



Quality Cataract Surgery Series

**Introduction to High Quality, Large
Volume, Sustainable Cataract Surgery
Programmes**

**Aravind Eye Hospitals
& Postgraduate Institute of Ophthalmology, India
Lions Aravind Institute of Community Ophthalmology, India
and
Seva Foundation, USA**



Quality Cataract Surgery Series

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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This series of modules can be improved with your help. If you have ideas or suggestions for ways the QCS series could better meet your needs, please write to the QCS Series Editor c/o Aravind Eye Hospitals. We welcome your comments and experiences. Thank you for your help.

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This series on large volume cataract surgery with high quality and low cost, developed by Aravind Eye Hospital writer teams with Seva Foundation consultants and edited by Seva's Julie Johnston of Canada and her Aravind counterparts in India, Nandini Murali and Chitra Ravilla, will be of significant value to blindness control programmes where cataract causes much needless blindness. At our eye hospitals, we have been able to organise for large volume by adopting the efficient techniques used in factory assembly lines, but with a human touch. I am certain that this series will be of immense use to eye surgeons and others all over the world, especially in developing countries.

Dr. G. Venkataswamy
Founder and Chairman
Aravind Eye Hospitals, India

Of course there are many challenges ahead. While it is possible to convey surgical and management skills rapidly in short training programmes, it is as yet unknown how easily transmitted and sustainable are the spiritual underpinnings of the work. For Dr. Venkataswamy, this is the great challenge of his life: Can an institution (not just an individual), through the way in which it carries out its daily practice of service, open itself upward sufficiently to allow the higher force and wisdom to pour forth through it in such a far-reaching way as to change the map of world blindness?

This hospital, one of the largest eye hospitals in the world, is a model of efficiency, modern technology, cleanliness, and selfless service. Anyone visiting Aravind becomes aware very quickly of the devotion and compassion of the staff and the extraordinary energy and inner light which they bring to their work. Dr. V, as Dr. Venkataswamy is affectionately called, is quick to point out that the spirit which imbues the entire undertaking is a manifestation of higher mind, [which has] guided his hand in creating the blueprint for this world-famous institution.

Ram Dass
Seva Foundation, USA

Dedication



The Quality Cataract Surgery Series was born from the vision and inspiration of one very special man, Dr. G. Venkataswamy, founder of Aravind Eye Hospitals and guiding light in the world of eye care and community ophthalmology.

We dedicate this effort to him.

Preface

Those of us who are involved in the delivery of eye care are often faced with a dilemma. On the one hand, we recognise the existence of a disproportionate burden of avoidable blindness, with unoperated cataract predominating. On the other, we see a need to make available and to apply the knowledge and technology that we already possess, in order to alleviate the needless blindness that exists, especially in the less economically developed parts of the world.

In trying to reach this objective, greater emphasis has been placed on the numbers of surgery done to reduce the backlog of cataract blindness, rather than on the number of sight restoring surgeries performed.

However, if our collective objective is to benefit the largest number in need, in the shortest possible time, at the lowest feasible cost, then we need to look beyond mere numbers. Behind quantity there must be quality, at an affordable price.

These salutary outcomes do not come easily. The institution must have a mission to provide quality services and its leadership must have a vision for quality assurance that is shared with the team. Quality consciousness must permeate the whole organisation.

This manual is the outcome of the vision and work of Dr. G. Venkataswamy, who set up an institution, Aravind Eye Hospital, with a mission for large volume, high quality surgery at an affordable cost, and shared this vision with all who came under his influence. I recall very vividly the discussion that Dr. V had with me, almost three decades ago, about his idea of applying the fast food concept of delivering a good product (good vision), in quantity, at an affordable price in a standardised manner, as a sustainable venture.

This concept, with suitable adaptation, is as valid today – especially within the context of VISION 2020 - The Right to Sight – as it was when he first promulgated it.

The merit of this manual is that it is not a document based on theoretical concepts or hypotheses. It is founded on evidence-based ophthalmic care. It spells out in clear, unambiguous terms what has been tried and proven to be best practice guidelines for ensuring quality of outcomes. This manual also provides practical strategies for making large volume, high quality and affordable service delivery both self-reliant and sustainable.

The Quality Cataract Surgery Series fulfills an unmet need in training and the provision of eye care services in general, and cataract surgery in particular. Although it has been compiled with eye care in the economically less developed regions in mind, it will have a far wider readership and application. I would like to recognise with appreciation the contribution made by Seva Foundation to the production of the manual and to making this valuable publication available to a wide group of eye care providers, the world over.

R. Pararajasegaram
FRCS., FRCP., FRCOphth., Immediate Past President, IAPB

Cataract – The Big Picture

The prevalence of blindness in developing countries is 10 to 40 times higher than in western developed countries.

- WHO, 1979

Worldwide, it is estimated that at least 38 million people are blind and that an additional 110 million have severely impaired vision. In all, about 150 million people are visually disabled in the world today, and the number is steadily increasing because of population growth and aging. Overall, the data show that more than 90% of all blind people live in developing countries and that more than two-thirds of all blindness is avoidable (either preventable or curable). Unfortunately, little information is available on the incidence of blindness around the world; it seems probable, however, that there are some 7 million new cases of blindness each year and that despite every intervention, blindness in the world is still increasing by 1 to 2 million cases a year. Thus, trend assessment points to a doubling of world blindness by the year 2020 unless more aggressive intervention is undertaken.

Presently, an estimated 7 million cataracts are operated on each year. There is a backlog of 16 million cases that have not yet been operated on. If this backlog is to be eliminated in the next two decades ... a staggering 32 million cataract operations must be performed annually by the year 2020.

In addition, there must be an improvement in technology because more than 50% of cataract surgeries in the least developed countries today are still performed without intraocular lens implantation. Thus, most of the developing countries need more surgery facilities, supplies and equipment, and an increased number of trained surgeons. Furthermore, particularly in sub-Saharan Africa, India, China and other parts of Asia, the volume of cataract surgeries must increase greatly. Although considerable progress is being made in some of these countries, the provision of good quality, affordable cataract surgery to all those in need will nevertheless remain the main challenge for ophthalmology worldwide for many years to come.

The second main focus of a global initiative to combat cataract blindness must be human resource development. To increase the efficiency of ophthalmologists in clinical work, further training of support staff such as paramedical ophthalmic assistants, ophthalmic nurses and refractionists is proposed. Improved management training for medical and paramedical staff through short courses, further training of equipment technicians to deal with the maintenance and repair of instruments, and the production of local spectacles and eyedrops are also proposed.

Appropriate technology and an infrastructure for quality eye care form the third cornerstone of the global initiative. This implies building a system of eye care on the basis of primary health care and making available the best technology that can be afforded at the public health level. If any blindness-prevention and eye-care scheme is to be successful, awareness of eye disease and its prevention and treatment opportunities must be increased in the poorest population groups.

While increasing the infrastructure facilities, the number of ophthalmologists and the availability of paramedical manpower could be a solution, what might be more important in some locations is to make better utilisation of existing resources and at the same time provide better quality of services. In India, for example, many of the ophthalmologists do not operate at all, thus wasting valuable resources and skills.

- Dr. K. C. Premarajan

Cataract and VISION 2020-The Right to Sight

A World Health Organization plan with world NGOs to eliminate preventable blindness by 2020, sponsored by the WHO's Programme for the Prevention of Blindness and Deafness.

[Cataract surgery] has a significant impact on the community because it changes people from being a burden on society to becoming contributing members once again. It's our intent to help them be productive partners in their community again, to restore their dignity.

- Chandra Sankurathri, Srikiran Institute of Ophthalmology

VISION 2020 - The Right to Sight is recommending a two- to five-fold increase in the volume of cataract surgery. The only way to accomplish this feat is to make best use of available personnel and facilities and to become organised to reach more people in need. These efforts will require considerable strengthening of programmes, expansion of trained staff, and engagement with communities in ways that stimulate people in need of surgery to come forward early in their progression toward blindness. In so doing, the likelihood of a programme being capable of sustaining itself from modest patient fees is enhanced.

- WHO, 1999

It is a paradox that the eye condition responsible for more than half of all blindness in the world can be treated with a successful surgery for individuals and with a cost-effective intervention for populations. Although cataract is the "bread and butter" of ophthalmological practice globally, we struggle to deliver sufficient quality and large enough volumes of cataract surgery at a price that the majority of people in developing nations can afford.

In industrialised countries, although waiting lists exist in some areas, there are few people "blind" from unoperated cataract. These countries have cataract surgical rates (CSR) of between 4000 and 6000 operations per year per million population to address "operable cataract."

India, with a current national CSR of approximately 3000, may or may not be meeting the incidence need, as so far there is little evidence that the prevalence of cataract blindness is decreasing. The next few years will probably answer this question. In most of the developing world the cataract surgical rate is less than 2000 and often less than 1000. In these societies, cataract is the major cause of blindness and it is increasing. Current evidence therefore suggests that countries with older populations will have to increase their CSRs in order to begin to reduce cataract blindness. How can this be achieved?

The "VISION 2020 - Right to Sight" programme from the World Health Organisation (WHO) and the International Agency for the Prevention of Blindness (IAPB) is promoting a model to provide high quality cataract services with IOLs at an affordable price. Between 1000 and 2000 cataract operations need to be performed every year for each 500,000 population, or around 30 cataract surgeries per week.

Recent thinking has moved away from reducing the cataract backlog (prevalence) through "campaigns" and "camps" to a consideration of static, sustainable services, which will deal with the incidence of "operable cataract." Sustainable programmes have been developed using this model in India and Nepal, and are currently being established in Africa. These will need replication for at least 2000 million of the world's most underserved populations. Providing affordable, successful IOL cataract surgery close to where people live appears to overcome most of the barriers to access and uptake of care.

Aravind Eye Hospital has pioneered access to quality surgical services, and their Aurolab factory has greatly helped to lower the cost of cataract surgery's consumables in many countries of the world. The development of this series of manuals is another important step in disseminating the information and experience gained in India so that cataract blindness can be eliminated globally.

- Dr. Allen Foster OBE., FRCS., FRCOphth., President Elect IAPB, Medical Director CBM

About This Series

Right now, our top priority is to save as many eyes as possible. What we need are strategies that cater to the needs of our community. We have got to keep in mind whom we are serving; our service delivery should be driven by what is best for the community.

**- Dr. G. Natchiar,
Aravind Eye Hospitals**

The main purpose of this manual is not to teach any surgical or management skill but to help an organisation or institution or individual to set up systems and facilities for doing large volume, high quality cataract surgery in a most efficient way, thus bringing light into the lives of millions of cataract blind in our communities.

- Dr. K. C. Premarajan

The Quality Cataract Surgery Series responds to the desire of many organisations and institutions around the world to provide more people with cataract surgery in order to prevent blindness or restore sight. Tools are needed to organise the energies, commitment and plans of the growing number of cataract programmes. The intent of this series is to provide an adaptable framework from Aravind Eye Hospital's "best practices," based on over 20 years of growing, changing, and learning from mistakes, with input from other cataract surgery programmes in the developing world. We hope it will stimulate development of high quality self-supporting eye care services by showing the process evolved by Aravind and its many partners since 1976. Seva Foundation's aim in collaborating on this series is to share how Aravind conceptualises and implements its high quality, large volume, financially sustainable cataract surgery programme. Seva is honoured to play a role in telling this story. We hope it will aid readers in designing or refining their eye care programmes to reach more people in need with better services on a sustainable basis.

The Quality Cataract Surgery Series consists of the following seven modules:

1. This Introduction Module, which gives an overview of the series, a look at the big picture of cataract in developing countries, and some history of Aravind Eye Hospitals' contribution to solving the problem.
2. Clinical Strategies Module, which reveals the clinical skills and management practices that form the basis for successful high quality cataract surgery programmes in large volume settings.
3. Paramedical Contributions Module, which highlights the role and critical contributions of trained paramedical personnel in large volume cataract surgery programmes.
4. Management Principles and Practices Module, which discusses leadership and management issues such as standardisation, human resources and cost effectiveness strategies.
5. Community Outreach and Initiatives Module, which outlines the organisation of eye camps, health education, and marketing techniques for improving patient awareness and increasing the uptake of cataract services.
6. Financial Sustainability Module, which reveals key considerations for achieving the goals of cost recovery and financial self-sufficiency.
7. Architectural Design Module, which describes architectural considerations for designing and constructing, or renovating, eye care facilities for large volume, high quality, sustainable eye care programmes.

The Quality Cataract Surgery Series is for eye care providers: ophthalmologists, ophthalmic paramedical staff, managers of eye care projects, outreach coordinators, project officers, facility designers, charities, foundations, government programmes, and local, national or international NGOs, plus others in eye care service delivery. The series has been designed to meet the needs of eye care professionals who want to provide the best in cataract services – high quality, large volume, low cost, and programme sustainability.

About the Series Partners

The Quality Cataract Surgery Series takes you step-by-step through the planning, organising and implementing of all aspects of a large volume cataract surgery programme. It

- presents a team approach to community-oriented cataract surgery service.
- encourages private practice ophthalmologists, eye clinics and hospitals of all sizes to increase the volume of their cataract surgery.
- works like a franchise handbook, suggesting ways to standardise care and procedures, cost and quality.
- serves as a guide to options and alternatives for those who are looking for ways to enhance quality, increase volume and implement cost recovery in their eye care programmes.
- Aravind Eye Hospitals, South India started in 1976 as an eleven-bed hospital in Madurai, Tamil Nadu. Today, Aravind is a network of four hospitals in South India with a combined bed strength of over 2,000. It is the most productive eye care system in the world in terms of volume of surgery, turnover of patients, and community orientation. Over the years, the Aravind team has evolved a system of procedures making sight-restoring cataract surgery affordable for many more people, especially the poor.
- Lions Aravind Institute of Community Ophthalmology (LAICO), Madurai, India, was established in 1992 to train health-related and managerial personnel in community ophthalmology and health care management. LAICO contributes to the development of large volume eye care services in many countries.
- Seva Foundation, USA, was established in 1978, and works to stimulate and support development programmes in domestic and international communities. Seva's principal activities abroad centre on blindness prevention and sight restoration activities in India, Nepal, Tibet, Malawi and Cambodia. Seva's sight programmes are a joint effort with Seva Service Society, Canada. The Sanskrit word "seva" meaning "service" reflects Seva Foundation's shared commitment to work towards alleviating suffering.

Aravind is unique because of the spiritual leadership of Dr. V and his family. Aravind has an absolute dedication to bringing eye health care to the poor, and the efficiency with which they do that is truly impressive.

- Larry Schwab, MD

LAICO is known for teaching eye care personnel basic principles of efficient public health management grounded in a value system of compassion, integrity, and perseverance.

- Sue Newlin

For more than 20 years, Aravind and Seva have developed ways of working that blend technical excellence with a spirit of service. We hope this series will catalyse efforts to reach more of the cataract blind people around the world who need surgery.

- Dr. Suzanne Gilbert, Director, Seva Sight Programmes

The QCS Series was developed and authored by Aravind Eye Hospital staff and Seva Foundation colleagues (ophthalmologists, ophthalmic assistants, managers, cost recovery experts, outreach personnel, and architects) with expertise and experience in large volume cataract services.

The Aravind Eye Hospital Model

Many aspects of our Aravind model for health care are innovative and have stood the test of time. We believe that community involvement, proper social marketing, and the appropriate utilisation of human and other resources are probably the cornerstones of any health care organisation. Some specific aspects of this model could be duplicated in other developing areas.

- Dr. G. Natchiar

By operating as a dynamic business, Aravind and hospitals like it show that good social development can also be good business.

- Alexander Nicoll

We need to apply factory-like principles, by bringing assembly line efficiency and quality to eye surgery, if we are going to overcome this problem. If fast food chains can market mass-produced hamburgers, why can't we replicate the system in eye care? We should be able to provide cheap but standardised high quality eye care for the masses.

**- Dr. G. Venkataswamy
Aravind Eye Hospitals**

Dr. G. Venkataswamy, a true visionary and leader, established Aravind Eye Hospital in 1976 as a non-profit organisation. In a span of two decades, Aravind grew from a rented house with 11 beds to a network of four eye hospitals spread across the southern districts in the state of Tamil Nadu, India. With its 2000-bed facility, it is now one of the largest providers of eye care in the world. In 2000, the hospital handled more than 1.3 million outpatient visits and performed over 190,000 surgeries. Part of this work is carried out through outreach diagnostic services organised as screening eye camps, and 1,548 camps were held in 2000. While these numbers by themselves are impressive, what has attracted the world's attention to Aravind is the manner in which these numbers are achieved.

Over two-thirds of the patients receive free eye care, and the financial resources for this and for all capital investments come through one third of the patients, who pay the market rates for eye care.

The hospital offers a full range of ophthalmic services, from preventive care to subspecialties such as retinal surgery. It has become one of the most sought-after centres for basic training in ophthalmology and fellow training in advanced disciplines. Ophthalmology residents from Asia, Africa, Europe and USA train at Aravind.

The hallmarks of "the Aravind model" are quality care and productivity at prices that everyone can afford. A core principle of Aravind is that the hospital must be financially self-supporting, and this is achievable through high quality and large volume. Aravind's mission is to eradicate needless blindness by providing appropriate, compassionate and highquality eye care to all people, rich or poor.

* High quality through a base hospital approach

With the establishment of more eye care infrastructure with operation theatre facilities in government, NGO and private sectors, there is a shift to the base hospital approach wherein patients are brought from screening eye camps to the base hospital and operated on in a permanent facility. This has been found not only to improve productivity and cost effectiveness but also to facilitate an aseptic environment so that surgeons can do higher quality cataract surgery.

* Large volume due to teamwork and high paramedical to ophthalmologist ratio

According to Dr. Venkataswamy, the key to Aravind's success is keeping its relatively high-priced ophthalmologists working in the operating theatre. In 1999, Aravind's eye doctors performed an average of over 1800 cataract

At Aravind it has always been a process of following the heart...Our capacity to follow our hearts and instincts has more often than not helped us to do the “right thing”...A lot has to do with being alert, being in touch with the outside, sorting through opportunities, and acting on those that hold the most promise...most of the juice comes from the creativity and responsiveness of committed people.

**- R. D. Thulasiraj,
Aravind Eye Hospitals**

surgeries each, next to the national Indian average of approximately 250 per year. According to the World Bank, India’s 8000 ophthalmologists and 45,000 beds set aside for eye-care services run at 50 per cent of capacity or less. Furthermore, in government hospitals, eye doctors are frequently saddled with paramedical chores while poorly managed schedules leave wards empty on some days and overcrowded on others. Aravind’s model proves the effectiveness of employing a high ratio of paramedical staff to ophthalmologists and training them to do specific tests and procedures, which allows the doctors to concentrate on diagnosis and treatment.

* **Self-support through efficiency and cost recovery**

Wise purchasing, economies of scale and maximisation of staff resources help to contain the costs of cataract surgery. Pricing scaled to the patients’ ability to pay helps to recover costs of cataract surgery.

By producing quality consumables at a fraction of the cost of imported IOLs and sutures, Aravind’s Aurolab has made sight-restoring cataract surgery affordable to many more people, especially the poor. This creates the possibility for building sustainable eye care programmes.

What's in a Name?

The only way to solve the increasing backlog of cataract blindness is to do significantly larger volumes of cataract surgeries. With proper organisation and the right attitude, it is not only possible to achieve large volume and high quality, but it is something that has to be done immediately in the face of the rising backlog of cataract blindness.

- R. D. Thulasiraj

Why Quality?

Without the promise of their vision truly restored, the cataract blind will surely not trust their eyes to us in sufficient numbers to bring the cost of surgery down. Quality must be our first priority. We define quality in terms of the structure, process, and outcome of the cataract surgery process. Quality means using available resources to best advantage, within a programme that provides compassionate and skillful services to the broader community, and producing the best possible visual results.

Why Cataract?

Cataract, a condition that strikes people at every socioeconomic level, is occurring at an increasing rate. The total estimated direct cost of blindness, globally, is US \$25 billion every year. This figure may double or triple if indirect costs are also considered. This series centres on the development of quality cataract surgery programmes because cataract is responsible for 50% to 80% of the world's blindness.

Why Surgery?

Millions of people in the developing countries are blind needlessly. Cataract blindness can be cured with a quick and simple surgical procedure costing less than US \$15 per person in some settings. Now that several highly effective, low cost procedures have been developed to remove cataract and replace it with an intraocular lens, the challenge becomes how to organise for the provision of surgery on a greater scale.

Why a Series?

The overwhelming significance of cataract in world blindness makes it the natural focus for this first Quality series. But cataract surgery is just one part of a total eye care programme. The authors also note the importance of other leading causes of blindness around the world: trachoma, onchocerciasis (river blindness), trauma, vitamin A deficiency and, increasingly, glaucoma and diabetic retinopathy, among others. Future modules in the series are planned, in order to present effective and compassionate ways to deal with these problems.

Note about Sustainability

Sustainable development has been defined as development that equitably meets the needs of present and future generations. In eye care in developing countries, sustainability means using available human and material resources in the most judicious and cost effective ways possible, in order to serve the highest possible number of patients over time.

Community is the secret ingredient in sustainability.

- Jim Leach

Note about the Editors

I slept and dreamt that life was joy, I awoke and saw that life was service, I acted and behold, service was joy.

- Rabindranath Tagore

Whatever you can do or dream you can, begin it. Boldness has genius, magic and power in it.

- Goethe

To make a great dream come true, the first requirement is a great capacity to dream; the second is persistence – a faith in the dream.

- Hans Selye, MD

Julie Johnston is a teacher, trainer, curriculum developer and writer from British Columbia, Canada, and a Seva Service Society board member. Through Seva, she has visited Aravind Eye Hospital five times since 1994, always impressed with the sheer magnitude of Aravind's contribution to the elimination of needless blindness. She is happy to have worked with such dedicated colleagues to spread the message about high quality, large volume, sustainable cataract surgery programmes. Aravind is truly compassion in action.

Nandini Murali is a Madurai-based freelance writer and editor. Her areas of interest include education, health, women's issues, and developmental communication. Since 1998, she has been associated with various publications brought out by Aravind Eye Hospitals. She has found working at Aravind to be a truly enriching experience.

Chitra Thulasiraj has been heading the Publications Division of Aravind Eye Hospital since 1984. Over the years she has acquired skills in editing, design, layout and managing the actual production of all Aravind publications. Several ophthalmic textbooks, manuals, health education materials, annual reports and newsletters have been produced under her direction.

Acknowledgements

We are realising that in an interconnected world, not only are problems interwoven, but the solutions are interconnected as well – which means whatever we do to help ourselves and our world, we must do together.

- David Spangler

The editors would like to acknowledge the wonderful contributions of those who worked on the Quality Cataract Surgery Series or supported our efforts: all the authors, support staff (especially Asha and Lydia), readers and reviewers, colleagues in other eye care institutions (notably Lumbini Eye Hospital in Nepal and L. V. Prasad Eye Institute in Hyderabad, India), well wishers, and family. We send special thanks to Douglas Richards and Dr. Mary Traverse of the Foundation for Dreamers in the USA for their generosity in underwriting the development and printing costs for this series.



Sushruta, the father of Indian surgery, described cataract and practised elementary cataract surgery almost 3000 years ago.