



Financial Sustainability

for High Quality, Large Volume,
Sustainable Cataract Surgery
Programmes

Aravind Eye Hospitals
& Postgraduate Institute of Ophthalmology
Lions Aravind Institute of Community Ophthalmology
and
Seva Foundation



Financial

Sustainability

for High Quality, Large Volume, Sustainable Cataract Surgery Programmes

The Quality Cataract Surgery Series is a set of modules explaining principles and techniques for developing high quality, large volume, sustainable cataract surgery programmes, especially in settings where cataract causes much needless blindness. Each module is based on the practices of Aravind Eye Hospitals in South India, with input from other successful programmes.

The set includes the following modules:

- Introduction
- Clinical Strategies
- Paramedical Contributions
- Management Principles and Practices
- Community Outreach Initiatives
- Financial Sustainability
- Architectural Design

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Quality Cataract Surgery Series
Aravind Publications / LAICO
72, Kuruvikaran Salai, Gandhinagar,
Madurai 625 020,
Tamil Nadu, India

Phone : 452-537580
Fax : 452-530984
Email : communications@aravind.org

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About the Author

David Green, Master in Public Health (University of Michigan), is a consultant in international health planning and economic development. He has worked all over the world with

- Seva Foundation (USA, India, Nepal)
- Al Noor Foundation (Egypt and Middle East)
- Christoffel Blindenmission (Kenya)
- International Agency for Prevention of Blindness (UK)
- Orbis International (New York)
- International Centre for Eye Education (Australia)
- International Eye Foundation (USA)
- National Eye Care Program (Malawi)
- Fred Hollows Foundation (Australia)
- World Health Organization (Geneva)
- American Academy of Ophthalmology (San Francisco)
- Seva Service Society (Canada)
- The World Bank

Mr. Green's expertise lies in the planning and implementation of cost effective, financially self-sufficient eye care programmes that are able to provide quality surgery and services to all economic strata. He also specialises in initiating and managing technology transfer projects for the manufacture of medical devices.

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- Mr. Vinaya Dhakhwa of Seva Foundation, Kathmandu, Nepal

Introduction

Rationale

Eye care with an emphasis on cataract surgery is probably one of the few health care services that can become financially self-sustaining from user fees while maintaining an orientation to serving the poor. Why is this? In large scale public health programmes that are prevention-oriented, it has been learned through many failures in cost recovery that people are unwilling to pay for prevention. In contrast, people are indeed willing to pay for a cure. Furthermore, in curative health care services, chronic and acute diseases can vary greatly in treatment and cost from patient to patient. There is not enough replicable volume to lower the unit cost and create economies of scale.

But the situation is different for cataract surgery. Cataract surgery can be basically the same technique and the same cost for each patient, so large volume can make high quality surgery affordable to the poor as well as self-sustaining for the provider.

Why cost recovery is possible in cataract surgery

- Cataract accounts for approximately 80% of blindness and is the primary income-generating procedure performed by ophthalmologists worldwide.
- Cataract, unlike most surgical procedures, is the same procedure performed repetitively with little variation. Per surgery unit costs will vary little, allowing for very accurate cost projections and financial control, based on anticipated patient demand.
- Because cataract is the same procedure performed repetitively, facility set-up, training, and operating procedures can be standardised for a variety of different settings and circumstances.
- Unlike preventive public health programmes, cataract is procedure-oriented and curative. People are generally willing to pay for a cure but are unlikely to pay for preventive services.
- Because of the large number of people requiring cataract surgery in developing countries, it is one of the few health care procedures that has the potential to pay for itself through user fees.

The prevention of blindness in the area of cataract is not purely a matter of ophthalmic technology but involves a complex of political, social and economic factors, the foremost of which is the calculation of the cost-benefit ratio in developing plans of action.

- Professor P. Siva Reddy

Objectives of the financial sustainability module

- To record lessons learned in the achievement of cost recovery in eye care programmes.
- To show how cost recovery principles can effectively support high quality, large volume, sustainable cataract surgery programmes.
- To describe the factors and principles to consider when implementing cost recovery measures for financial sustainability.
- To remind those responsible for economic development, costing decisions and financial decisions to ask the right questions to the right people at the right time in the planning process.

Examples and models

The cost recovery considerations for financial sustainability suggested in this module are drawn from a variety of sources. The most often cited programmes are:

- Aravind Eye Hospitals, Tamil Nadu, India
- Lumbini Eye Hospital, Nepal
- L. V. Prasad Eye Institute, Hyderabad, India
- Al Noor Foundation, Egypt

When we first started in 1976, we went around asking for donations, but we didn't have the credibility. A few friends promised to help us, but even they preferred to avoid monetary assistance. It was simple: we had to get started. So I mortgaged my house and raised enough money to start. Then one thing led to another and suddenly we were able to plan the ground floor of the Main Hospital. From the revenue generated from surgeries there, we built the next floor, and so on until we had a nice five-storey facility. And then with the money generated there, we built the Free Hospital. Almost 90% of our annual budget is self-generated. The other 10% comes from sources around the world, such as the Royal Commonwealth Society for the Blind (UK), now known as Sight Savers, and the Seva Foundation (USA). We expend all our surplus on modernising and updating our equipment and facilities. We have enough credibility now to raise a lot of money, but we don't plan to. We have always accepted the generosity of the local business community, but by and large, our spiritual approach has sustained us.

**Dr. G. Venkataswamy,
Founder, Aravind Eye
Hospitals**

International comparisons:

Comparative appraisals of programme unit costs across countries face several difficulties, including variations in the availability and pricing of skilled manpower, in the international pricing of materials and supplies, and in the levels of import tariffs and taxes. Thus, a particular intraocular lens (IOL) may cost \$100 in the United States, but an essentially equivalent one may be available in India for Rs. 220 (about \$5 using official currency exchange rates). IOL surgery may cost \$1000 in the United States, \$30 in Nepal, \$25 in India, and \$80 in Indonesia. It is overly simplistic to compare costs based on official currency exchange rates and conclude that one programme is more efficient than another.

In addressing difficulties posed by the use of official exchange rates to convert border prices into the domestic currency of a particular country, the United Nations Statistical Division (UNSTAT*) is coordinating an ongoing International Comparison Programme (ICP). The study aims to determine an appropriate conversion factor, labeled "purchasing power parity" (PPP), and defined as the number of units of a country's currency required to buy a fixed basket of goods and services in the domestic market compared to what the cost would be in the United States. The results reveal that the use of official exchange rates grossly undervalues domestically produced and consumed goods and services in developing countries, and grossly overvalues imported goods and services. Through the use of PPP exchange rates, it is possible to compare costs across countries using a realistic metric. The costs within each of the countries to be compared are first converted to a standard currency (the US dollar or that of one of the countries involved) and then the comparisons are made.

* UNSTAT - www.un.org/Depts/unsd

Definitions

- Catchment area** : Geographic range from which your patients (clients) will come.
- Cost** : Amount of money needed to produce and offer a service or product, in this case, cataract surgery.
- Cost effectiveness** : An analysis comparing the benefits of a treatment with the cost for producing such benefits.
- Cost per unit** : Total cost of producing a service or product divided by the total number of services or products produced and sold. (See also Unit Cost.)
- Cost recovery** : Generating enough revenue to cover operating costs.
- Consumables** : Disposable items used in cataract surgery and diagnosis of eye diseases; items that are not reused, as opposed to equipment.

Depreciation	: Loss in the value of an asset (equipment, building, vehicle) whether due to physical wear and tear, obsolescence or time; exhaustion of property, usually calculated over time; a mechanism for decreasing tax burden in order to be able to afford renovation or acquisition of new equipment in the future.
Economies of scale	: Reduction of cost per unit resulting from an increase in volume.
Fixed costs	: Costs that remain constant regardless of the volume of sales or service delivery, including salaries, rent, utilities, depreciation, insurance, etc.
IOL	: Intraocular lens
Market estimate	: Estimating the size of your target population or the number of potential users of your service or product.
Multi-tiered pricing	: Different prices for the same service are set according to the paying capacity of the client; sliding fee scale.
Operating costs	: All costs (fixed, variable, depreciation) related to the running of a programme. They do not include capital expenditures such as equipment, building, training, etc.
Paramedicals	: Staff members, such as ophthalmic nurses or patient counsellors, who perform some of the professional services to patients, allowing ophthalmologists to concentrate on diagnosis and surgery.
Paying capacity	: Price that is affordable to a particular socioeconomic group.
Predictive modeling	: Foretelling of a future event; estimates of the future based on different estimation methods, including past user patterns and statistical projections of current data.
Price	: Amount of money charged to the patient (client) for a specific service or product.
Profit/Loss	: Profit is total revenue minus total expenses where the value is positive. Loss occurs when total expenses are more than total revenue.
Projections	: Predicting numbers based on assumptions.
Replicable	: Able to be repeated in a standardised way.
Revenue	: Total amount of money earned in a given time frame.
Sensitivity analysis	: Changing the numbers in a scenario to see if the ranking of options will change.
Unit cost	: Total operating costs (fixed, variable, depreciation) divided by the number of units of service. (See also Cost Per Unit.)
Variable costs	: Costs that change directly with the amount of production or service, such as direct material costs. In eye care programmes, most variable costs are related to the consumables for surgery, mainly cataract surgery.

Cost Recovery Issues

The goal of this module is not to prescribe a cost recovery strategy for your eye care facility, but to explain the most important principles behind cost recovery and to illustrate the key factors and a formula for achieving self-sufficiency. Remember that your eye care programme is unique, and your transition to financial sustainability will depend on the unique characteristics of your programme. Appendix 2 (Planning Process for Development of Financial Sustainability in Eye Care) and Appendix 3 (Questionnaire and Planning Tool for Developing Financially Self-Sustaining Eye Care Programmes) will assist you in your research, planning, and implementation. Appendix 1 (Lumbini Eye Care Project - Self-Financing from User Fees) is a case study that illustrates how one eye care programme successfully adopted cost recovery principles.

Defining the issue: Who Is going to pay for eye care?

In these times of ever increasing competition for limited government health care resources and international aid, cost recovery can become the paradigm for creating comprehensive, self-sustaining eye care programmes.

In developing countries, a large percentage of the people are poor and do not have health insurance. Government infrastructure can sometimes be inadequate to provide high quality, large volume health care services to deal with the magnitude of the problem. Even where the government is providing health care services, sometimes the quality might be poor and few patients come. Incentives are lacking in the system to create organisational imperatives that promote excellence and concern for the poor. Increasingly, international and local non-governmental organisations (NGOs), who depend on donations for operating costs, are finding it difficult to obtain financing to maintain operations or to expand service delivery.

The principal solution to the backlog of cataract blind is performing cataract operations on a large scale. The same situation prevails in almost all developing countries. The basic problems and the barriers are similar. [But] the answer... has many possible solutions that may differ in various locations. [...] It may be impossible in some areas of Africa and South America to have multispecialty clinics, or it may be difficult to raise the necessary funds to pay for salary support and to obtain the necessary equipment.

- Dr. G. Natchiar, Joint Director, Aravind Eye Hospitals

Seva recognises that full local sustainability in all regards may not be achievable in all programmes. Many regions of the world with sparse population, limited cash economies, harsh logistical obstacles to travel, and barely functioning health care systems have significant need for sight services. Our goal is to promote sustainability of services in staffing, management, financing and leadership to the extent possible within each situation. In other words, building more sustainable programmes is a dynamic process. We must continuously learn about and strive to achieve the maximum level of sustainability possible for a given programme.

- Seva Foundation Report

In the newly emerging economies of developing countries, there is a substantial proportion of people who are willing and able to pay for cataract surgery at present market prices, and there is an even greater proportion who can afford

to pay for the cost of cataract surgery with intraocular lens (IOL) if the cost is lowered through efficient and effective use of resources in a large volume setting.

Organisational structure and programme character and direction are often determined by the source of funding. How eye care is funded, more than any other factor, affects service delivery. Those who control the expenditure of resources (budgeting choices) control programme planning and programme direction. It is important to remember that funding for developmental or charitable activities always originates from someone who has earned the money. So with external funding, programme direction often remains in the hands of the donors and not the project, and spending often occurs with little thought to the desired result. However, income that is earned by the programme itself is more difficult to obtain and therefore more wisely spent. For example, prioritisation is done better when the programme is earning and spending its own money.

One of the problems in government-run programmes is who controls the revenues generated from user fees. If the eye care programme is in an eye department within a government hospital setting, does the eye department get to keep and control its revenues to spend on its own development and operating costs, or does the government take the money?

In most settings, sustainability is dependent on gaining control of:

- Fees/charges to patients
- Hiring/firing/paying/recruiting/retaining of staff
- Staff working hours and conditions
- Purchasing
- Competence to manage

Is this control possible? Under what circumstances?

Napoleon said that there were three things needed to fight a war. The first is money. The second is money. And the third is money. That may be true for war, but it's not true for the non-profit organisation. There you need four things. You need a plan. You need marketing. You need people. And you need money.

- Peter F. Drucker

The effects of cost recovery on programme development

Generating revenues sufficient to cover operating costs (“cost recovery” or “financial sustainability”) changes the way a programme operates and views itself.

In almost every developing country in the world, there is a tremendous backlog of blindness due to cataract, which accounts for 50% to 80% of blindness. Top down planning approaches have been unsuccessful in helping the problem of cataract blindness in any significant way. The bottom up, market-driven approach fostered by cost recovery planning approaches will, it is expected, transform service delivery. As surgical volume increases, quality cataract surgery becomes affordable and sought after by the poor who otherwise would not be able to afford cataract surgery at present market prices.

Staff attitudes change as a programme begins to earn its own income and generate its own resources. Staff become more empowered and motivated

when there is ownership. Linking decision-making to income generation and management of financial resources leads to the development of programme planning skills. Those who are doing the work know their business the best and become better managers when they are in control of decision-making that affects financial viability and programme sustainability. Accountability becomes an imperative.

By embarking on the path to cost recovery, organisations begin the transition from utilising donations for operating costs to covering operating costs from patients fees. Ultimately, fees will generate extra income to pay for capital expenditures, new developments and expansion of service delivery to the truly underserved. Seva's sustainability model is an example that shows donors how they can use their precious resources for start-up costs (which are least available in a developing country) instead of for operating costs (which are obtainable in most areas of developing countries).

Seva provides consultation to eye care programmes in developing a fee structure for "cost recovery" whereby services are priced on a sliding scale within the income range of the population. By charging higher prices for luxuries (such as private hospital rooms) while maintaining large volume and the same high quality for all patients, an eye care programme with a focus on cataract surgery can generate sufficient income from paying patients to cover the cost of care for everyone.

- Seva Foundation Newsletter

Seva's sustainability model

Seva's work in eye care is guided by these fundamental principles:

- Eye care programmes can and should be staffed and managed by local people.
- Limited resources should go to the most frequent and curable causes of blindness.
- People should receive high quality care regardless of their ability to pay.
- Eye care programmes should make efficient use of local resources.
- Regular objective evaluation of the programme's impact on blindness among the population should guide programme planning.
- Eye care programmes can and should become self-sustaining.
- Eye care programmes should honour and build on the cultural and spiritual traditions of the people the programme is designed to serve.

Successful examples of financial sustainability in eye care

It has been successfully demonstrated that it is possible to develop eye care programmes that are financially self-sufficient while still able to provide care for the poor.

- At Aravind Eye Hospitals in India, which perform over 180,000 surgeries per year, 40% of the patients pay well above cost, 30% pay just below cost and 30% are given service at no charge. The institute is able to develop a substantial surplus to fuel its growth and to expand services, teaching and research.
- The Lumbini Eye Care Project in Nepal has rapidly achieved financial self-sufficiency. Since the introduction of cost recovery in 1994, surgical volume has more than tripled from 6,000 to over 20,000; patients receiving an IOL have increased from 50% to close to 100%; and the programme is now able to be fully self-sustaining from user fees, generating a 40% surplus which it utilises for institutional growth and free surgery to the very poor.
- L.V. Prasad Eye Institute in Hyderabad, India performs about 15,000 surgeries per year, 50% paying well above cost, 50% free surgery. Development has included centres for eye research and for rehabilitation of the visually handicapped.
- Aurolab, the non-profit business trust in southern India dedicated to producing high quality intraocular lenses, has proven that sophisticated medical manufacturing can be financially self-sustaining and yet priced to be affordable to the poor.

Cost Recovery Principles

Successful self-sustaining eye care programmes are founded on the following 13 principles of cost recovery and financial sustainability:

1. Collaboration, empowerment and ownership
2. High quality + Large volume = Low cost
3. Cost recovery by understanding people's capacity to pay
4. Multi-tiered pricing
5. Wise location of the facility
6. Compassionate capitalism
7. Changing the mindset and the practice of ophthalmologists
8. Use of IOL surgery to build reputation
9. Programme planning for a standardised, replicable approach
10. Appropriate (and appropriately priced) technology
11. Accountability
12. Responding to consumer expectations
13. Per unit cost as a tool for evaluating efficiency, productivity and quality

Few change programmes are successfully implemented by one person. Different individuals provide the necessary mix of skills, experience, personality and perceptions required to manage the change. It is impossible to institutionalise a change—and very easy to overturn it—when the ownership is vested in only one person. Successful management of change recognises this by building a network of supporters.

- MESOL, The Open University

Efficiency and staff reward are circular - you need each to feed the other. If you do this, money is generated from within the hospital by services to rich and poor with no need for outside NGO or government funds.

- Steve Miller, MD, Seva Foundation

1. Collaboration, empowerment and ownership

Financial sustainability is difficult for some nongovernmental organisations (NGO) to adopt because of their historical dependence on donations or the charity of others to sustain field programmes. Some NGOs are caught up in receiving support from large international donors like the World Bank, where the bureaucratic imperative might be to “spend the money according to schedule.” This kind of support often lacks any true incentive for development that leads to sustainability.

Other NGOs are tied in with the charitable model of raising funds from donors who usually respond to an appeal made on behalf of those who are so-called needy. When an organisation is tied into the charitable mentality for their fund raising appeals, they often lack the skills and attitudes necessary to earn money from the sale of a service or product. They might also lack basic business planning skills necessary for development of cost recovery models.

Collaboration, empowerment and ownership are key factors in enabling change. Organisational structure, management, and pre-existing bureaucratic imperatives can promote or inhibit movement toward economical, large volume, high quality eye care. The key issue is: what already exists in the present approach that might act as incentive (or disincentive) toward excellence? And how can motivating forces be built into the current operating structure?

According to Dr. S. K. Shrestha, there used to be a lack of ophthalmologists to provide services to the patients who visited Lumbini Eye Hospital. The main reason was low incentive and large volume of work. [...] Management experts realised the problem and formulated a plan of “net savings cash utilisation.” This plan has already been implemented and provides 100% of salary as additional allowance to all the ophthalmologists and four months of salary as incentive to other staff once a year. Lumbini is an efficient programme that shares its high income from this efficiency with its staff. This has definitely led to an increase in the morale of all the staff, which is why they are efficient and work hard doing many more cataract surgeries per day than any other hospital in Nepal. Staff and ophthalmologists are among the highest paid in Nepal even though Lumbini hospital sees 24% of patients for low or no fee. Efficiency (6-15 surgeries per doctor per day) gives high incomes and care of the poor at the same time.

Those ultimately responsible for change and development are involved from the start in reflecting on their present situation, and must formulate actions for themselves that take into account their unique history and local circumstances.

Local ophthalmologists and other key decision makers of the community are encouraged to define their present situation, and to develop action to transform and improve service delivery. They must define and set their own course of action if ownership is to be achieved. The role of consultants, if they are a part of the planning team, will be to guide and suggest in a manner that brings forth local solutions to local problems.

Large volume comes from very well trained surgeons, extensively supported by highly qualified and really, really dedicated para-medical staff. This year we have done around 6000 major surgeries, of which one quarter are paying and three-quarters are free. It should be pointed that there is only one ophthalmic surgeon here at Theni and three or four residents. High quality comes from the realisation that unless we provide excellent surgical, clinical and associated care, we won't survive.

- Dr. Datta, Aravind Eye Hospital, Theni

2. High quality + Large volume = Low cost

To achieve high quality, large volume eye care that is affordable to all economic levels, a programme must lower the per unit cost of surgery in order to allow pricing that the majority of the local population can afford. This can be achieved via increased surgical volume from improvement in patient satisfaction through quality outcomes. To bring about this transformation toward cost recovery, there are three key points that must receive focused attention:

1. Increase the number of surgeons performing surgery (if possible), increase the surgical volume per surgeon, and improve the quality of surgical outcomes.
2. Use paramedical staff in the correct ophthalmologist to paramedical ratio (one ophthalmologist to five paramedicals) in order to free up ophthalmologist time to perform surgery and to lower costs by utilising less expensive professionals.
3. Lower costs through intelligent purchasing of consumables (including economies of scale), decreasing wastage, and maximising staff resources with more efficient operating/surgical procedures.

At Aravind Eye Hospitals, viscoelastics are used in a number of cases, with one viscoelastic loaded in two syringes used for two patients instead of disposing it after a single use. Similarly, a single 2cc vial of antibiotics and steroids is used for the subconjunctival injections of three patients. Surplus medications, injectable antibiot-

ics, corticosteroids, needles and sutures purchased by the paying patients are used in the free hospitals. With all safety measures in place this method of sharing medications and supplies helps reduce cost. These practices have been found to contribute directly to economical utilisation of resources.

Costs are more important than earnings. Whether we speak of initial costs, maintenance costs, replacement costs, or whatever, there is nearly always more advantage in reducing costs than in increasing earnings.

- Charles K. Long

Achieving the above outcomes will allow for pricing that makes eye care affordable to all economic strata while earning sufficient revenue for the facility to become financially self-sustaining from user fees.

Three keys for transforming eye care delivery

1. Increase the quality and volume of each surgeon
2. Use 5 paramedicals for every 1 ophthalmologist
3. Lower the cost of consumables for cataract surgery

Ophthalmologist : Paramedical ratio chart

Ophthalmologist	Tables	Scrub Nurse	Running Nurse	Sterilisation Nurse	Instrument Sets	Surgeries per hr
1	1	1	1	1	1	1-2
1	1	1	1	1	3	2-3
1	2	3	1	1	6	4-5
1 + 1 Resident	3	3	2	1	8	6-8

3. Cost recovery by understanding people's capacity to pay

The Formula

Per unit cost of cataract surgery (all programme costs divided by the number of major surgeries) should equal paying capacity (the average monthly family income of the bottom 60% of the population).

So, the rule is: the cost per case should equal the average monthly family income of the lowest 60% of the population.

- David Green

The general rule, which we have found to be true in a variety of settings, is that people can generally afford to pay their monthly family income for cataract surgery with IOL. The other general rule we have discovered is that it is possible for the hospital's cost of cataract surgery to be reduced to a level commensurate with the average monthly family income of approximately the bottom (in terms of income) 60% of the population. This has been true for Aravind in India and for Lumbini in Nepal, and we are now discovering the same phenomenon in Egypt. Although Nepal and Egypt have very different economies with different standards of living and different per capita incomes, the same rule still holds true.

Apart from the spectrum of those who can pay something to those who can pay anything, there are those who cannot pay at all regardless of how low the fee is.

- R. Priya and R.D. Thulasiraj, Aravind Eye Hospitals

- Ensure that the quality of surgery and surgical outcomes is high so that patients will come.
- Increase the volume of cataract surgeries performed to decrease the unit cost of cataract surgery, making it affordable to the population.
- Since people can afford to pay their monthly family income for cataract surgery with IOL, reduce the hospital's cost of cataract surgery to a level commensurate with the average monthly family income of the bottom 60% of the population in the catchment area.

The secret, then, is to first assess the average monthly family income of the bottom 60% of the population you are serving, and then to analyse your costs (fixed, variable and depreciation), staffing pattern and production potential (number of cataract cases per surgeon per year when programme is operating at maximum efficiency) to determine what your productivity (increased surgical volume) has to be to sufficiently lower unit costs so that per surgery cost equals average monthly income. We will explain these steps in the Appendices.

Assessment of paying capacity of population

- Pre-existing data
- Surveys of population in catchment area
- Anecdotal
- Review of other prices
- National data

Analysis of Economic Status

	Total number	% Population	Average monthly income	Anticipated # patients
Rich				
Middle				
Poor				
Very poor				

4. Multi-tiered pricing

The cost recovery model and approach will vary according to the paying capacity of the local population. Two models of multi-tiered pricing have emerged among successful programmes that are financially self-sustaining:

1. This model is present in areas where there is a substantial portion of the population able to afford paying well above cost. These revenues are then used to subsidise service delivery to the poor (the rich pay for the poor).

Examples: Aravind Eye Hospital (AEH) in Madurai, India and L.V. Prasad (LVP) Eye Institute in Hyderabad, India

Hospital	Above cost	Around cost	Non-paying
AEH	40%	30%	30%
LVP	50%	0%	50%

2. This model is present in poor areas where only a small percentage of the population served can afford to pay in excess of costs. Most end up paying at or around cost.

Examples: Lumbini Eye Care Program in Nepal, Egypt, Malawi

Hospital	Above cost	Around cost	Non-paying
Lumbini	6%	84% *	10%
Egypt	20%	60%	20%
Malawi	0%	60%	20%

* 11% pay only for surgery, 3% pay only for IOL

The distribution of ophthalmologists between rural and urban locales [in India] further increases the barriers to eliminating cataract blindness. Although three quarters of India's population live in rural areas, three quarters of India's ophthalmologists live in urban areas.

- Dr. G. Natchiar

5. Wise location of the facility

Population density, demographics and socioeconomic status of a given geographic area are key factors determining the best location to set up eye care facilities where the intention is for income generation.

It's important to ensure that there is enough of a paying clientele to generate revenues sufficient to pay the operating costs. And it's important to balance supply and demand. Often practices established in rural areas will reach financial sustainability faster because of the lack of competition and because the area has historically been underserved. But, it's also important to develop a facility and programme that will attract and retain competent professionals.

Market research can determine optimal locations of facilities. Epidemiology and demographics, combined with the survey research methodology utilised in marketing research, will create an analytical and scientific approach to determining cost recovery viability of a given location.

- When choosing a location, be sure to balance supply and demand.
- Ensure enough paying patients to pay operating costs. Self-supporting hospitals must draw patients from the middle class and the poor.
- Combine epidemiology, demographics and market research to determine the best location for setting up a self-sustaining eye care facility, or if already set up, to determine your best target market.

6. Compassionate capitalism

Capitalism and the market economy are based on a sort of deception: developing the service or product for the least amount of money possible and selling it for the highest amount of money possible. Compassionate capitalism, in contrast, is about selling the service or product for the least amount of money possible in order to still generate some revenue, which is then used for good purpose. It means using profit and production capacity for service delivery to the poor. It focuses on building up the institution rather than increasing personal income or return on investment for shareholders.

Aravind, L.V. Prasad, and Lumbini all choose to utilise revenues from paying patients and excess production capacity to support services and surgery without charge to the poor, who account for a substantial proportion of the total patient volume. From an economic point of view, these programmes are providing a service that is affordable to most or free to the truly needy and yet is not dependent on the charity of others.

Compassionate capitalism is capitalism that understands that profit is the MEANS to an END, not the other way around as has become fashionable in the late 20th century. It is capitalism that evaluates itself in terms of its benefits to society, not just its bottom line. And it is capitalism that seeks to "do good" to its employees, its customers, its local community and the world at large, roughly in that order, without neglecting any component.

- Alice Mack, Ed.D.

The concept of compassionate capitalism can be applied to other settings, especially areas of higher population density with a large proportion of the population able to pay something, and where quality service attracts paying patients.

Success depends on where intention is.

- Gita Bellin

Compassionate capitalism means:

- Charging the lowest possible amount of money in order to become self-sufficient and continue to develop, while still providing affordable eye care services (maximising service delivery). This is in marked contrast to how capitalism usually works where the provider charges the highest possible amount of money or “what the market will bear” (maximising profit margins).
- Choosing to use profit margin/surplus revenue and excess production capacity to do work for the poor at low prices or for free.
- Managing finances properly in order to generate excess revenues and utilise that money to subsidise low paying or free work.
- Focusing on building up the institution rather than increasing personal income or return on investment for shareholders.
- Pricing the service or product to make it affordable to the targeted market, and developing social marketing or distribution channels to make the product accessible to poor people.
- Paying the staff well for their efficiency, to attract and keep high quality efficient staff.

Since we do a large number of surgeries, supported by a good number of paramedics, a few residents and only one or two ophthalmologists, and can attract patients from different levels of economic strata through our pricing system, the institution makes sufficient money to be financially self-sustaining.

- Dr. Datta

7. Changing the mentality and the practice of ophthalmologists

Currently most ophthalmologists do not believe it is possible to perform free or low cost surgery and still earn the livelihood they aspire to. But increasing productivity, decreasing costs and lowering prices will allow ophthalmologists to make money from large volume rather than high profit margin.

Charity pays. Revenues will increase when your programme targets its large volume services to underserved market potential. This then affects market perception, your reputation and overall revenues.

It is important to establish organisational imperatives and practice management habits that promote movement toward low cost, large volume, high quality eye care.

- Implement fixed salaries instead of fee for service
- Increase patient volume per doctor, reducing the cost per unit of surgery
- Focus on routine extracapsular or manual sutureless cataract surgery with IOL
- Ensure a high ratio of paramedical staff to ophthalmologists (5:1 is ideal)
- Use a team approach that utilises paramedical staff to do a high proportion of the work.

[O]ne surgeon can perform approximately five extracapsular extractions with insertion of posterior chamber intraocular lenses per hour [...] assisted by three scrub nurses, one orderly, one circulating nurse, and one nurse to sterilise the instruments. [...]

- Dr. G. Natchiar

Can cataract surgery be marketed like fast food hamburgers in developing countries?

- Dr. G. Venkataswamy

8. Use of IOL Surgery to build reputation

IOLs, Quality and Quantity

- Improving the quality of the product (postoperative visual outcome with IOL) and bringing down the price of the service will greatly increase the quantity as market demand is generated.
- With the advent of IOL implantation in the United States, the surgical volume increased in a few years from 330,000 per year to over 1.2 million.

Training in IOL implantation improves the quality of cataract surgery. IOLs provide better quality vision compared to aphakic correction (with spectacles). And research shows that over 50% of the cataract operated patients lose or break their spectacles within a year of surgery, rendering them blind again.

The prospect of better quality vision with an IOL attracts patients with cataract to come for surgery at an earlier stage of their condition, when they are still able to work and have the economic means to pay for surgery. This trend toward earlier surgery with IOL keeps people in the work force longer because they don't become economically blind; lost wages are minimised and individuals, families and communities are spared the tragedy of blindness.

Because of the increase in volume, cataract surgery programmes are therefore able to recover costs from user fees, leading to their financial self-sufficiency.

Early cataract surgery with IOL implantation promises patients substantially more returns through re-employment following sight restoration. Aravind Eye Hospital believes in charging a nominal fee payment, which creates an economic pressure to come for early surgery when they can still afford it and can make independent decisions as wage earners. This strategy, in the long run, will not only contribute to cost recovery but will also ensure that blindness due to cataract is prevented by early surgery, as well as helping to improve the economy through continued employment.

9. Programme planning for a standardised, replicable approach

Cataract surgery programmes lend themselves to a standardised replicable approach much in the same way that the franchising model works. There are many aspects of service delivery for cataract surgery that can be standardised as procedures and outcomes. They are:

- Training
- Supplies and equipment
- Purchasing and inventory control
- Outpatient department
- Preoperative procedures
- Operating theatre procedures
- Surgical technique

- Sterilisation procedures
- Sterile technique
- Central sterile supply
- Postoperative care procedures
- Medical records
- Management structure
- Maintenance and repair of equipment
- Financial controls

Other aspects of service delivery will vary according to factors like population density, socioeconomic status, infrastructure and geography. They include:

- Cost recovery
- Social marketing/Outreach

This “standardisable” aspect of eye care programmes eases the development and management of multi-centre operations spread out over a wide geographic area. (See the Management Principles and Practices Module for more information on standardisation).

Keep in mind that the programme’s goal is to provide the most appropriate services by striking a balance between what is best for an individual and what will benefit the community as a whole. Community needs on one hand and patient satisfaction on the other should drive the selection of appropriate technology. For long term sustainability, it is very important to have this perspective in focus.

- R. Priya and R.D. Thulasiraj

10. Appropriate (and appropriately priced) technology

Very often, discussions about making eye care accessible to poor people focus on the issue of “low cost” or “appropriate technology” when the real issue is price.

At Aravind Eye Hospital, IOL surgery began in the mid-1980s. When IOLs were still imported, IOL surgery was offered to poor patients at Rs.1200 (approximately US\$30). Later when the import prices dropped, the price to patients was also reduced, to Rs.800. While about 90% of the paying patients switched over to IOL during this period, amongst the free patients the switch was negligible. Aurolab was established in June of 1992, which made IOLs available at low cost (Rs.250). The price to free patients was dropped to Rs.500 and this also included discharge medication. Supplemented by active health education, the IOL acceptance in the free hospital has increased. Almost 100% now come willing to pay Rs.500 for the new procedure with IOL and the superior visual outcome that it produces.

Aurolab (an intraocular lens manufacturing facility housed at Aravind Eye Hospital in Madurai, India) is manufacturing low cost lenses using the same equipment and technology as American or European companies. However, the real innovations of our Aurolab are (1) low price to make the product affordable to the targeted market (poor people with cataract), and (2) distribution channels developed to make the product accessible to these poor people with cataract.

The hallmark of compassionate financially self-sustaining programmes is the choice to use profit and production capacity for service delivery to the poor; it is the choice to price the product and service at the lowest price possible while still allowing for sustainability and sufficient resources for ongoing development.

We realised that patients like personalised care and want their doctor to talk with them. Here at Aravind Eye Hospital in Theni, we stress the fostering of this relationship. At the same time, since we are to do a good number of surgeries and see a lot of patients, we cannot spend a considerable length of time with each patient. So what we do is judiciously mix both institutional practices and private clinic atmosphere whereby I do “just the right amount” of talking and leave the paramedical staff to take care of the rest. This way we tend to increase patient satisfaction.
- Dr. Datta

The quality of patient care has two dimensions: quality of clinical outcomes, and quality of nonclinical care (courtesy, cleanliness, procedures, dignity of treatment). Paying patients have a significant impact on quality. They are not willing to put up with services that don't match their expectations.
- R. Priya and R.D. Thulasiraj

High tech at low cost

- Surgical technique and instrumentation can be developed or adapted and refined to be appropriate and appropriately priced for economies of developing countries.
- With careful planning and thoughtful innovation, ophthalmologists in developing countries can achieve the same or better quality postoperative results as their counterparts in developed countries, at only a fraction of the cost.
- Low cost equipment and consumables, (especially the IOL), a large volume team approach to cataract surgery, fixed salary structure and a pricing of services for all economic strata are all factors that contribute to successful eye care delivery.

11. Accountability

Emphasis must be placed on satisfying patients and being accountable to them. As in any business, if the client is satisfied, the business thrives. This is in contrast to service delivery settings that are supposedly “free” where there is no monetary exchange between the client and the provider—if the patient doesn't have to pay for services, very often the provider doesn't feel accountable for the result. The simple act of charging a fee for service introduces accountability into the patient-provider equation because providers strive to satisfy the patient in order to gain loyalty and reputation in the market place.

Consumer behaviour and expectations regarding quality and satisfaction can transform service delivery; through their choice of eye care provider, patients-as-clients become “programme planners” as they force providers to improve efficiency, quality and value in order to remain competitive.

- Emphasis is placed on satisfying patients and being accountable to them.
- Payment for service introduces accountability into the patient-provider equation—providers strive to satisfy the patient to gain loyalty and reputation in the market place.
- Consumer behaviour and expectations regarding quality and satisfaction transform service delivery by forcing providers to improve efficiency, quality and value in order to remain competitive.

12. Responding to consumer expectations

In many settings and situations, as consumer expectations for quality and price change, how providers deliver eye care will be affected. Market forces can then come into play, creating competition in eye care delivery.

The introduction of market forces will transform your service delivery by guiding your planning and implementation for lower priced and better quality service. Market forces will also encourage you to develop highly efficient use of resources, and cost savings through economies of scale.

This is your opportunity to establish high quality, reasonably (not necessarily the lowest) priced services that become the market benchmark (standard), which consumers can then compare to other service providers, if available.

The cost of a cataract surgery is not just the actual cost of providing cataract services but also includes the cost of inefficiency and the cost of unnecessary services.

- R. D. Thulasiraj

13. Per unit cost as a tool for evaluating efficiency, productivity and quality

Per unit cost is determined by adding up all of your operating expenses (fixed costs, variable costs and depreciation), then dividing them by the number of major surgeries (80% of which will probably be cataract, as a rule). Since cataract surgery accounts for 80% of the revenue (another rule), this way of determining per unit cost is generally quite accurate.

Remember the 80% Rule

In many places,

80% of blindness is due to cataract

80% of programme costs are for cataract surgery

80% of revenues come from cataract surgery

Many programmes do not know how to measure efficiency. The per unit cost of cataract surgery can be used as a tool for measuring efficiency and for setting goals. In this way, cost recovery, with its measurement tool (per unit cost), becomes a “paradigm” for a comprehensive process of developing high quality eye care that is accessible and affordable to the poor. If your quality is not good, patients won’t come, so per unit cost will remain high. If your productivity is not up, you won’t be able to at least break even (have equal profit and loss) or bring the price down sufficiently to make the per unit cost affordable to the poor. If you do not have the proper paramedical to ophthalmologist ratio (5:1) then you will never free up surgical manpower sufficiently to increase volume per hour, in order to reduce unit costs. If you do not manage staff and material resources properly, costs will not be lowered sufficiently to make eye care affordable to the poor.

The following steps for bringing down the cost

- **Managing staff and material resources properly will save time and money**
- **Ensuring high quality (good visual outcomes with IOLs) will attract the patients in large volume**
- **Using the proper paramedical to ophthalmologist ratio (5:1) will free up surgical manpower to be more productive**

The cost recovery exercise in the following pages, though over simplified, illustrates the phenomenon of the impact of productivity on cost.

Cataract surgical volume per year	Fixed cost per cataract	Variable cost per cataract	Total cost per cataract
500	1,000	120	1,120
1,000	500	120	620
1,500	333	120	453
2,000	250	120	370

This represents the costs of running an eye care facility that has 50 beds, employs two ophthalmologists and performs 500 cataract surgeries per year. This is a fairly common scenario in India. Note that as the volume goes up the cost is reduced dramatically.

The motivation for the costing of programme services and products is evaluation, leading to efficiency improvements. With an increasing recognition of the importance of financial viability, particularly for those programmes undertaken by nongovernmental organisations, cost (as well as effectiveness) is becoming more central in evaluation efforts. Financial viability is aided by understanding where costs lie and where cost reductions are possible.

**- Leon Ellwein,
R.D. Thulasiraj,
A.R. Boulter, S.P. Dhital**

Cost Recovery Exercise

A. Infrastructure

Facilities		Staff	
Beds	: 50	Ophthalmologists	: 2
Operation theatres	: 1	Paramedics	: 9
Outpatient facilities	: Yes	Housekeeping staff	: 6
		Office and Security staff	: 6

B. Performance

Outpatient visits	: 20,000
Admissions	: 600
Cataract surgery	: 500
Other surgeries	: 50

C. Annual Expenditures*

Fixed costs		Variable costs (for cataract surgery only)	
Salary	: 1,584,000	Suture, drugs etc.	: 120,000
Electricity	: 60,000	IOLs (450 @300)	: 135,000
Maintenance	: 50,000	Instruments	: 25,000
Other fixed costs	: 100,000	Stationery	: 5,000
		Other variable costs	: 30,000
Total fixed costs	: 1,794,000	Total variable costs	: 315,000

* This exercise can be done using any currency

D. Assumptions for allocation of costs

- Assume that 80% of fixed costs are incurred in providing cataract surgery
- Assume that the variable costs shown are entirely for providing cataract surgery

Exercise 1

Work out cost per cataract surgery and resource utilisation for the current performance level.

a. Calculating cost per cataract surgery

Steps:

- Fixed cost component per cataract surgery = 80% of total fixed costs / 500 surgeries.
- Variable cost component per cataract surgery = Total variable cost / 500 surgeries.
- Cost per cataract surgery = Fixed cost component + Variable cost component.

b. Calculating resource utilisation

Steps:

1. Cataract operations per bed = Total cataract operations / 50
2. Cataract operations per surgeon = Total cataract operations / 2

Exercise 2

Project the cost per cataract surgery and the resource utilisation for each volume.

a. Calculate cost per cataract surgery at different performance levels:

Cataract surgical volume per year	Fixed cost per cataract	Variable cost per cataract	Total cost per cataract
500			
1,000			
1,500			
2,000			

b. Calculate resource utilisation at different performance levels

Based on your experience (and perhaps through discussion) pick your capacity norms to calculate your percentage of capacity utilisation:

- i. Cataract surgeries per bed per year :
- ii. Cataract surgeries per ophthalmologist per year :

Cataract surgery per year	Surgeries per bed		Surgeries per ophthalmologist	
	No:	% Utilisation	No:	% Utilisation
500				
1,000				
1,500				
2,000				

c. Calculate your percentage of capacity utilisation

For example, if your hospital does 500 surgeries with 2 surgeons, your number of operations/surgeons/year is 250. This is about one operation per day. If you think your surgeons could do 4 operations per day, this is 1000 cases per surgeon per year. If 1000 cases per year is your capacity norm and you are currently doing only 250/1000, then you are doing 25% of the number of operations you could be doing.

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Appendix 1

Case Study - Lumbini Eye Care Project — Self-Financing from User Fees

Regarding the financial viability of a facility or programme, a critical issue deals with the long term sustainability of revenue sources. It is not only an issue of cost containment. The proportion of expenses that are covered by sustainable revenue sources, whether from patient fees, in-kind contributions, or international or local fundraising, must reach 100 percent. Indeed they must exceed 100% if cash reserves and other assets are to grow to meet the developmental needs of the programme and the expectations of the community served by the programme.

**- Leon Ellwein, R.D.
Thulasiraj, A.R.
Boulter, S.P. Dhital**

1. Introduction

Nepal is one of the ten poorest countries in the world. The average family income is less than US \$150 per year. Cataract accounts for 80% of blindness and represents a major public health problem. The challenge was to facilitate a process that would enable the Lumbini Eye Care Project to provide quality eye care services to all, regardless of the ability to pay, and still earn enough revenue to be financially self-sustaining.

Lumbini's path to financial sustainability has its roots in the example of Aravind Eye Hospital in South India. Aravind is the largest eye care programme in the world, performing over 180,000 surgeries per year. Aravind uses its revenues from paying patients and its excess production capacity to support services and surgery without charge to the poor, who account for 60% of their total patient volume. Aravind is providing a service that is affordable to most or free to the truly needy and yet is not dependent on the charity of others. Key to making self-sufficiency a reality for eye care projects is the following set of factors:

- Improving surgical results through (1) training in microsurgical technique, (2) IOL implantation, and (3) use of axial length measurements to select IOL power
- Bringing down the cost of materials and medical supplies for eye care
- Improving efficiency and increasing surgical volume
- Establishing management structures that support efficient use of resources and planning for financial independence
- Changing the mentality of ophthalmologists and service providers so they understand how to increase volume and lower prices to make their service more accessible to poor people, yet still make a good living.

2. Profile of Lumbini Eye Care Project (LECP)

Lumbini Rana-Ambika Eye Hospital, in Bhairahawa, Nepal, was established in 1983 by founding organisations Nepal Netra Jyoti Sangh (NNJS), the quasi-governmental national body governing and sanctioning all eye care programmes in Nepal, Seva Foundation USA, and Seva Service Society of Canada. Since 1985, Seva has sponsored activities of the Lumbini Eye Care Project, serving the needs of Lumbini Zone in Nepal (population 2 million) and neighbouring northern India (population 25 million). At present, the hospital performs the highest number of cataract surgeries with IOL in Nepal and probably northern India as well.

Lumbini Eye Hospital is on the Indian border. Nearly 70% of the patients come from the poor regions of Uttar Pradesh, Bihar, and Himachal Pradesh in North India. The hospital does no social marketing or outreach in India; patients

come solely by word of mouth advertising, which is a testament to the philosophy of a market-driven approach to eye care delivery rather than a top-down approach.

LECP Staff	1993	Service Statistics	1993
Ophthalmologists :	3	Surgeries :	6,000
Paramedical :	34	Exams :	90,000
Administrative support :	10	Rural clinics :	6
Cleaning/Security/Maint :	7	Surgical camps :	6
Total :	64	Screening camps :	20

In October 1993, a cost recovery scheme was introduced into the Lumbini programme.

The conditions for introducing financial sustainability into LECP were ripe:

- New, expanded building (75 beds)
- Well trained and dedicated staff under the direction of Dr. S. P. Dhital
- Patients flocking to Lumbini because of the high quality of surgery

Under the leadership of Dr. S. P. Dhital, the Lumbini Eye Care Project rapidly achieved financial self-sufficiency. In fact, the Lumbini programme covered its daily running costs in the first year of cost recovery. (See chart at end on revenue, expenses and surplus). From the introduction of cost recovery in 1994 to 1998, surgical volume more than tripled from 6,000 to over 20,000; patients receiving an IOL have increased from 50% to close to 100%; and the programme is now able to be fully self-sustaining from user fees. It now generates a 40% surplus, which it utilises for institutional growth and free surgery to the very poor.

According to the paying capacity of the local population, 6% pay two or three times cost; 70% pay around cost; 11% pay only for surgery; 3% pay only for the IOL, and 10% receive surgery at no charge. Through efficient maximisation of human and material resources, the unit cost for cataract surgery with IOL (total of all programme costs divided by the number of major surgeries) is US \$24.

3. Process for introducing financial sustainability from user fees

In order to build toward long term self-reliance, the Lumbini Eye Care Project established the following objectives for 1993-94:

3.1. Establish a management team and a process for becoming self-reliant

A team approach was developed for the planning and implementation for LECP self-reliance. Team members included Seva Director in Nepal, Mr. Vinaya Dhakhwa; LECP Director, Dr. S. P. Dhital; and David Green, Seva Technical Director for Blindness Prevention. The team convened for three sessions in Lumbini over a six month period, with each planning session lasting 10 days to two weeks.

The clearly stated intention [of the Lumbini Eye Care Programme] was to develop the programme to the point at which foreign [support] and volunteers would become unnecessary. The programme itself was founded on a public health approach that used epidemiological data to design efficient programmes to reach the community members most at risk.

-Maura Santangelo, M.D.

Several consultants from Aravind Eye Hospital, including Mr. G. Srinivasan and Mr. R. D. Thulasiraj, reviewed the plans and gave advice. A group of consultants from Kathmandu also assisted in the assessment of Lumbini management needs and in the conducting of a survey to ascertain the socioeconomic status of the population living in the LECP's catchment area.

Regarding the development of the cost recovery plan and a new management structure, the team established guidelines that it followed in charting a course:

a) Management and reporting

- The Lumbini Management Team is the principle decision-making body.
- The Lumbini Eye Care Project will send monthly patient service reports and revenue and expenditure statements to the Central Nepal Netra Jyoti Sangh (NNJS), Nepal's national blindness prevention programme, the local NNJS and Seva.

b) Philosophy of service delivery

- Free care and surgery will be given to those who cannot afford to pay.
- Charges to patients based upon market projections will be defined at the outset to be adequate to cover the full operating costs.
- Pricing will be the same as or less than prices for similar eye care services elsewhere in Nepal, because of operating efficiencies.
- Any excess revenue (remaining after operating and capital costs are met) generated from patient fees or donations from Seva will be utilised by the Lumbini Eye Care Project management team for further development of the LECP.

c) Contribution of Seva Foundation

- Seva will contribute toward the costs of the Lumbini Eye Care Project with decreasing dollar amounts over a five year period.
- Seva stipulates that all LECP revenues generated from patient fees be utilised for the daily operating costs and development of Lumbini Eye Care Project.

d) The process of introducing cost recovery had several key features:

- Forecasting based on carefully calculated projections of patient numbers and fees
- Open and straightforward communication and planning teamwork between the Nepalese and outside consultants
- Respect for everyone's opinion
- Empowerment of the Lumbini staff to chart their own course
- Active development of skills in financial control and decision making regarding resource allocation
- Gaining control of revenues from patient fees to use solely for LECP operating and capital expenses
- Getting permission for new pricing structure from national and local governing organisations
- Taking the risk to do something new and different

What allows us to do large volume cataract surgery? In the beginning we did a lot of social marketing along with quality service at a very cheap rate with the support of an international NGO. We tried our best to satisfy the patients, vision-wise, cost-wise, and by providing prompt service. Well trained paramedicals with dedicated ophthalmologists are our main strength.

- Dr. S. K. Shrestha

3.2. Determine the current and future cost of services

The cost of service delivery was projected by determining the fixed costs, variable costs, depreciation and patient volume. Cost projections were arrived at by gathering service and cost data and organising it into various spreadsheets with estimates of increases in patient volume for the coming year. The numbers were analysed and manipulated for cost control.

- Data on surgical volume and other service statistics were gathered.
- Operating costs were defined and placed in three categories:
 - Fixed
 - Variable
 - Depreciation on building and equipment.
- The cost of future service delivery was projected as accurately as possible.
- Unit cost was determined by the following formula: total programme costs divided by surgical volume.

3.3. Do market research to ascertain the amount of money people of varying socioeconomic levels were willing and able to pay for eye care services

Formal market surveys were conducted to ascertain the varying socioeconomic status of the people living in the hospital catchment area, their ability to pay and what amount would be appropriate to charge. Pre-existing epidemiological, demographic and socioeconomic data were also examined.

Prices for similar services in Nepal were reviewed. Costs, prices and organisational structures in other self-sustaining eye hospitals oriented to poor patients were also researched. Anecdotal surveys of staff and patients were conducted to ascertain impressions regarding appropriate pricing structures.

3.4. Make projections of market, revenue and price settings, with sensitivity analysis of different scenarios

Based on survey data, projections were made regarding patient volume for each pricing category. A multi-tiered pricing structure was established. Different prices were set to be affordable to the different economic strata. The prices were differentiated according to the varying levels of comfort and privacy in accommodation. Those too poor to afford the price are given free surgery, subsidised by revenue from paying patients and Seva Foundation. The actual patient care and surgery, however, are the same for all patients, regardless of their ability to pay.

After projecting the most likely scenario for patient volume for each price category, predicting costs and profit (or loss) was made possible through the generation of many different spreadsheet scenarios (over 30 different spreadsheet realities were formulated). Each scenario included the following spreadsheets:

- Variable costs (consumables)
- Fixed costs (salaries, maintenance, utilities, vehicles, etc.)
- Equipment depreciation

- Revenue from cataract surgery (different rates for different accommodation)
- Revenue from other surgical procedures
- Revenue from out-patient department
- Revenue from other sources (lab, optical shop, pharmacy, etc.)
- Surplus (revenue minus expenses)

After much discussion on the part of the planning team, a scenario was chosen that seemed to be the most realistic in its projection of reality. The success of this process has been shown by the fact that our choice of the most likely scenario differed by only a small percentage from actual reality.

3.5 Develop improved management

The management structure was reviewed and a plan developed and implemented to reorganise how the programme manages itself. The refinement and implementation of this plan enabled the programme to run more smoothly and efficiently, with improved staff satisfaction and a decrease in the LECP director's administrative burden. The planning team arrived at a new management structure that was designed with these points in mind:

- The new structure should minimally disturb the current administrative structure in the LECP.
- Create additional tiers to the hierarchy to spread the authority, responsibility and accountability to more individuals in the system.
- Create departments where responsibility and authority are granted for the governing of the department.
- Create a non MD managerial position and fill it with someone from within LECP who is trusted by the MD director and staff.
- Abide by the following: taking responsibility, granting authority, defining boundaries, improving quality, and viewing mistakes as part of the learning process.
- Pay all staff well for productive work and long hours. Develop a base salary plus productivity bonus system for working longer than usual hours.

Department heads were selected for each of the seven new departments. These people were selected because they were already acting in a supervisory capacity. Each department will hold a meeting once a week. The LECP manager and his or her secretary will be present at each of the department head meetings. The department heads will meet once a week to share the results of their weekly meetings and to engage in group decision making.

An important part of the development of this process has been the definition of (a) the authority that department heads have to enact solutions without further approvals, and (b) which types of decisions require final approval from further up in the hierarchy.

The efficiency of the hospital has improved dramatically with the new management structure. Staff members are enthusiastic and more productive with a more participatory management process, which enables each department to set goals and improve its practice.

4. Problems encountered and solutions found

4.1 Introducing business planning approach to programme development

Historically, the LECP, as well as most development programmes in Nepal, have been dependent on foreign aid for operating costs. The idea of earning sufficient revenue to be financially solvent and independent was a somewhat alien concept. Introducing a business planning approach based upon spreadsheets that tracked costs, revenue and surplus required training for the people who were to bring this approach into operation. Developing systems of financial control, cost control and information management to track the costs and revenues of each operation was a challenge that was time consuming but ultimately successful.

4.2 Arriving at true cost of service delivery

The LECP had cost information for all facets of its operation but the information and the way it was recorded and used required reorganising. This was achieved by breaking the costs down into fixed, variable (mostly the consumables used in cataract surgery) and depreciation.

4.3 Determining affordable price structure that would generate enough revenue to make the hospital financially self-sustaining and yet still provide access to all patients regardless of the ability to pay

Many different scenarios were generated based upon our costing information and our market surveys. The challenge was to match our projected costs with projected demand and our best sense of how many patients would be expected to select the varying pricing categories. Success was achieved in part by pricing the services to be affordable to 90% of the population and by allowing the poorest patients to receive services absolutely free.

4.4 Gaining approval from the Nepal Netra Jyoti Sangh (NNJS)

The key issues here were gaining local hospital control of revenues from patient fees and getting permission for a new pricing structure. Ultimately, all of the necessary approvals were granted by NNJS; the project put into place a new pricing structure and LECP has a bank account that it controls.

This revolving fund account receives revenues generated from patient fees and is drawn upon on a daily basis to pay for the operating costs of the hospital.

5. Results

Since October of 1993, the Lumbini Eye Care Project has been financially self-sustaining for its operating costs. Eighty-four percent of the patients pay around the cost of service delivery. Ten percent receive service or surgery for free. Six percent pay well above the cost of service delivery. The number of surgeries increase 10%-30% each year. Patient clientele is the same as when the programme charged only nominal fees.

A balance had to be achieved in arriving at a pricing structure that would enable the programme to recover its operating costs and still price its services low enough to be accessible to the majority of patients, who for the most part are poor.

- David Green

Projections based on analysis of the first eight months indicated the programme would earn in its first year of implementation \$185,000 from patient fees and spend \$145,000 per year for operating costs. Operating costs include:

- staff salaries
- supplies and equipment
- building maintenance
- utilities
- vehicle maintenance
- outreach/social marketing
- screening camps
- surgical camps
- the operation of five rural clinics. (Basically, operating costs include everything except training costs and new capital costs)

The average cost of cataract surgery with IOL is about US \$24. This number is arrived at by dividing the annual total cost of running the project by the annual surgical volume. (The unit surgical cost is thus inclusive of all costs, including the outreach department, all screening camps, utilities, building maintenance, salaries, etc.) If you were to include only the actual costs of cataract surgery with IOL (staff time, consumables, equipment, postoperative care), the unit cost would be approximately US\$18.

The key to the Lumbini Eye Hospital's high degree of financial sustainability has been strong patient demand due to improving the quality of cataract surgery with IOL implantation. Lumbini's catchment area covers some of the poorest regions of India, and Nepal remains one of the 10 poorest countries in the world, which demonstrates that very poor people are willing and able to pay for something they value—their sight.

6. Latest Statistics

LECP Staff: 1997

Ophthalmologists	6
Medical Officer	1
Manager/Ophthalmic Officer	1
Ophthalmic Officers	2
Ophthalmic Technicians	10
Ophthalmic Assistants	15
Lab Technicians	2
Nurses	11
Eye Workers	5
Administration/Accounting/MIS	9
Housekeeping/Patient Movers/Runners	15
Security Guards	8
Optical Shop	2
Outreach Coordinator	1
Pharmacy	2
Gardener	1
Electrician	1
Drivers	2
Total Staff	94

Cataract surgery quality can be improved with

- 1) ECCE technique
- 2) IOL implantation
- 3) Small incision surgery
- 4) Axial length measurement.

- Steve Miller, MD

Lumbini Zone Rural Clinic Staff: 1997	
(5 clinics)	
Ophthalmic Assistants	5
Housekeeping/Patient Movers/Runners	5
Eye Workers	5

Total Bed Capacity: 1997	
A Class (Private)	4
B Class (Semi-private)	8
C Class (General Ward)	60
D Class (General Ward)	96
Septic Ward	12
Total Beds	180

Rural Clinic Bed Capacity: 25

Service statistics:

Total OPD examinations (up to December 1997)	: 938,435
Total surgeries (up to December 1997)	: 78,597
Free Surgery	: average 10%
IOL Surgery	: over 90%
97/98 Surgical Volume	: 2700 surgeries per surgeon
97/98 Bed Utilisation	: 97 cases per bed

Lumbini Eye Care Programme Revenue, Expenses, Surplus

	92/93*	93/94*	94/95	95/96	96/97	97/98	98/99
Outpatients	87,966	94,650	108,279	127,106	131,592	149,937	144,816
Total surgery	6,327	6,389	8,855	11,518	12,328	16,284	19,112
Cataract	5,383	5,392	7,561	10,113	11,158	14,874	17,584
Cataract with IOL	3,313	3,970	6,687	9,305	10,353	13,988	16,734
Revenue**	-	\$127,462	\$250,217	\$392,076	\$446,447	\$498,075	\$585,351
Expenses	\$83,984	\$111,550	\$216,174	\$245,994	\$293,944	\$396,782	\$411,861
Surplus	-	\$15,912	\$34,043	\$146,082	\$152,503	\$101,293	\$173,490
Unit cost per surgery	\$13	\$17	\$24	\$21	\$24	\$24	\$23

* donated consumables

** US dollars

Appendix 2

Planning Process for Development of Financial Sustainability in Eye Care

A) Goals of the planning process

- Provide planning expertise and skills transfer to improve cataract service delivery through an on-site planning approach.
- Evaluate the present status of eye care delivery and conduct a needs assessment for how to improve cataract surgical quality and productivity.
- Focus on these prime areas:
 - surgical volume
 - surgical quality
 - presence and role of paramedical staff
 - existence of outreach and methodology for generating patient demand
 - cost of consumables
 - management structures
 - productivity
 - clinical efficiency and outcomes
 - ophthalmic technician skills
 - cost recovery
 - financing
- Create links between projects and training programmes like the Lions Aravind Institute of Community Ophthalmology (LAICO) for training and technical assistance in developing effective service delivery models and development of teaching methodology and curricula.

B) Specific measurable objectives (and expected results)

Evaluate and monitor the programme to measure movement toward fulfilling these objectives:

- Service is offered to those in need (increase in low income people served)
- Financial sustainability (revenues exceed costs)
- Increase in surgical volume (indicator of quality and efficiency)
- Efficiency improves and surgical volume increases (unit cost per surgery is decreased)
- Surgical volume per surgeon increases (to at least 3-4 per hour)
- Ophthalmologist to paramedical staff ratio improves (optimally 1:5)
- Short and long term quality outcomes of surgery are measured (and show same or better results)
- Patients are surveyed to determine their level of satisfaction (quality of service questionnaire is administered to patients and results provide feedback to the programme)

C) Timeframe

- Phase 1 (First site visit, if a consultant is involved)
Gather preliminary information on the programme (prior to visit, if applicable) and then engage in a process of evaluating present circumstances and begin the planning process for recommending future interaction and changes.
- Phase 2 (Second site visit, if a consultant is involved)
Link the programme to appropriate resources for training, financing, supplies and equipment. Training resources include LAICO and L.V. Prasad Eye Institute among others.
- Phase 3 (Third site visit, if a consultant is involved)
Set up a process (or follow-up site visit) to engage in programme planning for developing workable management structures, financial controls, increased productivity, etc. This phase (or site visit) could also include
 - informal training in microsurgical technique; ECCE with IOL; and small incision sutureless
 - organisation for efficiency in preop, operative, sterilisation, and postop procedures
 - cost effective social marketing/outreach for increasing patient load
 - management

D) Predictive modeling methodology

The process of developing a cost recovery model is very similar to the predictive modeling that most businesses perform in projecting costs, determining prices and estimating market share. It involves the following steps:

1. Definition of total costs (variable costs, fixed costs, depreciation)
2. Assessment of constraints or obstacles to more productive service delivery*
 - (a) Management expertise
 - (b) Skill level of staff
 - (c) Required number of staff
 - (d) Leadership and continuity of the staff
 - (e) Supply and equipment needs
 - (f) Facility infrastructure and expansion/renovation requirements
 - (g) Financial controls
 - (h) Demand for service
 - (i) Demand generation

*See section E (Programme Assessment) for a complete list of factors to be assessed.
3. Planning for the removal of constraints or obstacles*
 - (a) Review management expertise and (re)train where necessary

- (b) Determine the skill level of staff and their (re)training requirements
 - (c) Decide what additional staff will be needed and hire
 - (d) Determine optimum leadership processes and methods for ensuring continuity of staff
 - (e) Delineate processes for meeting supply and equipment needs (acquisition, inventory control, costs, maximisation of material resources)
 - (f) Ensure appropriate facility infrastructure (expansion/renovation requirements)
 - (g) Review financial controls and revamp where necessary
 - (h) Demand for service (examination of past user patterns of eye care services and existing epidemiological data on incidence and prevalence of various eye diseases)
 - (i) Demand generation (review of outreach and interaction with various community and social groups)
- *See section E (Programme Assessment) for a complete list of factors to be assessed.
4. Market projections and assessment of paying capacity of population
 - (a) Review pre-existing data or conduct surveys in the catchment area to determine varying income levels of population (rich, middle, poor, very poor) and the percentage of population that falls into each income bracket
 - (b) Review demographic data to define the demographics of the area (economic status of the population and what percentage of the population has the ability to pay and at what price)
 5. Cost sensitivity analysis
 - (a) Create different scenarios (changing variables of price, percentage of patients per pricing category) and choose the one that most approximates projected reality
 - (b) Project costs and revenues into the future and do a final adjustment of the model to best ensure sustainability
 6. Development of a multi-tiered pricing system appropriate to the local economy
 - (a) General rule is to charge patients their approximate monthly family income for cataract surgery
 - (b) Set different prices according to the level of privacy and comfort in accommodation, or difference in consumable package (e.g., IOL made in U.S. or India)

E) Programme assessment

The planning process for financial sustainability development involves preliminary assessment on site to evaluate the programme, guide the change process, and make recommendations on the following:

1. Clinical: efficiency and effectiveness of present service delivery model
 - Outpatient department
 - Preoperative procedures
 - Operating theatre procedures

- Sterilisation procedures / Sterile technique
 - Postop care, discharge and follow-up procedures
 - Maintenance and repair of equipment
2. Assess staff and skill levels: training requirements, additional staff needed
- a. Ophthalmologists
- Surgical technique
 - Surgical results
 - Service mentality
 - Attitude toward patients
 - Openness to new ideas/development
 - Political constraints / Will to change
 - How many ophthalmologists altogether, and how many also engaged in private practice?
 - What percentage of surgery is ICCE, ECCE, ECCE with IOL, manual sutureless, instrumental phaco?
- (b) Ophthalmic assistants
- Presence and use of ophthalmic assistants, ophthalmic technicians, ophthalmic nurses
 - Ratio of ophthalmologists to paramedicals
 - Roles and responsibilities of paramedicals
- (c) Managers
- Do they exist?
 - Roles and responsibilities
 - Authority
 - Training
- (d) Management
- State of management and what expertise needs to be developed
 - Management structure
 - Staff utilisation
 - Equipment
 - Purchasing, inventory control, stores
 - Ongoing training
 - Medical records, registration
- (e) Service delivery statistics
- Gather surgical volume and other service statistics
- (f) Attitude/Mentality of staff
- Team approach
 - Mutual respect
 - Organisational structure
 - Staff incentives
 - Bureaucratic imperatives
- (g) Organisational structure
- Organisational chart
 - Reporting/hierarchy, where the power lies

- Roles, responsibilities, decision-making authority of key staff
- Intra-organisational communication
- Transparency of structure and finances
- (h) Finances and financing
 - Present financing mechanisms
 - Financial controls
 - Accounting
 - Financial planning
 - Decision making
 - Possibility for cost recovery/self-financing through user fees
- (i) Social marketing
 - Level of community support
 - Cost effectiveness of outreach (per unit cost of outreach for each patient)
 - Outreach methods and social marketing techniques employed
 - Level of interaction with various community and social groups
- (j) Supply and equipment needs
 - Acquisition/purchasing method of consumables
 - Inventory control
 - Present equipment and needed equipment
 - Maximisation of material resources
- (k) Facility infrastructure
 - Layout and design of facility
 - Optimising space for efficient through put of patients
 - Space allocated for teaching activities
 - Expansion/renovation requirements for training or to improve efficiency/capacity
 - Orient space utilisation toward cost recovery—how does space use result in income?
- (l) Eye care training
 - Suitability of patient volume for expanding training activities
 - Present and needed training equipment
 - Identification and engagement of training opportunities and resources
 - Overview/evaluation of present training programmes

Appendix 3

Questionnaire and Planning Tool for Developing Financially Self-Sustaining Eye Care Programmes

Introduction

This questionnaire is designed to gather information to form a general impression about the operation of your eye care facility. It is a programme planning exercise designed to gather relevant data to inform and guide planning toward a financially self-sustaining eye care delivery model.

You will be asked to provide numbers about a variety of aspects such as surgical volume, finances, etc. If numbers are not readily available, please fill in the blanks with your estimate of what these numbers are.

At this early stage of data gathering, exact numbers are not necessary—it is enough for initial programme planning purposes to gather an impression of how you perceive the relevant numbers and the operation of your facility. The numbers will be refined to be more exact later in the planning process.

The ultimate goals are to improve quality of service delivery and surgery, increase surgical volume, and lower costs through efficient use of staff and material resources.

There are three important aspects to take into account in the achievement of these goals:

1. **Ophthalmologists:** number of surgeons performing surgery, improving quality of surgical outcome, and increasing surgical volume by doing more surgeries per surgeon
2. **Paramedicals:** in the correct ophthalmologist to paramedical ratio (optimally one ophthalmologist to five paramedicals) so as to free up ophthalmologist time to perform surgery and lower cost of service delivery by utilising less expensive professionals
3. **Consumables:** achieving efficiency by lowering the cost of consumables through intelligent purchasing, decreasing wastage, and maximising staff resources with more efficient operating procedures

If the above are achieved in some measure, the result should be:

- High quality cataract surgery
- Large volume cataract surgery
- Low cost cataract surgery

A multi-tiered pricing structure can then be developed to price eye care so that it is affordable to all economic strata while earning enough revenue that the eye care facility can become financially self-sustaining from user fees.

Baseline data on facility

Name and address of the hospital

Name and Address

Phone

Fax

Email

Name & designation of person(s) reporting

Function

Name

Designation

Head of institution

Head of the medical services

Head of administration

Overview of annual statistics

(please give estimates if numbers are not known)

Total outpatients	
Number of beds	
Total surgical volume	
Cataract surgical volume with IOL	
Cataract surgical volume without IOL	
Total revenue	
Total expenses	

Primary sources for operating expenses

Fee for service

Government

Donations/grants

Other

Physical facilities

	How many?	Size?	Patient Capacity?
Private rooms			
Semiprivate accommodation			
Wards			
Septic ward			
Operating rooms			
Outpatient department			
Administration			
Supply room			
Other			

Staffing

Professional Staffing	How many?
Ophthalmologists	
Optometrists	
Opticians	
Ophthalmic assistants	
Ophthalmic technicians	
Ophthalmic nurses	
Social workers/patient counsellors	
Managers/administrators	
Accounting/financial control	
Public relations/outreach/marketing	
Other professional staff	

Ratio of paramedical staff to ophthalmologists:

Paramedical Roles

(circle Yes or No)

Visual acuity	Y / N	Patient counselling	Y / N
Patient exam	Y / N	Blocking for surgery	Y / N
Refraction	Y / N	Laboratory	Y / N
Tonometry	Y / N		
Assisting in surgery	Y / N		
Sterilisation	Y / N		
Biometry	Y / N		
Contact lens fitting	Y / N		

Ophthalmologist status	How many?
Full-time and paid fixed salary	
Part-time and paid fixed salary	
Full-time but paid for cases seen/operated	
Part-time but paid for cases seen/operated	
Use hospital but collect fees directly from patients	

Other staff	How many?
Reception	
Records	
Housekeeping	
Security	
Maintenance	
Food service	
Drivers	
Other	

Major diagnostic and surgical equipment available

Type	How many?	Functioning? (Y/N)
Operating microscope		
Vitreotomy machine		
Cryo unit		
YAG		
Autoclave		
Slit lamp		
Indirect ophthalmoscope		
Direct ophthalmoscope		
Fundus camera		
Refractometer		
A-scan		
Keratometer		
Schiotz tonometer		
Other		

Service statistics

Surgical volume	How many per year?
Cataract (total)	
Cataract with IOL	
Glaucoma	
Retinal	
Corneal	
Paediatric	
Oculoplastic	
Minor	
Ptyerigiums	

Efficiency statistics	How many?
Average number of cases per day	
Operating tables per surgeon	
Ratio of operating room staff to surgeon	
Average yearly surgical volume per surgeon	
Busy months for surgery	
Slow months for surgery	
Average surgical volume per month	

Surgical process

Staffing	How many?
Ophthalmological surgeons	
Scrub (assistant) nurses	
Running (circulating) nurses	
Sterilisation nurses	
Equipment technicians	
Theatre assistants/Runners/Orderlies	
Block room nurses	
Other	

Sterilisation	How Many	Functioning?
Autoclave		Y / N
Ethylene oxide		Y / N
Chemical		Y / N

Finances

Financial Information (based on the last year)	How much in local currency or US \$
Revenue (donations, fees, interest)	
Expenses (operating costs, capital, depreciation)	
Profit (surplus revenue) / Loss	

How are the operating costs met?

Sources of revenue	% of total	Amount
Own income generated from private patients		
Government grant/subsidy		
Donations		
NGO support		
Grants from the managing agency		
Loan		
Others		

How are the capital expenses met?

Sources of revenue	% of total	Amount
Own income generated from private patients		
Government grant/subsidy		
Donations		
NGO support		
Grants from the managing agency		
Loan		
Others		

Optical dispensing	Y / N	Amount	Income
Eye glasses (ready made)			
Produced on premises			
Yearly volume of eye glasses dispensed			
Approximate revenue			
Approximate expense			
Profit/loss			
Do you also dispense drugs/eye drops?			

Other sources of revenue?

How much?

Training Programmes	Number of participants	Duration
Ophthalmology residency		
Ophthalmology fellowship		
Sub-specialty fellowship		
Ophthalmic assistants		
Optometrists		
Other		
Workshops (list topics or titles)		

Hospital operations/Procedures

Please describe procedures, working hours, work load, staffing, policies, etc. for the following departments:

Outpatient registration process

Outpatient examination/procedures

Surgical admission process

Preoperative procedures (patient preparation, blocking)

Organisation of operating room

Sterilisation procedures

Postoperative procedures

Inpatient care / Counselling

Postoperative days in hospital

Discharge process

Medical records

Lab tests available

Stores/inventory/purchasing

Support facilities (housekeeping, security, maintenance, dietary, etc.)

Administration

Finances/Accounting

Management process

By whom and how are the decisions taken on policies and procedures?
(regarding salary scales, recruitment, major purchases)

By whom and how are the routine decisions taken regarding

- Personnel activities (sanction of leave, posting, etc.)

- Money handling (food concessions for the patients and staff, depositing, etc.)

- Routine purchases (who authorizes and signs on the indent? who decides routine purchases? what is the procedure?)

Comments on management

Information system

What types of reports are generated in the hospital? (Please enclose the formats)

- Medical records
- Camp (outreach) reports
- Performance reports
- Management reports
- Comments on the information system

Problems faced by the hospital?

Future expansion plans?

Organisational structure (Please draw a diagram of your organisational structure)

Enclose:

- Staff policy statements
- Financial statements
- Organisational chart

Baseline data on beneficiaries

What are the major eye problems diagnosed and treated in the hospital?

Problem	Amount/year	Approximate %
Cataract		
Refractive errors		
Corneal		
Glaucoma		
Vitreo-retinal		
Paediatric		
Oculoplastic		
Minor		
Ptyerigium		
Other		

How do you get your patients?

Method	Number	% of total
Word of mouth		
Referral		
Eye camps		
Assistance of community groups		
Social marketing programmes oriented to poor		
School screenings		
Other		

Epidemiological and market perceptions

Country data (estimate if numbers not known)	Number/Estimate
Cataract prevalence	
Annual cataract surgery volume	
Urban cataract volume	
Rural area cataract volume	

Country data (estimate if numbers not known)	Number/Estimate
Total number of blind	
Blind due to cataract	
Number of ophthalmologists	

Cataract surgery performed	% of total
Private practice	
Government	
Nongovernmental/Charity	

Socioeconomic Demographics

What are the average yearly income levels of the population you serve?

Urban	Average yearly income	% of population	% of your patients
Rich			
Middle			
Poor			
Very poor			
Rural			
Rich			
Middle			
Poor			
Very poor			

Average prices for services in your area

	Your price	Private practice	Government	Non-profit
Cataract surgery				
Cataract surgery with IOL				
Other major eye surgery				
Minor eye surgery				

	Your price	Private practice	Government	Non-profit
Cataract surgery				
Outpatient visit				
Refraction				
Accommodation				

Do you presently provide surgery for free? Y / N

% of total

Do you have different prices for different economic levels? Y / N

Y / N

From how far away do patients travel to get to your eye care facility?

	Miles / Kilometres	Travel time (in hours)
Furthest point		
Average distance		

How do patients travel to the facility?

	Yes/No	Estimated average cost
Bus		
Car		
Animal		
Walk		
Other		

Average Yearly Income of Ophthalmologists	Amount
--	---------------

Established private practice

(5 years or more with established clientele)

- Urban
- Rural area

Not yet established in private practice (less than 5 years)

- Urban
- Rural area

Ophthalmologist serving in both government and private practice

- Urban
- Rural area

Ophthalmologist serving only in government practice

- Urban
- Rural area

Other situation

- Urban
- Rural