistribution of health workers.⁶ Rates of blindness and visual impairment are disproportionately high in poor countries, primarily due to infectious agents (e.g., trachoma) and a lack of eye-care services.

Year	Estimates of blindness
1972	10–15M
1978	28M
1984	31M
2002	37M
2011	39M

Table 1: Estimates of the number of globally blind

Not only does visual impairment personally affect those with the condition and their families, but it has a significant impact on the economy.⁷ In 2010, the direct and indirect (productivity, informal care, etc.) healthcare system costs to the global economy as a result of visual impairment were estimated to be greater than \$2.3 trillion and \$3.0 trillion, respectively. A subsequent study by the University of Michigan and VisionSpring, a non-profit social enterprise whose purpose is to alleviate global visual impairment, indicated that a pair of eyeglasses given to a visually impaired individual increases their productivity by 35%.⁸ Individuals in the study who obtained eyeglasses experienced a 20% increase in their monthly incomes. These findings suggest that solutions for the visually impaired and needlessly blind can have a profound impact on their lives and the economy.

With the second largest population in the world, India is home to a significant portion of the global blind (8.1M)⁹ and accounts for over 20% of the visually impaired.¹⁰ In the lowest segments of the socioeconomic strata, the prevalence of blindness is nine times greater than in the highest.¹¹ The lack of resources and expertise in ophthalmology make the process of reaching the marginalized that much more difficult. In the 1980s, whereas phacoemulsification (PHACO) surgeries in developed countries had become common, the few cataract

2 Paul Courtright and Susan Lewallen, "Global Blindness 2010: What Do We Know?," *Expert Review of Ophthalmology* 6, no. 3 (2011): 385-92

3 World Health Organization, "Vision 2020: The Right to Sight," accessed September 29, 2013, http://www.who.int/blindness/Vision2020_report.pdf.

4 Donatella Pascolini and Silvio Paolo Mariotti, "Global Estimates of Visual Impairment: 2010," *British Journal of Ophthalmology* 96, no. 5 (2012): 614-18.

5 Donatella Pascolini and Silvio Paolo Mariotti, "Global Estimates of Visual Impairment: 2010," *British Journal of Ophthalmology* 96, no. 5 (2012): 614-18.

6 G. Natchiar, Alan L. Robin, Ravilla D. Thulasiraj, and Senthil Krishnaswamy, "Attacking the Backlog of India's Curable Blind: The Aravind Eye Hospital Model," *Archives of Ophthalmology* 112, no. 7 (1994): 987-93.

7 AMD Alliance International, "The Global Economic Cost of Visual Impairment," accessed September 29, 2013, <http://www.amdalliance.org/global-economic-cost-of-visual-impairment-2010.html>.

8 VisionSpring, "Why Eyeglasses?," accessed September 29, 2013, <http://visionspring.org/why-eyeglasses/>

9 Donatella Pascolini and Silvio Paolo Mariotti, "Global Estimates of Visual Impairment: 2010," *British Journal of Ophthalmology* 96, no. 5 (2012): 614-18.

10 Rohit Khanna, Usha Raman, and Gullapalli N. Rao, "Blindness and Poverty in India: The Way Forward," *Clinical and Experimental Optometry* 90, no. 6 (2007): 406-14.

11 Rohit Khanna, Usha Raman, and Gullapalli N. Rao, "Blindness and Poverty in India: The Way Forward," *Clinical and Experimental Optometry* 90, no. 6 (2007): 406-14.

surgeries that were taking place in India were intracapsular cataract extractions (ICCEs). The lack of equipment, ophthalmologists, and instruments needed for surgeries led to higher complication rates and prevented widespread adoption of these surgeries. Furthermore, the cost of the surgeries was prohibitive for those most affected, the poorer segments of the population.¹²

Cataract surgery

Modern day cataract surgery was developed in the mid-1700s. The ICCE procedure was used in the 18th century and involved large corneal incisions to remove the natural lens in the eye. Not only did these procedures result in high mortality rates, but they also left the patients in need of high-powered hyperopic glasses to see. The development of the intraocular lens (IOL) in 1949 was a major inflection point for cataract surgery. The IOL allowed for replacement of the natural lens and eliminated the need for glasses following surgery. Gradual improvements in surgical technique and instrumentation allowed the surgery to be performed more quickly and through smaller incisions. The PHACO surgical technique, in which the natural lens is emulsified with an ultrasonic handpiece and aspirated from the eye, followed by an IOL implantation, has since become the standard for cataract surgery, resulting in excellent clinical outcomes with reduced perioperative morbidity and recovery time.¹³ Cataract surgery has advanced into a finely tuned procedure that has transformative vision results within a matter of minutes.

Aravind and LV Prasad response to eye care needs in India

India, under the heavy economic and disease burden from blindness and visual impairment, spawned many innovations in eye care. Two care models that have gained considerable global acclaim are the Aravind Eye Care System (AECS) and the LV Prasad Eye Institute (LVPEI). AECS and LVPEI are two of the largest, and arguably among the most successful, eye care hospitals in the world. Both organizations were founded by charismatic leaders who personally embody the vision, mission, and values of their respective facilities. The leaders mandated that their services be affordable and accessible to low-income patients while serving other economic segments.

Aravind

The grand vision of the founder of the Aravind Hospital, Dr. Govindappa Venkataswamy (affectionately known as Dr. V), is to end curable blindness. This goal is even more daunting when considering that Dr. V was a retired surgeon at the age of 58 with a crippling rheumatoid arthritis condition. AECS began in 1976 with an 11-bed hospital in the south Indian city of Madurai and has grown into the world's largest eye care system.

Dr. V recruited several of his siblings, all ophthalmologists, to establish the original clinic. These strong family ties may be one reason why, despite significant challenges including long hours and dismal wages, the close-knit family and staff persevered.

AECS lean healthcare principles

1. Focus on the patient (and not the hospital or staff) and design care around them
2. Identify value for the patient and remove all else
3. Minimize time to treatment

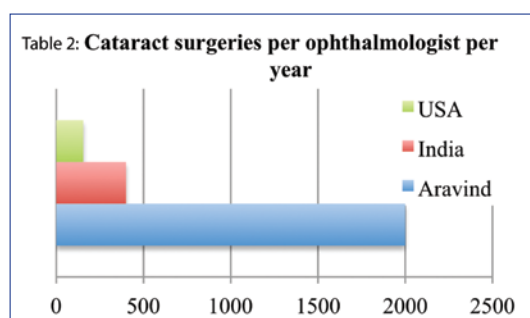
¹² Rohit Khanna, Usha Raman, and Gullapalli N. Rao, "Blindness and Poverty in India: The Way Forward," *Clinical and Experimental Optometry* 90, no. 6 (2007): 406-14.

¹³ Jorge Alió, Jose Luis Rodriguez-Prats, and Ahmed Galal, "Advances in Microincision Cataract Surgery Intraocular Lenses," *Current Opinion in Ophthalmology* 17, no. 1 (2006): 80-93.

The vision of becoming a self-sustaining hospital providing care to patients regardless of their ability to pay led to the two key innovations of the model: high patient procedure volumes and cross-subsidization.

High patient volume

To successfully operate with a high patient volume, AECS implemented “lean production” healthcare principles.¹⁴ Without explicitly defining them as lean production or explicitly pointing to auto manufacturing models, AECS was an early adopter of the lean manufacturing principles popularized by Toyota automobile manufacturing.¹⁵ Taking the patient’s perspective and needs as the organizing focal point, all aspects of the hospital operations are monitored, measured, evaluated, and subjected to continuous improvement processes.



The first principle is patient-centered care for all income levels. In patient-centered care, the patient’s perspective is given highest priority in decision making, problem solving and communications.¹⁶

The second principle flows from the first, where “quality” is defined as the experience of the patient. When asked how best to create a high-quality institution, the director of operations and one of Aravind’s founding team members Mr. Thulsi responded, “Clinical quality is but a fraction of the touch points for a patient during a trip to the hospital.

Ensuring quality and compassion at each step along the patient lifecycle at the hospital is the way to achieve true quality.”¹⁷ Ensuring patient satisfaction from the moment the patient enters the facility, including how they are greeted and treated and how long the waiting times are, is held in equal value to clinical outcomes.

Clinical treatment options and all associated costs are fully laid out for the patient prior to the procedures to promote transparency. In an Indian healthcare market where cost deception is rampant and malpractice not uncommon, transparency has been an important method for building patient trust and community confidence.

Aravind has implemented various systems to capture, monitor, and regularly evaluate quality metrics. For example, patient waiting times between registration and seeing the ophthalmologist are captured and displayed in real time. Real-time feedback informs and motivates the clinical staff to continue meeting their goals. Furthermore, capturing the data allows the clinics to incorporate new methods through objective experimentation.

Each weekend, AECS runs outreach camps in partnership with local community sponsors. Initially, however, the number of patients opting for free surgeries was extremely low. Careful analysis of subsequent surveys revealed that opportunity and transportation costs of traveling to the hospital for the procedures



¹⁴ John Touissant and Roger A. Gerard, *On the Mend: Revolutionizing Healthcare to Save Lives and Transform the Industry* (Cambridge, MA: Lean Enterprise Institute, 2010)

¹⁵ Christopher S. Kim, David A. Spahlinger, Jeanne M. Kin, and John E. Billi, “Lean Health Care: What Can Hospitals Learn from a World-Class Automaker?,” *Journal of Hospital Medicine* 1, no. 3 (2006): 191–99.

¹⁶ Christine Laine and Frank Davidoff, “Patient-Centered Medicine: A Professional Evolution,” *Journal of the American Medical Association* 275, no. 2 (1996): 152–6.

¹⁷ Author’s interview, August 2012.

were a major barrier for the target population. To address this, AECS provided food and round-trip transportation for the outreach patients to support their transport to surgery and subsequent recovery periods. The rates of surgery conversion immediately spiked and have remained over 90% with transportation support.

The third principle is minimizing treatment time. Through their unique “assembly line” approach to operating rooms, AECS can perform 10 times as many cataract surgeries per year as the US national average (Appendix A). Each surgeon works with two beds in a single operating room. While the surgeon is operating on one patient, the nursing staff preps the next patient on the adjacent bed. In this manner, the surgeon is able to rotate between the two beds, allowing a single microscope and “phaco machine” to be used for both beds, maximizing the utilization of both the equipment and surgeon. The highly standardized and repetitive processes of the surgeries allow the nursing staff to be extremely efficient, irrespective of the surgeon operating. The placement of four operating beds, for two operating surgeons at a time, in a single operating room further maximizes utilization and reduces the costs of each surgery.

Aravind has further optimized its systems, allowing patients to receive treatment the day after consultation. This applies both to outreach patients, who are able to receive cataract surgery the day after the eye camp, and to paying patients, who can undergo surgery the day after their consultation. Aravind puts considerable planning and effort on a daily basis into scheduling cataract surgeries. Each morning, all surgeons (regardless of specialty) first perform cataract surgeries, before performing surgeries in their specialty. This requirement has the two-pronged benefit of clearing all the cataract patients and maintaining high surgical skill in cataract procedures.

Cross-subsidization

Aravind implemented a cost-tiering system for its services. Patients pay as they are able; some patients who are unable do not pay for services, and others choose from a “tariff” of service and product bundles at varying price points. Patients choose the type of recovery room, the time to surgery, and the type of lens, all of which are price differentiated to appeal to different patient segments. These features and costs are transparently described during the pre-surgery consultation. Great care is taken to ensure the clinical outcomes are virtually identical among the various priced and free care options. The availability of expensive brand-name lens options coupled with AECS’s high quality outcomes attract paying patients who make possible the cross-subsidization financing scheme, allowing poor patients to receive free care.

In the late 1980s, as AECS sought to lower the costs of surgery, analysis of their cost data found that the single largest component cost was the IOL. Aravind vertically integrated by creating AuroLab, a manufacturing facility initially designed to produce inexpensive IOLs. At the onset of production, the AuroLab was able to create lenses that were seven times cheaper than imported lenses but comparable in quality.¹⁸ Over time, the variable manufacturing costs have further dropped, and the success of AuroLab has allowed it to expand into manufacturing most instruments and equipment for ophthalmology at a fraction of worldwide prices.

The combination of these various efficiencies allowed AECS to perform over 300,000 surgeries in 2010 (over 150,000 for free) while maintaining prices lower than market clearing prices in the local Indian market.

18 Mahad Ibrahim, Aman Bhandari, Jaspal S. Sandhu, and P. Balakrishnan, “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.

LV Prasad Eye Institute

Having spent most of his career in the United States, Dr. Gullapalli Rao, Clinical Associate Professor in Ophthalmology at the University of Rochester, decided in 1981 to return to India and begin an eye hospital to alleviate the blindness epidemic. After several years of challenges in overcoming bureaucracy, gathering funds, and establishing the requisite infrastructure, the LVPEI opened its doors to its first patients in 1987 in Hyderabad.

All aspects of the facility, including ambiance, aesthetics, patient flow, and cleanliness, were designed to create a place that did not feel like a hospital, and instead focused on the patient experience.¹⁹ Systems and detailed policies were established that went well beyond typical care in Indian hospitals.

While some areas have changed over time to adjust for evolving needs, the primary components of the operations have remained the same. The standards set in the original systems have allowed LVPEI to maintain high levels of efficiency, care, and compassion. It is the combination of these features that has allowed the Institute to be self-sufficient, achieve high clinical quality, and provide completely free care to almost half of their patients.²⁰ Since its founding 25 years ago, LVPEI has seen over 6 million people and performs more than 600,000 surgeries annually across its primary, secondary, and tertiary level eye care centers.

Model of care

Originating as a single center in Hyderabad, the LVPEI network has grown into a large system covering most of the state of Andhra Pradesh. The LVPEI Pyramid of Eye Care (PEC) model establishes permanent infrastructure

across communities and efficiently treats patient needs ranging from community outreach and vision screenings to the most complex eye surgery, including retina transplants.

At the base of the pyramid are the Vision Guardians, individuals who conduct door-to-door visits for a population of roughly 5,000 individuals. In addition to identifying patients for care at LVPEI facilities, they offer preventive care tips and techniques, as preventive health services to rural populations continues to be a primary challenge.²¹

At the next level in the pyramid are the Vision Centers (VCs), small facilities located in rural towns and communities that aim to provide

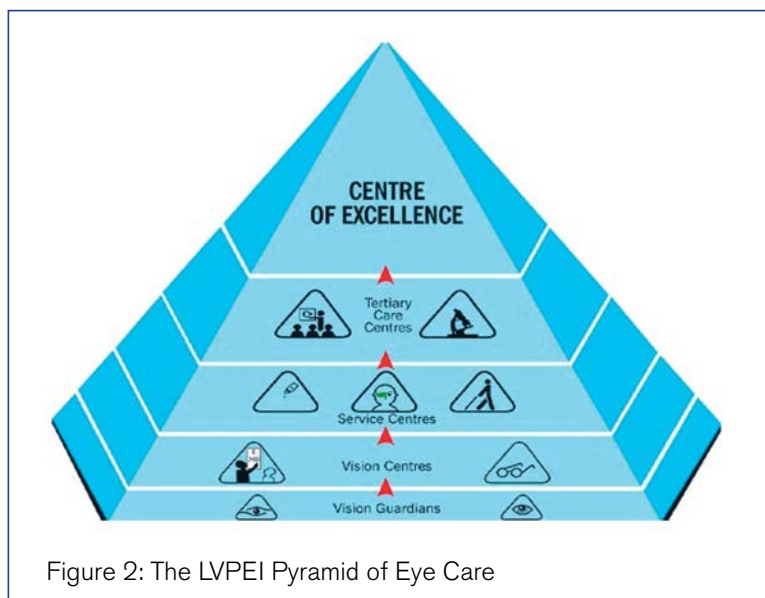


Figure 2: The LVPEI Pyramid of Eye Care

basic primary eye care needs for approximately 50,000 individuals. VCs serve as local hubs for low-priced expert eye care.

¹⁹ LV Prasad Eye Institute, *So That All May See*, Silver Jubilee Commemorative Book (Hyderabad: LVPEI, 2012).

²⁰ LVPEI raw surgical data made available to the authors upon request.

²¹ Michelle M. Casey, Kathleen Thiede Call, and Jill M. Klingner, "Are Rural Residents Less Likely to Obtain Recommended Preventative Healthcare Services?," *American Journal of Preventative Medicine* 21, no. 3 (2001): 182-8.

Figure 3: The LVPEI Network



The subsequent levels in the pyramid are the Secondary Centers, Tertiary Centers, and Centers of Excellence. These facilities operate similarly to their Western counterparts, handling the majority of eye issues, surgeries, complex cases, physician training, and advocacy. The high patient volumes at LVPEI have helped these facilities evolve into some of the best in the world.

While the PEC model establishes patient outreach and an infrastructure to handle the subsequent patient demand, the various internal achievements, such as the low cost and high quality outcomes, attract patients to the Institute.

Social mission and patient-centric approach

The founding vision of LVPEI is simply, “so that all may see.” This vision is coupled with a mission emphasizing “patient-centric care.” Many observers and internal leaders point to the patient orientation as an organizing principle resulting in the conspicuous success, high

quality, and high patient volumes of the Institute.

The patient-centric approach is formalized in the first few General Policies of LVPEI. They state that all patients in need of eye care should have equal access to the highest possible care and that there shall be no distinctions made in the clinical care given to patients, irrespective of their ability to pay.

These policies were and continue to be not only extremely ambitious but also transcendent given the status quo in India for health care at the time of their creation.

Patients that cannot pay have always been given free care at LVPEI. Through a cross-subsidization model, similar to that used by AECS, paying patients are given multiple options for care at various price points, and this revenue helps cover the cost of care for non-paying patients. Although there is no difference in any element that affects clinical outcomes, such as the surgeons performing the surgeries, for the paying or non-paying patients, all of the peripheral features (including waiting rooms, the wait times, the type of lens implanted) can be varied based on willingness to pay. This technique preserves the quality of care while cleverly using differential pricing to accurately approach the willingness to pay for each of the paying patients.

Right-skilling

When patients enter the outpatient checkup room, the first person they interact with is the optometrist. The optometrist conducts the background history check, administers the vision and refraction tests, and fills out the patient chart with a pre-diagnosis. After this initial 15- to 30-minute checkup, an ophthalmologist enters, confirms the medical information and pre-diagnosis, and advises the patient on the best course of action. For a routine cataract case, the time an ophthalmologist spends with a patient is roughly three minutes. An experienced optometrist will often have an optometrist-in-training shadowing and assisting during the checkups. This efficient allocation of resources and the little time required with each patient allows a single ophthalmologist to rotate between four rooms at once and treat over 100 patients in an 8-hour day.

LVPEI policy and system focus areas

- Equitable distribution of healthcare between paying and non-paying patients
- Self-imposed high standards for patient care
- Streamlined patient admission, scheduling, and checkup norms
- Nursing guidelines
- Human resource guidelines
- Team hierarchies
- Maintenance and engineering expectations

Similar improvements in efficiency are sought in the operating rooms through the use of multiple layers of right-skilling.²² The systems in the operating rooms at LVPEI remove all peripheral responsibilities from the surgeons, allowing them to focus their time and efforts on the surgeries. The nursing staff manages the entire patient flow, from the instrument preparation, to the pre-operative workups and surgery prep, to all of the post-operative care. The assignment of specific tasks to staff with varying levels of training is the essence of right-skilling. For a cataract procedure, the surgeon's time within the operating room is limited to the 10 minutes from incision till close; idle time—

time spent not performing the surgery—is almost completely eliminated. This not only increases the surgeons' capacity but also allows for the fixed (surgeon) costs to be spread over more procedures.

LVPEI has implemented procedures to leverage right-skilling as part of its academic teaching center model. Positioned alongside senior surgeons to learn techniques, residents are tasked with many of the less surgically intensive responsibilities: patient prep and paperwork management. This preparatory training allows the training surgeons to understand, appreciate, and evaluate the non-surgical activities provided by other staff. Separately, the patient allocation each day funnels the routine surgical cases to the junior surgeons, which has the dual benefit of training the junior surgeons and providing the senior staff with more challenging, complex cases. Similar systems exist within the nursing staff training programs.

The implementation of these measures has allowed LVPEI to recast the traditional view that academic centers are inherently inefficient. Not only has LVPEI continued to produce the highest performing ophthalmologists, but they have also created a workflow that balances training with the needs of the patients. The academic training center is attractive to physicians, as it ensures they will build procedural capabilities and have the support and encouragement to conduct publishable research. This in turn supports retention and motivation for high-skill health workers.

Standard operating procedures

To maximize the benefits of the learned best practices, LVPEI has made standardization a central aim. Standard operating procedures (SOPs) exist for all of the surgeries. All of the personnel, equipment, and instruments are pre-defined for procedures, removing the search costs and variability associated with highly individualized processes. Standardization and repetition at LVPEI has the triple benefits of reducing variation, reducing training time, and improving clinical outcomes.

Continuous quality improvement (CQI) also challenges standardization with an aim of continually eliminating unnecessary steps, accommodating new process or technical innovations and maintaining the patient-centric focus.

22 Sally Redfern and Sara Christian, "Achieving Change in Health Care Practice," *Journal of Evaluation in Clinical Practice* 9, no 2 (2003): 225-238.

salaUno

Javier Okhuysen and Carlos Orellana, engineers turned investment bankers and private equity professionals, met in 2005 while working in Madrid, Spain. The two had virtually no background in eye care but were inspired by the story of Aravind Hospital in C.K. Prahalad's book, *The Fortune at the Bottom of the Pyramid*. The social entrepreneurs saw an opportunity to provide innovative eye care at affordable prices in a resource-poor setting. A truncated encapsulation of SU's vision is "doing well by doing good."

Okhuysen and Orellana traveled to AECS in Madurai, India to learn how to build and operate an eye hospital. AECS offers a structured program at their Lions Aravind Institute of Community Ophthalmology (LAICO) facility in which they share their best practices for those who seek to emulate their success. Over several weeks, Okhuysen and Orellana attended training workshops held at LAICO to acquire the knowledge to replicate this approach to eye care. The LAICO training included details on the architecture and staffing of clinics, the high volume cross-subsidization model (indigent patients receive free care supported by paying patients), and community outreach methods.

After considering several locations, Okhuysen and Orellana selected Mexico City to launch their for-profit eye care enterprise. Arriving in Mexico City in early 2011, the duo invested their life savings to initially capitalize a clinic they named salaUno (SU; Spanish for "room one," emblematic of the lean production surgical theatre approach where multiple patients are treated simultaneously). After five months of infrastructure development, establishing local and international relationships, and recruiting staff, SU opened its doors and saw the first patient in August 2011.

Cataracts, the treatment of which is the primary service offered by SU, are the second leading cause of visual impairment in Mexico, causing half the cases of blindness. The aging of the Mexican population and increasing incidence of diabetes further compound the problem. By 2020, a projected 22% of Mexicans will be 50 years or older, a contributing factor to cataract development. Additionally, Mexico has the second-highest incidence of diabetes per capita in the world. Diabetics experience a 40% increase in risk of cataracts as well as an increased risk for diabetic retinopathy.²³

In 2011, only 135,000 cataract surgeries were conducted in Mexico out of an estimated annual incidence of 300,000, an annual increase in prevalence of 165,000 and a backlog of 2 million cases. Government eye care providers are overburdened and patients are often forced to wait approximately eight months to be seen. Current private-provider solutions are priced out of reach for approximately 65% of the population, posing a serious problem as well as an opportunity, which were seized by the SU founders.

SU's goal is to build in 10 years what AECS accomplished in 30, exploiting a flattened learning curve and utilizing innovative equity and debt financing to accelerate growth: from one to ten surgery centers by 2016. SU completed more than 2,100 cataract surgeries with sales of more than \$1.2 million USD in its first year of operation. After one year, SU ranked in the top four Mexico City hospitals for number of cataract surgeries per month. At the time of the interviews that informed this case, SU was performing 380 surgeries per month, and 3,000 patients per month were being examined, diagnosed, and treated.

23 Instituto Nacional de Estadística y Geografía, accessed September 29, 2013, <http://www.inegi.org.mx>.

In sharp contrast to the existing Mexican eye care market, the SU vision is to create a for-profit eye care system that provides affordable and accessible care to all segments of the population. The existing market can be divided into 1) for-profit private clinics emphasizing quality and comfortable amenities but at a price out of reach for lower-middle- and low-income patients, 2) non-profit social assistance centers and teaching hospitals, and 3) government hospitals that accept all patients regardless of ability to pay, which have variable clinical quality outcomes and long waits (see “Competitors or alternatives to SU” below).

Similar to health reforms and global health care innovations, the model of providing eye care services for the poor, relying on cross-subsidization from paying patients, faces the problem of infinite needs or demand against finite resources. This has been described as the iron triangle of health care: balancing the goals of low cost, high quality, and easy access. AECS and LVPEI represent remarkable examples that have carefully balanced these three aims. SU’s challenge is to find a similar point of equilibrium while fitting itself to the new enabling environment of Mexico City (see “Enabling environments: replication from India to Mexico” below).

Indian eye care success factors

- Leadership
- Social mission
- High-volume facility
- Standardization of processes
- Right-skilling
- Teaching centers

Success factors and pillars

As SU has become operational, the two leaders have maintained highly active involvement in all meetings, strategies, and decisions of the organization. Although the founders do not have a clinical background, they are emulating the high-involvement, hands-on, high-visibility leadership observed at AECS and LVPEI. The LAICO training emphasizes that AECS’ success results from strongly held organizational values expressed and demonstrated by charismatic leaders. Leadership is identified as the “secret sauce” of success, as much as clinical expertise and lean production approaches to the processes of care.

Drawing upon best practices from AECS, and to a lesser extent LVPEI, SU is emulating key success factors with the expectation of achieving more quickly the impressive results realized in India. Through a review of salaUno’s development and the care delivery models of both AECS and LVPEI, IPIHD MBA intern Mukesh Singhal identified six principles that SU has adopted in their early efforts.

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2. SU’s compelling vision, “eliminating needless blindness,” applies to all income levels. SU is committed to serving everyone with the same high quality of care, regardless of ability to pay. This goal is achieved through a cross-subsidization structure in which additional amenities, including upscale waiting rooms and reduced wait times, are offered to patients able and willing to pay for such services. Revenue generated by paying patients helps to cover the cost of care provided to those who cannot pay.
3. High volumes are required to cover the high fixed costs of eye care surgery. India and Mexico are both markets with high unmet eye care needs. However, significant outreach to patients is required to generate adequate numbers for consultation and a resulting fraction who, upon positive diagnosis, seek treatment.

4. Standardization of processes reduces training time, eliminates wasted steps, and allows workers to focus on a limited, specific set of tasks with associated quality measures and continuous improvement approaches. Standardization enables economies of scale, which further reduce costs.
5. Right-skilling reorganizes roles and responsibilities whereby each worker is trained for specific knowledge, skills, and abilities. Tasks that can be reorganized away from a highly paid surgery or ophthalmology role, without sacrificing quality, are shifted to other roles.
6. The Indian models emphasize mentoring and teaching: the less experienced learn from the more senior, allowing continuous movement to higher-skilled roles upon mastery of the preceding level. Patients are triaged such that less experienced workers take lower-intensity, lower-complexity cases and increase capabilities over time toward more complex cases.

SU has also developed, with the help of its board, a strong organizational culture framework of five pillars that articulate the SU values and inform the pursuit of the success factors drawn from the Indian pioneers. The five organizational values pillars are:

1. Focus on eliminating needless blindness
2. Service with dignity and effort
3. Continuous evolution
4. Team work based on discipline and confidence
5. Do well by doing good

The structure and flow of operating rooms, outpatient care, and procedures were modeled after AECS. The methodology required for structuring outreach eye camps (community outreach events where free eye exams are conducted) and their requisite number of surgeons, nurses, and administrative staff were all derived from the proven AECS approach. With these clinical processes, structures, and systems in places, SU laid the foundation for a high-volume eye care clinic.

Levels of care

SU offers two types of cataract surgery (PHACO & SICS) at multiple price points (three prices are depicted in the representative table of services/prices below). This constitutes 78% of SU's business.²⁴ Some fully and partially subsidized SICS surgeries are funded through the Cinépolis Foundation (CF) and, until recently, Seguro Popular (SP).²⁵ CF participates with SU in a marketing alliance in which patient awareness is raised through public service announcements at Cinépolis movie theaters, and the foundation fully subsidizes a limited number of surgeries (100 per month at the time of the case). For several years, SP offered partial reimbursement for cataract surgeries for qualifying patients. However, SP stopped covering cataract surgeries in May 2013. SU's tiered pricing for SICS and PHACO mimic the Indian models in which paying patients can choose varying wait times, recovery room amenities, and lenses at differing price levels. SU also offers an optical shop, an ophthalmological pharmacy, and additional ophthalmic surgical procedures targeted to diabetics and the elderly.

²⁴ Pricing, market share, product offering, and strategic growth plan descriptions were provided by SU.

²⁵ Seguro Popular is a government insurance program targeting Mexico's informal (non-taxable) workers, approximately 50 million people.

- PHACO uses phacoemulsification/IOLs and typically has short recuperation times (two to three days) and rare hospitalizations. Most patients return to work two days following surgery.
- SICS uses ICCE, which has a longer recuperation period (seven days). SICS is more affordable, and like PHACO, hospitalization is rare. Patients return to work two days after surgery but require additional follow up at the SU hospital.
- Retinopathy: Laser treatments can delay complete vision loss by cauterizing blood vessels damaged by illnesses such as diabetes. The outpatient procedure takes less than one hour. The laser treatment cannot restore lost vision.
- YAG Laser: Iridectomy or corectomy is performed using a laser, which surgically removes part of the iris.
- Pterygium removal: The pterygium is a benign growth in the eye. At initial stages, the growth can be treated medically to reduce inflammation and its growth. Cases refractory to medical treatment require surgery.
- Optical services: Optometrists evaluate vision levels and prescribe lenses; eyeglasses can be fashioned the same day. SU offers a variety of frame styles and high-quality lenses.
- Pharmacy products: SU's pharmacy offers post-operative home care kits to increase the success rates of cataract surgeries as well as outpatient remedies, such as eye drops, for common eye problems.

SU's replication of AECS has created a high-volume operating system leveraging cross-subsidization that

Product / Service	Price Range (USD)
Check-up	\$1.75 - \$3.50
PHACO cataract surgery	\$705 - \$1,740
SICS cataract surgery	\$415 - \$1,285 \$400 (for subsidized surgeries)
Retinopathy	\$60 - \$100
YAG laser	\$105 - \$330
Pterygium removal	\$300 - \$580
Optical services	\$75 (average)
Pharmacy products	\$10 - \$30

Table 3: Representative salaUno Services and Prices (2012)

provides eye care services at 60% less than private competitor prices. Similar to AECS and LVPEI, SU uses lean production principles to minimize costs and maximize efficiencies.

An SU adaptation unique to its context has local municipal governments and institutions bearing the costs for SU's outreach campaigns, which advertise services and provide patient transportation. Additionally, SU has integrated vertically: through its subsidiary labUno, SU imports and sells surgical consumables from Aurolab (AECS manufacturing facility) to lower its variable costs.

Competitors or alternatives to SU

Patients can choose three groups of alternatives or competitors (SU reports that it does not view the alternatives as competitors, given the high level of unmet need of Mexican patients requiring eye care): private for-profit clinics; non-profit health providers, including eye care-dedicated organizations; and public general hospitals. Private clinics are prevalent in the Mexico market, targeting middle- and upper-income patient segments; typical pricing is too high for the low- to middle-income population. Private clinics account for 20,000 cataract surgeries per year, or 15% of the total market (as reported by SU in 2012).

Non-profit social assistance centers and teaching hospitals (SA/TH) are also alternatives. While their pricing is lower than private, for-profit clinics, typical SA/TH pricing is approximately double that of SU's SICS-level services, and patients informally report that wait times are long. Mexican patients can also choose eye care-dedicated non-profits such as the Ophthalmology Institute of Conde de Valenciana, the Association to Avoid Blindness in Mexico (APEC), and the Nuestra Señora de la Luz. In 2012, this segment of organizations performed 15,000 cataract surgeries per year, 11% of the market.

The largest eye care market share, 74%, is taken by the public general hospitals. The Mexican public health infrastructure struggles to meet demand and suffers from chronic delays and poor service, as reported informally by patients. In 2012, public general hospitals performed 100,000 cataract surgeries per year.

SU's 2012 market share was estimated at 2.5%. This is projected to grow as SU receives media coverage and builds a positive reputation. The CF alliance both provides credibility and spotlights SU's commitment to social impact. Sixty percent of patients are referrals from other patients.

SU advantages: lower costs and greater visibility

Physicians at SU complete a multi-week training program to learn the cost-reducing PHACO and SICS surgical techniques. SU uses automation to manage patient flow, electronic medical records, and administrative processes. In May 2012, SU won a NetSuite grant to implement a cloud-based enterprise-wide reporting system to manage operations more efficiently.

In addition to lower operating costs, SU is dedicated to building greater visibility over alternative care options. Through partnerships, SU conducts significant community outreach to generate higher volumes of patients. Community outreach campaigns can be as frequent as six times a week. An outreach program includes a three- to eight-person team, which visits poor communities to offer free diagnosis. Local governments, clinics, and hospitals organize campaigns that target towns with high cataract incidence. Local health care entities market the campaigns and provide transportation to and from surgery for those patients who, once diagnosed, choose SU for treatment. SU outreach staff understand the surgical process and provide prospective patients with information to help them make an informed choice. The campaigns are designed to eliminate the most common barriers to seeking diagnosis and treatment: cost, transportation, and patient-centered information. In addition to the cross-subsidization business model, CF and SP subsidize surgeries resulting from community outreach campaigns.

SU also benefits from free media. Funded by SP and CF, SU advertises free surgeries through radio, television, newspapers, and magazines. The PR agency Zimat provides design support for direct-to-consumer advertising in exchange for eye-care services for its employees. In addition to traditional media presence, SU has tens of thousands of followers on Facebook and hits on its website. This online presence generates referrals.

Satisfied customers are also effective in spreading the word and SU has developed an Ambassador Program to leverage their help in generating new customers for SU. Patients can volunteer to be local advocates in their communities, referring friends and family through this program. Approximately 60% of new patients come from no-cost patient referrals.

To capture more of the market share and strategically align services with where potential customers already are, SU is developing diagnostic centers in alliance with retailers (Wal-mart, Cinépolis, Monte de Piedad) and Mexico City's Government (subway clinics and primary care hospitals that do not provide ophthalmology). The Inter-American Development Bank has provided SU with a \$250,000 USD grant to build the centers.

Plans for growth: 2013 to 2016

Hub-and-spoke expansion

SU plans to build 10 additional surgical clinics (hubs), each supported by 50 surrounding vision centers (spokes). There are three types of vision centers: 1) stand-alone centers, financed and operated solely by SU; 2) retail alliances, located in retail chains like Wal-Mart and Monte de Piedad; and 3) health center alliances, located in Mexico City government's clinic network (subway stations and hospitals without an ophthalmology practice). The vision centers generate volume for the surgical clinics. Each vision center needs one to two employees, whereas each surgical clinic requires staffing of 35 to 50 people. In select higher-income neighborhoods, the hub and spoke model will also include a "salaUno Plus" center that provides information and initial diagnosis in a setting appropriate to this customer segment.

The expansion follows set guidelines for referral and operations. Vision centers diagnose major vision problems through telemedicine, sell eyeglasses, and refer patients to the surgical centers as needed. In addition to vision centers, in selected areas, "salaUno Plus" centers cater to a higher socio-economic market segment to ensure cross-subsidization can support the mission and business model. Surgical clinics (the hubs) refer complicated cases to the existing main hospital.

Teaching hospital

The plan to build a teaching hospital is based on the aspiration to rapidly teach physicians and nurses lean production techniques and inculcate the SU operating culture using the five pillars. As described below in "Challenges," SU's planned expansion into a teaching hospital also serves to offset resistance by some workers to ever-increasing volumes of surgery and patient care. Increasing skills training and the ability to conduct and publish research can serve as meaningful incentives to increase commitment and improve retention.

Nursing training

In January 2012, SU founded Mexico's first nurse training specialization in ophthalmology. Mexico has a shortage of nurses, and of those available, none have formal training in ophthalmology. Nurse training is one part of SU's human resources strategy to support its expansion plans.

Enabling Environments: Replication from India to Mexico

AECS has blazed a path that SU can emulate. However, the local Mexico City conditions, the enabling environment (EE) or ecosystem that supports eye care innovation, are different than the Indian EE. Among the greatest challenges for replication of innovation from one market to another is contextualizing to a new EE.

An EE is a milieu of health and business institutions, capabilities, capital markets, legal systems, and labor markets that allow health-related businesses and organizations to form and grow.²⁶ The EE, which has also been described as an innovation "eco-system,"²⁷ has an important effect on the manner in which an innovation emerges and evolves and, in turn, how the innovator acts upon the environment in which it operates. The relationship between

26 Private Sector Task Force, "Health Workforce Innovation: Accelerating Private Sector Responses to the Human Resources for Health Crisis," accessed September 29, 2013, http://www.who.int/workforcealliance/knowledge/resources/privatesectorhrh_report/en/index.html.

27 Rod Adner, *The Wide Lens: A New Strategy for Innovation* (New York: Portfolio/Penguin, 2012).

private health sector firms or organizations and the EE is co-dependent: causality between the innovator and the enabling environment is bi-directional.

The innovators often function as a disruptive influence²⁸ on the EE by introducing change and stimulating the evolution of new models of health care business or health care delivery. As much as the enabling environment potentiates and constrains these innovators, the innovators also act upon that environment, causing it to evolve, although at an uneven pace, and at times create competition and at times create conflict.

This co-dependence operates as a paradox where the private health sector organizations and firms are dependent upon the EE to support them and the EE needs the innovators to evolve new forms of competition and growth. Both LVPEI and AECS have changed the local markets in which they operate by creating a new local market alternative: low-cost, high-quality care is available to all. Similarly, SU can be seen as a disruptive innovation that will, upon continued success and growth, change the competitive dynamics in the Mexico eye care market. Economic theory suggests that higher-priced eye care providers will reduce their costs to protect their market share, find differentiation features to support their higher prices, or shift away from eye care to other health care services.

Four characteristics of the Indian EE are particularly relevant for the development and success of AECS and LVPEI:

1. Low level of health care regulatory requirements and enforcement
2. Low cost of labor and materials
3. Ability to recruit available and educable workers
4. High percentage of out-of-pocket cash paying patients

LVPEI and AECS have exploited the low regulatory EE to right-skill and train staff following their own needs and prerogatives. A higher regulatory burden and enforcement could have impeded the Indian innovators from creating heretofore undefined, uncertified, and uncredentialed work roles. SU has a similar opportunity to innovate in its human capital formation through a limited health work force regulatory hurdle in Mexico.

The “purchasing power parity” comparison between Mexico and India is roughly four to one; patients have four times the purchasing capacity in Mexico. Income per capita is significantly higher in Mexico, thus creating a middle class with a greater disposable income for eye care procedures, suggesting a higher percentage of patients with an ability to pay for services. Health care salaries in Mexico are also significantly higher. Historically, Mexico has produced few ophthalmologists who can operate on cataracts, which contributes to higher salaries for this professional services field.

The cataract surgical rate per million habitants for Mexico is 1,400; India's is 4,000. SU reports a Mexican backlog of 2 million eyes that need cataract surgeries. The 2012 annual incidence of cataract surgeries in Mexico is 300,000 eyes, and the total yearly output is 140,000 surgeries in addition to an annual gap of 160,000 cases that add to the backlog (as reported by SU). The backlog is created, in part, by the historically low number of ophthalmologists and the prevalence of low-volume care delivery settings.

Low wages have allowed AECS and LVPEI to keep their labor costs low even for highly skilled workers such as surgeons and ophthalmologists. It is easier to provide lower-cost care in an environment where many durable and disposable goods associated with care, as well as labor costs, are relatively cheap. It remains to be seen

whether high-skill workers, in short supply in Mexico, will accept SU's mission-driven culture coupled with a for-profit business structure. Co-founder Okhuysen responds to employee salary concerns by pointing to a recent BCG survey, which concluded that SU pays above-market salaries when compared with four other local health care institutions.²⁹ In addition to competitive salaries, SU has begun emphasizing its professional training and high volume experience, which are highly valued by health care professionals. As expansion plans include a teaching hospital and more specialized nurse training, training may become a critical factor in overcoming resistance to increasing volumes while labor is paid at flat salaried rate. SU's ability to attract, train, maintain, and motivate its workforce is critical to its human resources strategy, plans for expansion, and ultimately its success.

In India, although the shortage of ophthalmologists in the country shrunk the talent pool, the ability to recruit nursing and paramedical staff from the local rural communities has been a key advantage. As a marginalized segment, women from these rural communities are often expected to stay at home until they are married and are rarely afforded any career opportunities. Young women, before marriage (which typically occurs in their early 20s), are eager for training and employment opportunities offered by AECS and LVPEI. Although Mexico is a different cultural context, there too there are younger workers, primarily women, who have the capabilities and desire to be trained for SU roles. With the help of grants from the Inter-American Development Bank, SU has graduated three classes (with five students each) in ophthalmic nursing, which increases the labor supply and, coupled with right-skilling, reduces the task burden on doctors.

The Indian health care market is primarily an out-of-pocket, cash market. With limited financing sources for the poor, providers must price their services to meet the disposable incomes of their patients. This creates a downward pricing pressure, making lean production techniques necessary to keep prices low. The price sensitivity of a cash market and the inherent asymmetry of information in healthcare (making it difficult for the consumer to judge quality) can promote false claims and low quality care. LVPEI and AECS have added transparency, describing in detail the activities, costs, and expected outcomes to their low-pricing, low-overhead approach, in response to price sensitivity and low quality competitors. The combination of low cost, high quality, increased access, and transparency has resulted in high consumer confidence.

In the Mexico market, SP paid a fixed fee to accredited private providers for cataract surgeries, immensely disrupting market forces in Mexico. In Years 1, 2, and 3 of this program, it incentivized capacity building by financing 10,000, 30,000, and 75,000 surgeries per year, respectively. Government has the power to create and distort markets. Patients have little incentive to pay out of pocket when government subsidizes service costs. As noted earlier, SP stopped coverage for SU eye surgeries in May 2013.

With few producers of lenses (e.g., Alcon), there is a virtual monopoly that keeps replacement lens prices high. SU has become an Aurolab distributor in Mexico, in part to create price competition and thus lower prices. Here too, SU can be seen as a disruptive innovator that is changing the market pricing dynamics for intraocular lenses.

SU has adapted outreach as practiced by AECS and LVPEI to a more efficient economic model using joint sponsorship. The alliance with CF and others, with costs borne by the alliance partner rather than SU, is a notable innovative adaptation to the local EE. SU increased from an average of one outreach camp per week in 2011 to four camps per week by August 2012.

²⁹ The private study was conducted by BCG for Endeavor, an entrepreneurship network, in 2013. The study is not publicly available. The results were reported to the authors by Okhuysen.

Challenges Facing salaUno

Challenge: Balancing fidelity to the AECS and LVPEI success factors with the need to contextualize to the Mexican enabling environment

Each of the six key success factors described earlier are present in various stages of implementation in SU's model. The ability to draw upon the history and apply knowledge from the Indian innovators should accelerate SU's learning from experience. SU is also drawing upon their founders' and core teams' previous experiences in the airline, retail, and manufacturing sectors to quickly implement lean manufacturing concepts and outreach to low-income consumers. The training by AECS and periodic review of operations by LAICO teams is invaluable to SU. And yet, SU must contextualize itself to the Mexico market, balancing fidelity to the Indian pioneers' processes with adaptation and modification to fit the Mexican context. Optimizing this balance is a crucial challenge for SU success.

Challenge: Ensuring staff acceptance of lean processes, new roles, right-skilling, and ever-increasing volumes.

The majority of ophthalmologists and nursing staff at SU were trained elsewhere and brought preconceptions of their roles and responsibilities to SU. The discrepancy between clinical staff expectations and the initial SU experience led to higher than expected turnover in the first year of operation. Paradigms needed to be broken, and new operating standards and goals needed to become the norm.³⁰

Ophthalmologists in Mexico have grown accustomed to private practice supplements to their income. Historically, they have also had lower patient surgery workloads. This mismatch of expectations led to an initial high turnover rate among the most highly skilled clinical staff. AECS and LVPEI had different histories in which the founders and an early cadre of followers were willing to accept lower salaries and difficult work conditions, rallying behind a unifying mission. This has contributed to AECS and LVPEI work cultures that assume some level of sacrifice in pursuit of high ideals. As a for-profit institution, it may be difficult for SU to pursue its social mission and vision as a motivator to employees while providing profits to their investors.

In response to the higher than expected turnover, SU implemented a nursing training program, with hopes of eventually establishing training programs for surgeons and ophthalmologists as well, in a partnership with AECS, American universities, and ORBIS International. Salaries that are lower than expected, even if they are above local market rates, may be offset by the incentives of high-level training and research opportunities. A significant EE contextualization challenge between India and Mexico is the background, experience, and expectations of highly skilled health workers.

Challenge: Avoiding the social entrepreneurial “traps”

Although the need for high quality, low cost, high volume eye care is present in the Mexico market, SU must avoid social entrepreneurial “traps.” Karnani has been an outspoken critic of Prahalad's work (author of *The Fortune at the Bottom of the Pyramid*), arguing that romanticizing the poor does not relieve the well-meaning social entrepreneur from coping with business and economic realities.³¹ Karnani has identified a series of traps that

³⁰ Private communication with the authors during on-site interviews, 2012.

³¹ Anel Karnani, *Fighting Poverty Together: Rethinking Strategies for Business, Governments, and Civil Society to Reduce Poverty* (New York: Palgrave Macmillan, 2011).

must be avoided if the fortune at the bottom of the pyramid is to be realized.³² They can aptly be applied to the SU replication of Indian eye care models.

- **Unmet needs:** The size of a market is determined by the number of people willing to pay a price for the product, not the number who need the product.
- **Affordability:** The poor can afford only low-priced products because they have very little purchasing power and many competing demands on disposable income.
- **Adaptability:** It is usually necessary to reduce quality to significantly reduce costs.

SU will avoid these three Karnani traps if sufficient volumes of paying patients choose the SICS and PHACO procedures to make cross-subsidization possible. Adaptability, or creating levels of quality at varying price points, is avoided by turning the concept on its head: high-quality care is provided irrespective of payment level. The heart of the replication is that paying patients have confidence in the quality so that they choose the same care provider as non-paying patients.

- **Multiple objectives:** Trying to serve multiple social objectives beyond the profitability of selling a beneficial product usually leads to failure.

To date, SU has maintained fidelity to its five pillars, which can act as a deterrent to the “multiple objectives” trap. Over time, this fidelity may be tested by the concurrent challenges of growing a health care business and the notoriety and resulting demands of being a high-profile global health care social entrepreneur.

Finally, two additional traps identified by Karnani are formidable challenges to SU achieving success.

- **Cost of capital:** A business has to earn more profit than the opportunity cost of capital employed in the business; it is not enough to just cover operating costs.
- **Distribution:** Successful business models often piggyback on existing distribution networks and try to achieve economies of scope; distribution networks (defined as disease awareness for eye care in the SU case) to serve the poor often do not exist or are very inefficient.

Perhaps ironically, as SU pursues a for-profit model and generates net earnings and equity to avoid the “cost of capital” trap, it may exacerbate a preceding challenge: retaining and motivating staff. Will Mexican staff, specifically highly specialized surgeons and ophthalmologists, embrace increasing volumes of patients while SU generates earnings for its investors? Will the fifth pillar of SU, “doing well by doing good,” create a conflict for staff motivated by “doing good” set against the corporation’s goal of “doing well”?

The Cinépolis alliance has been effective in raising patient awareness, funding patients living in poverty, and increasing both initial acceptance of SU offerings and the current volumes of treated patients. An additional alliance with the Nacional Monte de Piedad (NMP), Mexico’s largest NGO funded by pawn shop interests, has also given SU greater stature among NGOs, raised patient awareness, and been a source of some funding. However, to achieve the self-sustaining and cross-subsidizing financial model seen at LVPEI and AECS, SU must significantly increase its volumes and therefore its reach into communities. Scale is of the utmost importance to make the economic and social model work; it enables cross-subsidies, bargaining power with providers to lower costs,

32 Anel Karnani, “Selling to the Poor,” *The World Financial Review Online*, accessed September 29, 2013, <http://www.worldfinancialreview.com/?p=215>.

optimal asset utilization, and efficiencies in marketing, among others. Through its innovative Ambassador Program, SU empowers patients to diagnose and refer people in need of eye care in their communities to vision centers, diagnostic centers (not yet built), or surgical centers. This initiative accounts for 60% of SU's new patients. The histories of LVPEI and AECS suggest similar patterns where a broad network of care facilities and outreach was established to achieve the complete vision of high-quality, low-cost, high-volume, patient-centric care. SU defines scale as having 30% to 40% coverage of the annual cataract incidence in the area where it operates; today, it only covers 4%.

Outreach camps take place as often as six times per week, with the help of local partners who provide transportation and follow up, to identify patients and invite them in for treatment. Twenty vision centers diagnose an average of 15 patients per day, 25% of whom have cataracts and are referred for surgery. As a result, SU surgeons perform a higher average number of annual surgeries than other Mexican ophthalmologists. Even with this favorable volume comparison for surgery, a steady and high volume of patients seeking diagnosis is required so that the fraction requiring surgery remains high to avoid a distribution trap.

Challenge: Separating inspirational leadership from clinical leadership

AECS and LVPEI were successful, arguably in large part, due to charismatic leadership provided by the clinical leadership of their founders. Okhuysen and Orellana are following inspirational leadership as one of the critical success factors of the Indian pioneers. Okhuysen and Orellana each offer unique leadership strengths, yet neither is a clinician. To what degree is the charisma of the Indian founders grounded by, or due in large part, to their clinical credibility?

Okhuysen is an outward-facing, engaging co-founder with robust global health and Mexican healthcare market contacts, leading the finance and strategy tasks for SU. He routinely walks through the facilities, greeting patients and talking to staff. Orellana is the day-to-day operational leader of the organization. He works behind the scenes and maintains cohesion among the staff. The distribution of leadership tasks appears to be effective. It remains to be seen whether leadership, separated from clinical leadership, can evoke the same levels of staff commitment, as seen at AECS and LVPRI, and fidelity to the SU vision.

Demonstrating Impact through the Evidence to Evaluation Continuum

Unfortunately, too many global health care innovators rely on self-reported evidence of impact. There are insufficient monitoring and evaluation data to provide objective measures of health outcomes and impact. SU will benefit from the decades of cumulative experience in evaluation research from AECS and LVPEI. However, it will be SU's task to capture the operational and monitoring data that inform evaluation research for its operations in Mexico. It cannot be assumed that SU has the same levels of quality and impact on patients; SU must demonstrate that with its own data.

AECS and LVPEI evidence and evaluation

AECS is widely known to emulate the lean production practices of McDonald's and other non-health production innovators. Following those models, both AECS and LVPEI have developed elaborate operational measures to ensure they are continuously eliminating non-value-adding activities. With operational measures developed over 25+ years of experience, additional evidence has been developed to evaluate patient outcomes, satisfaction, and

overall impact. Beyond establishing that eye care services are accessible, cost effective, and high quality, Aravind has continually expanded its research role to evaluate impact on patients and to inform continuous delivery improvement.

LVPEI provides a wider variety of eye care procedures and has a mission that is more akin to a Western academic

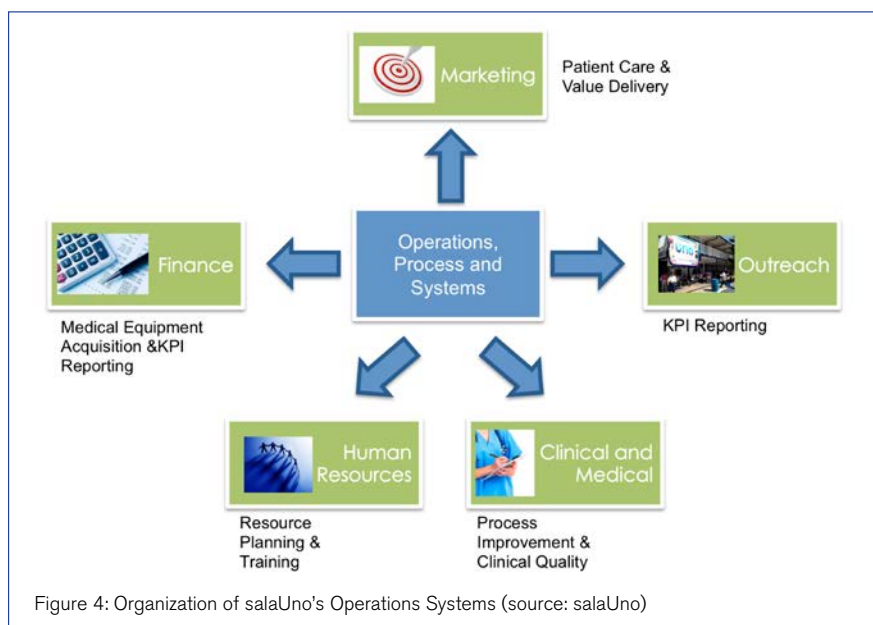


Figure 4: Organization of salaUno's Operations Systems (source: salaUno)

medical center with practicing clinical faculty who also conduct basic research. Much of their research is designed not only to demonstrate the impact of their work on creating improved patient outcomes but also to push the frontiers of the eye care field.

Overall, AECS and LVPEI are arguably among the best in their clinical areas, when considering cost, quality, and access coupled with patient outcomes and satisfaction. Few global health care innovators can claim such research productivity to measure their results and impact while contributing more broadly

to innovation in surgical procedures and understanding of the etiology of eye disease. To underscore this point, Michael Porter's recently initiated International Consortium for Health Outcomes Measurement uses AECS data as the base "disease registry" for cataract surgery and includes LVPEI as a contributing partner for eye care outcomes measurement.³³

SU's key performance indicators and future evaluation of impact

Key performance indicators for the SU enterprise are measured and reported using a centralized, automated resource. SU has conceptualized its information automation systems around an "operations, process, and systems" hub. Data are captured from and integrated with other operational areas to measure performance in finance, marketing, outreach, clinical and medical services, and human resources.

With this integrated approach, SU seeks to better manage revenue, evaluate, and improve customer service; drive their lean production objectives; and monitor quality. Following Atul Gawande's work,³⁴ SU has implemented a clinical checklist to ensure critical pre- and post-surgery steps are correctly executed. The checklist includes:

- Blood pressures and blood sugars
- Eye, lens type, and surgery type verifications
- Patient signed consent forms, payment, surgery information entry completion, and security and safety steps

Following process improvement leaders such as McDonald's and Toyota, they have organized kaizen events³⁵

33 Stefan Larsson, Peter Lawyer, Göran Garellick, Bertil Lindahl, and Mats Lundström, "Use Of 13 Disease Registries In 5 Countries Demonstrates The Potential To Use Outcome Data To Improve Health Care's Value," *Health Affairs* 31, no. 1 (2012): 220-7.

34 Atul Gawande, *The Checklist Manifesto: How to Get Things Right* (New York: Metropolitan Books, 2011).

35 Kaizen is a Japanese word typically translated as "continuous improvement." See Anthony Manos, "Lean Lessons: The Benefits of Kaizen and Kaizen Events," *Quality Progress* (February 2007).

and posted lean charting to involve staff in continuous quality improvement. With the active involvement of AECS consultants who have made site visits to SU, significant work has been focused on reducing wait times and eliminating bottlenecks. Goals and metrics have been developed in diagnosis and procedures.

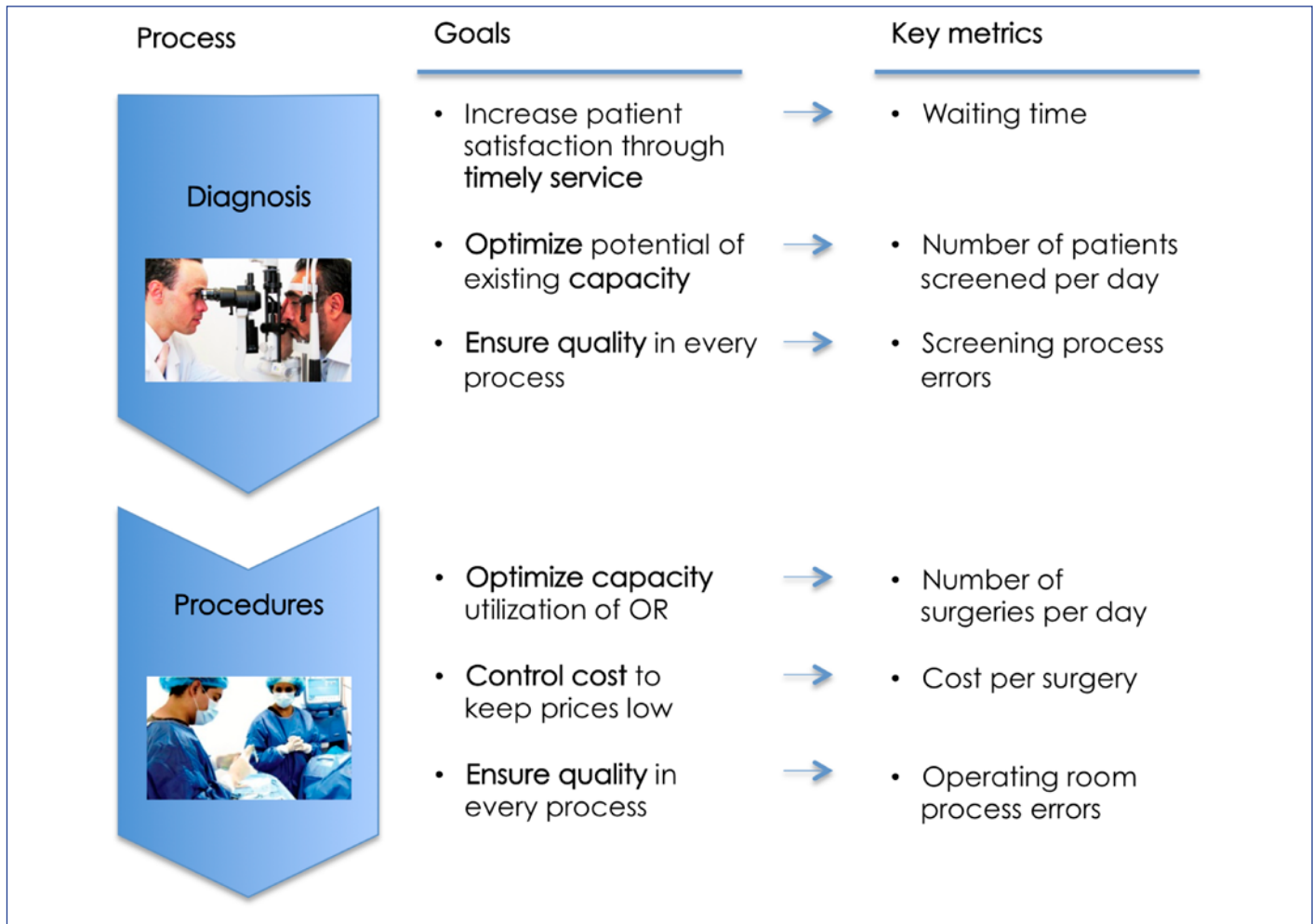


Figure 5: Goals and Metrics for Diagnosis and Procedures (source: salaUno)

SU has implemented a software sub-system for financial management, Net Suite, which captures income and expense transactions; creates financial statements; manages inventory in the operating room, optic shop, and drug stores; and supports customer relationship management. NetSuite software was licensed at a discount, which will decrease as SU meets future gross revenue milestones. A second system, Visualiza, coordinates patient flow and captures patient information in an electronic medical record. The International Eye Foundation and Visualiza Eye Care System developed the software specifically for eye care; SU is adapting the software to its use.

As SU implements its strategic plan, including a teaching hospital, the faculty at the research hospital should be expected to publish articles describing new procedures and scientific accomplishments. This is the path set by AECS and LVPEI, which SU is emulating. It is also expected that with growing research capabilities will come increased attention to outcomes or impact evaluation. Ultimately, SU has the responsibility to demonstrate that its work is not only high quality and low cost with clinical outcomes comparable to those of the Indian pioneers but that it is also making a measureable health and economic impact on the populations it serves.

Implications for Future Eye Care Replications

Some have argued that innovative care delivery models such as Aravind should not be used as models for “wholesale” replication but rather as “laboratories of innovation.”³⁶ IPIHD was formed to promote the growth of innovative health care delivery either in the form of scaling the models themselves or adapting the principles and lessons that can be drawn from them to promote replication elsewhere and argues that innovations that do not migrate and replicate in other countries are missed opportunities. Implementation from one market to another is a particular challenge, as innovations emerge in their own cultural, social, and health sector contexts. The unique constellation of an EE will differ when the innovation is replicated into a new locale. However, these translation and implementation challenges should not diminish the enthusiasm for replication of eye care delivery, as practiced at AECS and LVPEI. These models have been demonstrated to be self-sustaining, pro-poor, attractive to all income levels, and high quality. After thirty years of eye care innovation in India coupled with the expected success at SU, a growing aspiration is likely to emerge to emulate the practices of these eye care innovators elsewhere.

Recent work on “reverse innovation” raises the prospect that some healthcare innovations created in or for emerging markets can migrate into high-income markets such as Europe and the United States. Reverse innovation has been defined by DePasse and Lee as “the process of first identifying and/or fostering a successful innovation in a low income country (LIC) that addresses an unmet need in a high income country (HIC), then adapting and spreading the innovation from the LIC to the HIC.”³⁷ For example, GE’s MACi electrocardiogram machine, a lower-cost device developed for India, is now offered at a new price point (\$500 vs. \$10,000 for a full featured machine) with fewer product features in 120 markets, including the United States and Europe, that offers “accuracy, convenience and value for money.”³⁸ Other examples have included new healthcare worker roles developed in Rwanda that were then emulated in Wales.³⁹ A mature eye care service delivery solution created in India and now being replicated in Mexico raises the specter of eye care innovation migrating across the United States’ southern border. It will be instructive to observe the constraints that may delay or block reverse innovation of eye care models into the Western hemisphere while watching for additional replications of India-inspired eye care innovation into other LICs.

Relevant research questions follow from the SU experience that have broad implications for the global replication of health care innovations.

- At what rate will SU achieve market penetration, volumes, and quality goals compared to AECS and LVPEI? (The SU founders strive for a rate three times faster than the Indian comparators.)
- What other low-income or emerging markets are good probability-of-success markets for replicating these models of eye care innovation?
- Gathering evidence from India and Mexico, what factors in the healthcare market enabling environment influence the success of eye care replication?
- What can we learn from eye care replication to inform an emerging “implementation science” discipline?

36 Peter Berman, “Getting More from Private Health Care in Poor Countries: A Missed Opportunity” *International Journal for Quality Health Care* 13, no. 4 (2001): 279-80.

37 Jacqueline W. DePasse and Patrick T. Lee, “A Model for ‘Reverse Innovation’ in Health Care,” *Globalization and Health* 9, no. 1 (2013): 40.

38 Vijay Govindarajan and Chris Trimble, *Reverse Innovation: Create Far From Home, Win Everywhere* (Boston: Harvard Business Press, 2012).

39 Felicity A.E. Jones, Daniel P.H. Knights, Vita F.E. Sinclair, and Paula Baraitser, “Do Health Partnerships with Organisations in Lower Income Countries Benefit the UK Partner? A Review of the Literature,” *Globalization and Health* 9, no. 1 (2013): 1-10.

IPIHD and a variety of other “pro-innovation” global health NGOs and accelerator networks are working closely with innovators to link them to capital and expertise to document their activities and progress. Ideally, IPIHD and others will pursue these research questions to assist populations and their governments, which seek higher-quality, lower-cost health care solutions that are accessible by all, including the poor.

Appendix A

Comparison of adverse outcomes from cataract surgery: Aravind Eye Care System and The Royal College of Ophthalmologists (UK)

Adverse Events During Surgery			Adverse Events Within 48 Hours of Surgery		
Event	Aravind, Coimbatore (N=22,912)	U.K. National Survey (N=18,472)	Event	Aravind, Coimbatore (N=22,912)	U.K. National Survey (N=17,257)
Capsule rupture and vitreous loss	2.00%	4.40%	Corneal edema	8.00%	9.00%
Incomplete cortical cleanup	0.75%	1.00%	Uveitis more than expected	5.00%	5.60%
Iris trauma	0.30%	0.70%	Periocular bruising and edema more than expected	1.00%	1.40%
Persistent iris prolapse	0.01%	0.07%	Weak leak/rupture	0.67%	1.20%
Anterior chamber collapse	0.30%	0.50%	Hyphaema	0.90%	1.10%
Loss of nuclear fragment into vitreous	0.20%	0.30%	Retained lens material	0.87%	1.10%
Wounds	0.30%	0.25%	Vitreous to section	0.10%	0.30%
Choroidal hemorrhage	-----	0.07%	Endophthamitis	0.05%	0.03%
Loss of IOL into vitreous	0.01%	0.16%	Hypopyon	0.04%	0.02%
			Other*	0.70%	1.50%

*Other includes iris abnormality, intraocular lens dislocation, cystoid acula edema, chroriditis, optic neuropathy, and capsule opacity.

Data sources:

Aravind Eye Hospital, Coimbatore, Aravind Eye Care System.

The Royal College of Ophthalmology. Cataract Surgery Guidelines, Outcome of Cataract Surgery, U.K. National Survey 2001.

Appendix B

Aravind patient statistics

	Outpatient			Surgeries		
Year	Free	Paying	Total	Free	Paying	Total
1976	-	-	-	-	248	248
1977	2,366	15,381	17,747	-	2,366	2,366
1978	18,251	15,781	34,032	1,045	1,320	2,365
1979	47,351	19,687	67,038	2,430	1,612	4,042
1980	65,344	31,334	96,678	5,427	2,511	7,938
1981	75,727	39,470	115,197	8,172	3,139	11,311
1982	79,367	46,435	125,802	8,747	4,216	12,963
1983	102,781	56,540	159,321	11,220	4,889	16,109
1984	104,799	69,419	174,218	11,954	5,796	17,750
1985	153,037	89,441	242,478	17,586	7,194	24,780
1986	164,977	111,546	276,523	19,623	8,202	27,825
1987	180,181	121,828	302,009	21,562	9,971	31,533
1988	232,838	182,274	415,112	23,635	12,702	36,337
1989	290,859	203,907	494,766	25,867	15,103	40,970
1990	338,407	227,243	565,650	31,162	17,896	49,058
1991	327,692	241,643	569,335	31,979	19,511	51,490
1992	341,378	257,688	599,066	36,438	24,577	61,015
1993	364,558	293,149	657,707	41,380	27,979	69,359
1994	399,948	317,306	717,254	49,632	32,083	81,715
1995	414,817	327,768	742,585	59,535	36,138	95,673
1996	463,214	347,775	810,989	69,149	38,663	107,812
1997	574,350	401,518	975,868	80,287	42,808	123,095
1998	697,649	465,496	1,163,145	108,552	49,275	157,827
1999	752,819	530,253	1,283,072	127,708	55,460	183,168
2000	763,888	567,105	1,330,993	134,498	58,267	192,765
2001	725,210	603,800	1,329,010	127,893	63,265	191,158
2002	749,414	650,047	1,399,461	128,384	68,055	196,439
2003	721,021	758,991	1,480,012	123,579	78,487	202,066
2004	765,860	870,171	1,636,031	141,690	85,745	227,435
2005	793,113	928,785	1,721,898	154,101	93,134	247,235
2006	1,329,289	1,375,091	2,704,380	185,327	127,491	312,818
2007	1,073,614	1,101,154	2,174,768	149,570	113,097	262,667
2008	1,273,811	1,182,137	2,455,948	138,282	131,295	269,577
2009	1,140,694	1,250,264	2,390,958	150,742	135,225	285,967
2010	1,267,979	1,378,150	2,646,129	160,394	155,089	315,483
Total	16,796,603	15,078,577	31,875,180	2,387,550	1,532,809	3,920,359

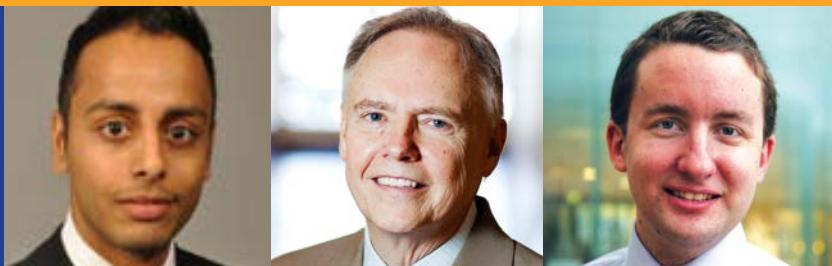
Data source:
Rangan, VK "Aravind Eye Hospital, Madurai, India: In Service for Sight", Harvard Business Publishing, 2009.

The Authors – IPIHD Case Study #102

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Mukesh Singhal currently works within the Life Sciences Strategy practice at Deloitte, focusing on projects that develop innovative business models and novel care-delivery system strategies for clients. Prior to Deloitte, Mukesh worked at three startup medical device firms, leading the development of several novel medical products on the market today. Mukesh received his B.S. in biomedical engineering from Boston University in 2003 and his Masters in Business Administration from the Fuqua School of Business, Duke University (Health Sector Management concentration) in May 2012.

As an IPIHD intern, he visited Aravind Eye Care Hospital, the LV Prasad Eye Institute, and salaUno in July-August 2012. A desk audit of materials provided by all three institutions before his onsite engagements informed his observations and interviews in India and Mexico. The audits, literature reviews, interviews, and follow-up discussions are the basis for the case study.

Jeffrey Moe is an Executive in Residence and Adjunct Associate Professor in the Health Sector Management program, Fuqua School of Business, Duke University; Adjunct Faculty with Duke's Global Health Institute; and a lecturer at the University of Witwatersrand, Johannesburg, South Africa. Dr. Moe is the faculty lead for the Health Sector Advisory Council and the Collaborative on Health Care for Aging Populations and Advanced Illnesses, two external advisory boards to the Fuqua School of Business.

Professor Moe served as the Director of the Private Sector Task Force, which operated under the aegis of the Global Health Workforce Alliance. The Private Sector Task Force report describing 31 "health workforce innovators" is available on the Global Health Workforce Alliance website in the knowledge center. Dr. Moe has authored case studies on innovative global health care approaches and health care leaders. He received his Ph.D. in Organization Development and Institutional Studies from the University of North Carolina at Chapel Hill in 1981. He graduated from the Northwestern University Kellogg School of Management Executive Development Program in 1997.

Richard Bartlett serves as the Associate Director of IPIHD, a non-profit organization affiliated with Duke Medicine that supports the scale and replication of successful healthcare delivery innovations globally. Mr. Bartlett is also the Associate Center Director for the USAID-funded Social Entrepreneurship Accelerator at Duke (SEAD), a Duke University collaboration to create an ecosystem-focused accelerator model for supporting and scaling global health social enterprises.

Mr. Bartlett provides operational leadership for IPIHD, including driving and overseeing all programmatic areas as well as helping lead the strategic objectives of the organization. Additionally, he is responsible for leading the programmatic areas aimed at providing business and investment support to healthcare innovators and facilitating all projects and pilots.

Mr. Bartlett is formerly of McKinsey & Company, where he worked within the Global Healthcare Practice serving clients around the world on different topics in health systems reform. Whilst at McKinsey, he was heavily involved in innovative healthcare delivery and led all work with the World Economic Forum on the topic. He is originally from the UK and moved to the United States in the middle of 2011. He graduated from the University of Warwick in the UK with a first-class bachelor's degree in Industrial Economics.

IPIHD in 2013: A Global Network of Innovators



Global Reach, Local Impact

IPIHD was founded to support the growth of healthcare innovation through scaling and replicating successful delivery solutions around the world that improve access to quality care at affordable costs. This growth is achieved by addressing the four primary gaps facing healthcare delivery innovators:

- Access to networks, expertise, and best practices
- Capabilities and capacity required to develop their business
- Financing and investment to grow
- Knowledge of and change in regulations and policies that challenge their growth

IPIHD provides targeted support for selected innovators, articulating a clear value proposition for all stakeholders, and creating a platform to collaborate, rather than compete, with other organizations in the space and to share knowledge and expertise.

The IPIHD Network facilitates linkages between innovators for peer-to-peer guidance and also between innovators and industry leaders in the field, enabling the innovators to benefit from seasoned advice and expertise. Industry leaders, in turn, gain the opportunity to better understand innovations unfolding at the cutting edge of healthcare delivery. The IPIHD Network also drives the exchange of information between innovators, other health practitioners, health system leaders, and policy makers.

Learn more at www.ipihd.org, find us on facebook at www.facebook.com/ipihd, and follow us on twitter @ipihd.

From the Executive Director



The International Partnership for Innovative Healthcare Delivery (IPIHD) works to positively impact and scale innovation in care delivery in order to increase access to high quality care for all populations. Health systems across the globe, in both developed and emerging economies, struggle with challenges related to cost, quality, and access. While the specifics of these challenges differ by context, themes such as rising costs, overburdened facilities, workforce shortages, and quality measurement cut across countries, regions, and stages of economic and social development.

The IPIHD Innovator Network showcases opportunities to achieve step-change improvements in healthcare delivery. We have a great deal to learn from these innovations and believe that their experience and impact can benefit health systems everywhere.

This case study highlights both the potential and the challenge of spreading good ideas across borders. Successful care delivery innovations are born in and shaped by a particular environment but hold the potential to solve needs far beyond their home borders. The experience of salaUno provides insight into the translation process, identifying and implementing the “active ingredients” of low-cost high-quality eye care models developed in India and replicating them in Mexico. There are lessons here not just for salaUno in Mexico, but also for the US, UK, and other health systems looking to achieve better outcomes and reach more patients without breaking the bank.

We are grateful to our supporters who provide the financial support, time, and expertise that make possible the work and achievements of IPIHD. Please visit www.ipihd.org to learn more about how you can participate with us and contribute your knowledge and expertise as an innovator, supporter, or member of our wider community.

A stylized, handwritten signature in black ink, consisting of several fluid, connected loops and strokes.

Krishna Udayakumar, MD, MBA

Executive Director

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The Founding and Expansion of salaUno



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