Manual for Planning of Tertiary Eye Care Services

A VISION 2020: The Right to Sight - India Publication

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A VISION 2020: The Right to Sight - India Publication

Developed by

laico
LIONS ARAVIND INSTITUTE OF
COMMUNITY OPHTHALMOLOGY

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Ministry of Health & Family Welfare
Nirman Bhavan, New Delhi – 110108

Foreword

I am happy to know that the Lions Aravind Institute of Community Ophthalmology, Aravind Eye Care System, supported by Sight Savers has developed a manual for Planning Tertiary Eye Care Services and the same is being released in the public domain shortly.

Ophthalmology has grown leaps and bounds especially in the last two decades. Advancements in the technological innovations coupled by the increasing expectations of the population have fuelled a lot of eye hospitals to upgrade themselves to offer tertiary eye care services. Eye care centres are not content to be just a cataract service provider, since the patients expect comprehensive ophthalmic care. Increasing longevity and changing life styles mean that the disease spectrum is going to change towards more chronic eye morbid conditions. The diagnosis and treatment of these conditions as exemplified by glaucoma, diabetic retinopathy and age-related macular degeneration (to name a few) is going to be more complex, time consuming and expensive. Given these demographical and epidemiological transitions, even as we work to strengthen the eye care at primary level to eliminate avoidable blindness in the country, we need to develop more hospitals equipped with state-of-the-art infrastructure at the tertiary level. While primary eye care services and secondary eye care services provide "low hanging fruits", due care and planning have to be in place to develop a cost effective tertiary eye care service model.

The elaborate manual shall be a stimulus for developing new eyecare institution at the tertiary levels and since this manual includes the experiences and study of other institutions it shall provide a good guideline for an ideal Eye Care Institution. These guidelines provide adequate framework on the managerial aspects, process of upgrading primary and secondary level eye care hospitals, teaching training and research care and all other important aspects of eye care in a comprehensive way.

In a vacuum, where no such manual existed, this is timely & welcome and I am sure will be tremendously useful for the eye care fraternity in the countr

(Sujaya Krishnan)

Healthy Village, Healthy Nation

एड्स - जानकारी ही बचाव है
Talking about AIDS is taking care of each other

Foreword

It gives me great pleasure to present the Tertiary Eye Care Manual from VISION2020: Right to Sight - India.

With greater awareness being generated to deliver quality eye care, large number of secondary eye hospitals are moving towards graduating to tertiary eye care organisations.

At this point in time this manual would prove to be an asset and act as a guide. At the same time the manual can motivate as well as be a gentle reminder to many others to progress towards tertiary eye care

We are indebted to LAICO for their valuable inputs and authorship and Sight savers for their initiative and support. We are grateful to Dr TP Das Dr R V Ramni and Prof Rajvardhan Azad for their technical and professional inputs.

I am sure this manual with its detailed content would help to guide many hospitals and Institutions.

Col (Retd) Dr. M. Deshpande
President, VISION 2020: Right to Sight - India

Foreword

This publication in the form of a manual is the fruition of a monumental task undertaken by a core team at the Aravind Eye Care System under the leadership of Mr. R.D. Thulasiraj, Executive Director, Lions Aravind Institute of Community Ophthalmology (LAICO).

In the formative years of the WHO Programme for the Prevention of Blindness, following close on the heels of the Alma Ata Conference and Declaration on Primary Health care, it was stressed that the delivery of eye health care as an integral part of primary health care should be the bedrock of the programme. However while the intrinsic value and virtues of the principles and practice of the PHC concept were being extolled, it was firmly believed and decreed that PHC could not function in isolation and that it needed a backup system provided through an effective referral mechanism to Secondary and Tertiary centres, that had the infrastructure and technology, and appropriately trained human resources and monitoring and evaluation information systems to deal adequately with the more complicated conditions identified at the community, or primary level. However it was stressed that the referral system should not mean that the Tertiary level worked in isolation, but that there was a feedback mechanism to the point of referral, thereby strengthening the functioning at the community and primary levels.

While the three tiered health care system was already in vogue in many countries, the Alma Ata Declaration helped to further strengthen the system. However, in the eye health field progress was slow. Most patients with even simple eye conditions sought care at the eye departments in existing district (secondary) or in general (tertiary) hospitals.

In more recent years, in the wake of the introduction of more sophisticated diagnostic technologies and treatment modalities, sub specialities in eye care have evolved that requires investment in expensive equipment and instruments. A further stimulus for such developments has been both the demographic and epidemiological transitions that are rapidly changing health care needs in general and in eye care in particular. The burgeoning incidence of chronic diseases such as diabetes mellitus, has a direct impact on eye care, which in addition to other primarily chronic ocular conditions such as glaucoma, age related macular degeneration poses increasing challenges to eye care providers.

To be able to meet these challenges and save sight and restore vision and meet the expectations of patients and their communities, the strengthening or development of appropriate tertiary centres, either free standing or as an integral part of a general health system has become imperative. Historically such developments have been an evolutionary process which has not always provided the opportunity to follow preferred guidelines for their development and effective and efficient functioning. This manual, born not only of the experiences of developing and managing the

world's largest group of hospitals related to the provision of eye care (AECS), but also a painstaking study of other institutions both in India and abroad as well as a review of published literature on the subject, provides the preferred guidelines based on evidence, to the extent possible. The step by step principles of development and management, whether as a process of upgrading an existing secondary or tertiary institution or a new development would be facilitated by the adoption and application of these principles and strategic actions.

While emphasis is placed on patient care, the domains of teaching and training and of research as part of the critical role of a tertiary centre have also been emphasized. So also the multifaceted issues of governance and good management in all aspects including human resources, finances etc., that fosters efficiency and patient satisfaction.

In conclusion, as the title of the Manual denotes the emphasis is not merely on Tertiary Centre development but on Tertiary Eye Care Service provision. Although from an epidemiological and advocacy perspective, it may be useful to describe the magnitude of the problem of avoidable blindness in terms of the millions affected or in the millions of Disability Adjusted Life Years (DALYs), it is important to remember the often quoted aphorism of the Late Sir John Wilson, the founder of the erstwhile Royal Commonwealth Society for the Blind (RCSB) currently Sightsavers - "People do not go blind by statistics - they go blind individually, in their own predicament".

Our objective through the use of the manual should not be to build "Ivory Towers" but to help develop effective and efficient critical components of the eye health system based on the principles and practice of primary health care, that ensures patient centred, comprehensive, quality and equitable eye care that is sustainable.

Sightsavers has to be commended on providing support to this publication as it goes beyond funding service delivery. It provides an opportunity to describe the road map and strategies of delivering these services in areas where scaling up and or replication of tertiary level service eye care delivery is planned.
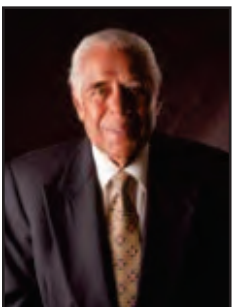
Dr. Ramachandra "Para" Pararajasegaram FRCS., FRCP., FRCOphth.
Past President, IAPB, Co Chair

Preface

Having crossed the midpoint of VISION 2020 RIGHT to SIGHT, there is an increased fervour among all stakeholders to fast track the process of achieving the VISION 2020 goals. The key strategies being, to offer comprehensive eye care services for the prioritized eye conditions, human resource development, and improving the use of technology. The recent documents - the WHO Action Plan 2009 - 2013 as well as the IAPB report reiterated the need for tertiary eye care facility providing comprehensive services. As the spectrum of the blinding conditions change, there is a real need for tertiary eye care centres with state of the art infrastructure. However at present, a big gap in service delivery is the lack of comprehensive tertiary eye care facilities. On the other hand is the desire by several well established secondary eye hospitals to upgrade themselves to a tertiary eye care facility.

There is no manual available in eye care today on, "How to set up a tertiary eye care facility" or on "How a secondary eye hospital can transition to a tertiary eye care facility". Hence this manual is being brought out with the twin objectives of addressing both the needs. It will serve as a handy reference guide for those who want to know how to set up a new facility as well as for those who are seeking to upgrade their existing services.

Tertiary eye care centre refers in common parlance to the complete spectrum of clinical activities and very often training and research are construed as add on. However for the purpose of this manual we are operationalizing the term "tertiary" to mean a comprehensive range of clinical services, with the entire spectrum of supportive services running with excellent management systems (or end to end systems and procedures) in place with training and research thought as an essential part of the tertiary eye care centre.

Aravind Eye Care System comprises several tertiary eye care centres and is also a recognised WHO Collaborating Centre for Prevention of Blindness. It is also a centre of excellence as per the VISION 2020 pyramid with a strong globally renowned patient care delivery model (with comprehensive range of services from several tertiary eye care facilities to multiple secondary care hospitals to numerous primary eye care centres); training facility for all cadres of the eye care workforces; a unique research facility which caters to wide spectrum of researches ranging from clinical trials to research in basic sciences to health systems research; a unique process of capacity building of other eye care providers to strengthen their management capability.

The practical working models in place as well as the exposure to the various eye care centres in the developing world gives the Aravind team a better insight into what makes a good and comprehensive tertiary eye care centre. All these factors placed Aravind in the best position to author this manual.
The main source of information for this manual came from the people on the ground

actively involved in operationalizing different activities, be it patient care, clinical areas or management arena, or maintenance and support services. A range of authors with technical expertise contributed to shaping this manual. It should be reiterated that this manual is not based on the Aravind Model of tertiary eye care but rather it is a reflection of the experience of working with Aravind Eye Hospitals as well as with tertiary eye hospitals elsewhere. Interviews were also carried out with Heads of tertiary eye care centres and also who have transitioned from a secondary eye care setting to a successful tertiary eye care facility.

The Manual provides an overview in the initial chapters regarding the need and role of tertiary eye care centres. This is followed by providing a detail of the entire spectrum of clinical and supportive services as well as the management systems which need to be in place. Further chapters elaborate on training, research services and the manual concludes with the possibility of the tertiary eye care centre further transitioning into a centre of excellence for the region.

This manual would not have been possible if it were not for the initiative taken by Sightsavers to fund this manual and make this valuable publication available to a wide group of eye care providers, the world over.

Dr. R. D. Ravindran
Chairman
Aravind Eye Care System

Foreword

The increasing focus on strengthening primary and secondary eye care services in the country has also generated the need to strengthen the tertiary eye care services in quantity as well as in quality. Tertiary services apart from absorbing complicated cases also serve as a support mechanism in strengthening secondary and primary services through skill & capacity enhancement, support in quality service delivery and other support services.

Planning and executing the development of a tertiary eye care system requires enormous amount of planning, resource inputs in the form of sufficient finances, quality human resources, appropriate and quality equipment, technology especially IT; advanced MIS and medical records systems and various other systems and services. Given the emerging need and the phenomenon of many secondary setups transitioning to a tertiary level, the need for developing a tertiary eye health manual was conceptualised.

This manual a handiwork of Laico supported by Sightsavers has been developed based on Laico's years of experience in the field of eye care services especially in tertiary services. We are extremely grateful to Laico for taking this up as a challenge and bringing out this comprehensive manual that we at Sightsavers hope would serve all concerned stakeholder in the eye care sector.

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Acknowledgement

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Director
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Acknowledgement

Dr. G. V. Rao
CEO
VISION 2020: The Right to Sight – India

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Abbreviations

ACE	-	Angiotensin Converting Enzyme
ARK	-	Auto Refracto Keratometer
ARMD	-	Age Related Macular Degeneration
BIOM	-	Binocular Indirect Ophthalmo Microscope
BSV	-	Binocular Single Vision
CBC	-	Complete Blood Count
CBR	-	Community Based Rehabilitation
CME	-	Continued Medical Education
CSF	-	Cerebrospinal Fluid
DCR	-	Dacryocystorhinostomy
DCT	-	Dacryocystectomy
EB	-	Eye Bank
EBM	-	Eye Bank Manager
EBT	-	Eye Bank Technicians
EBTC	-	Eye Bank Training Centres
ED	-	Executive Director
EDC	-	Eye Donation Centres
EDC	-	Eye Donations Counsellors
ELISA	-	Enzyme-Linked Immunosorbent Assay
ERG	-	Electroretinography
EUA	-	Examination Under Anesthesia
FFA	-	Fundus Fluorescein Angiography
GA	-	General Anaesthesia
GDx	-	Glaucoma Diagnostics
GTT	-	Glucose Tolerance Test
HCV	-	Hepatitis-C Virus
HIV	-	Human Immunodeficiency Virus
HR	-	Human Resource
HRT	-	Heidelberg Retinal Tomography
ICD	-	International Classification of Diseases
ICG	-	Indocyanine Green angiography (ICG)
ICP	-	International Classification of Procedures
IEC	-	Information, Education through Communication
IOL	-	Intra Ocular Lens
IOP	-	Intra Ocular Pressure
IP	-	In Patient
LAICO	-	Lions Aravind Institute of Community Ophthalmology
LASIK	-	Laser-Assisted in Situ Keratomileusis
LFT	-	Liver Function Test
MD	-	Medical Director

Abbreviations

MLOP	-	Mid Level Ophthalmic Personnel
MRI	-	Magnetic Resonance Imaging
NABL	-	National Accreditation Board for Testing and Calibration Laboratories
NACO	-	National AIDS Control Organization
NGO	-	Non-Governmental Organization
NICU	-	Neonatal Intensive Care Unit
NNN	-	Netra Nirmay Niketan
NPCB	-	National Programme for Prevention and Control of Blindness
OCT	-	Optical Coherence Tomography
OPD	-	Out Patient Department
OT	-	Operation Theatre
PCR	-	Posterior Capsular Rent
PDT	-	Photodynamic Therapy
PRP	-	Pan Retinal Photocoagulation
PUK	-	Peripheral Ulcerative Keratitis
QA	-	Quality Assurance
QC	-	Quality Control
RAF	-	Royal Air Force Ruler
ROP	-	Retinopathy of Prematurity
SNC	-	Sadguru Netra Chikitsalya
SOP	-	Standard Operating Procedure
SOPM	-	Standard Operating Procedure Manual
SR	-	Suture Removal
SS	-	Stainless Steel
TNO	-	Test of Netherland Ophthalmologist (Translation of Dutch Words)
TTT	-	Transpupillary Thermotherapy
UBM	-	Ultrasound Scanning (B-Scan and UBM)
VEGF	-	Vascular Endothelial Growth factor
VNG	-	Video Nystagmography
WHO	-	World Health Organisation

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1

Role And Scope Of
Tertiary Eye Care Services

Background

According to the recent World Health Organisation's estimates, there are about 285.3 million people around the world whose vision is impaired, due to either eye diseases or uncorrected refractive errors. Of this, 39.8 million people are blind. Today there is a dynamic shift in demographics such as doubling of population in the age group of above 50 years; changing lifestyles including increasing literacy etc., This further adds to the existing burden of blindness and visual impairment. Globally, though cataract is still considered the single largest problem, there is a gradual rise in blinding and life style associated eye problems such as diabetic retinopathy, glaucoma, ARMD, childhood blindness etc. that constitutes a little more than 25% of the total blindness. These changes are already being experienced in the developing countries.

With concerted efforts by the Government, NGOs and private eye care providers over a period of two decades, blindness rate in India has been brought down to 0.8% from 1.4%. Cataract, the major cause of blindness contributes to 60% and refractive errors at 19.7% of the blindness while eye problems such as diabetic retinopathy, visual impairment among children and glaucoma are on rise due to changing demographics. It is estimated that around 3.2% of the Indian population is afflicted with diabetes; 20% of them with diabetic retinopathy. Similarly, it is estimated that 1 in 100 people are affected by glaucoma. Managing these emerging eye problems require different approach.

On the other hand, there are no adequate resources available to tackle the increasing problem of blindness and visual impairment (Table1.1). Currently there are very few eye hospitals that provide comprehensive eye care services which in turn are skewed in its distribution. Additionally, only a handful of ophthalmologists are specialized in emerging eye problems. Thus current eye care service delivery has a limited access to the community at large especially for the sub-speciality eye problems which requires adopting an approach of early detection and medical intervention.

Table 1.1: Disease Control

	Need	Current	%
Cataract surgeries	8,000,000	5,000,000	63%
Spectacles (10% of population)	100,000,000	10,000,000	10%
Eye Care to Children	20,000,000	2,000,000	10%
Diabetic Retinopathy	4,000,000	400,000	10%
Examinations for DR	20,000,000		< 5%
Low Vision (1% of population)	10,000,000		< 5%
Glaucoma (1% of population)	10,000,000		< 5%
Corneal Opacity	Not Available		< 5%
Rehab for the Blind (1 per 1000)	1,000,000		< 5%

Recent initiatives in eye care target at addressing these problems through prioritisation and action. Outlining this, India's the current National Five Year Plan has priorities laid out, that move beyond cataract to glaucoma, diabetic retinopathy, paediatric eye care services, primary eye care approach, human resources development etc.

Thus it becomes imperative to develop tertiary eye care services in a comprehensive approach that ensures increased reach and accessibility to quality eye care services. In recent years, there has been a concerted effort undertaken to develop paediatric eye care services in a comprehensive way and to some extent, diabetic retinopathy services.

There are many eye hospitals in the country that have potential to graduate from secondary eye care to tertiary eye care provider. Graduating to tertiary levels not only creates access to such services to the community; it definitely enables these eye hospitals to experience organisational growth - both in terms of increasing scope of services, retention of key human resources for a long term and human resources development. However there is not much documentation or literature available that provides a roadmap or guidance on developing sub-speciality service delivery – services planning, facilities and resources, strategic approach, financial requirements, etc.

Design of Eye Care Services

Effectiveness of eye care services is largely determined by whether they are designed to address the issues of service delivery (Fig 1.1). In the context of developing countries, eye care providers are faced with issues of uneven distribution of the demand (both geographical and temporal), underutilisation of the hospital's resources, lack of access to affordable supplies and restrictive policies (Fig 1.2 a). It is essential then, that the providers design the services and the way they are managed and delivered to address these issues. Furthermore, the problem is further complicated by issues in the community (Fig 1.2 b). Issues such as poor awareness, low prioritisation of eye care, fear and misconceptions should be tackled through education and empowerment and by involving the community.

Fig. 1.1: Effective Eye Care Requirements
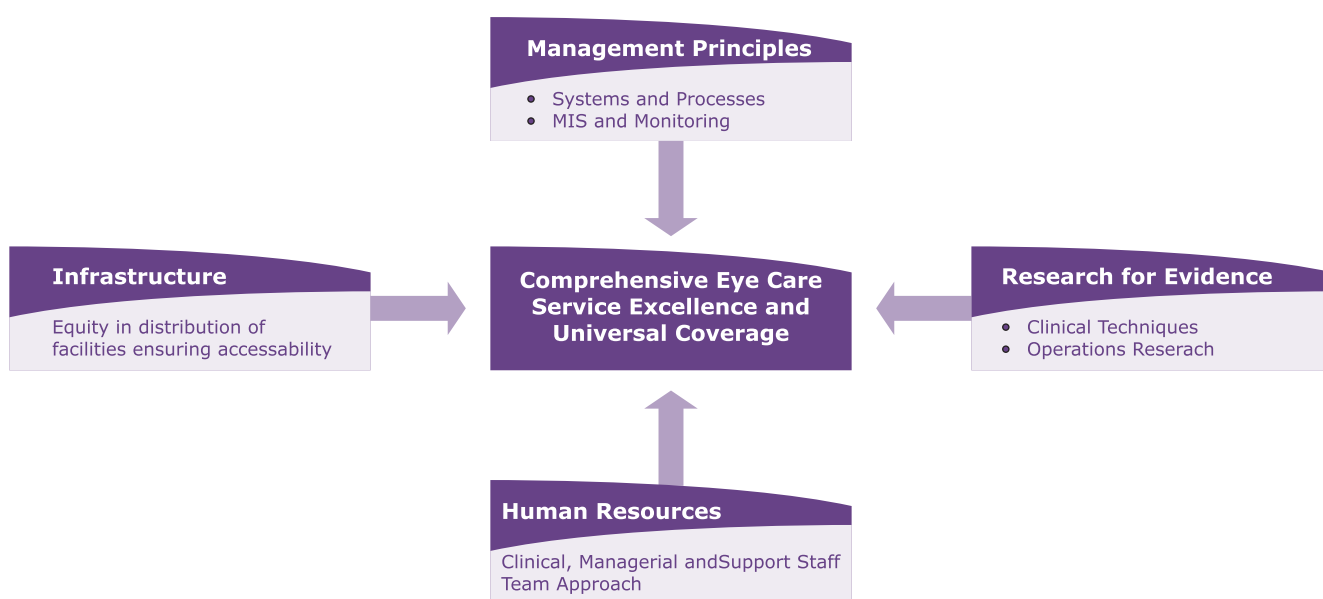
Fig. 1.2a: Real Issues in Eye Care Providers: Hospitals
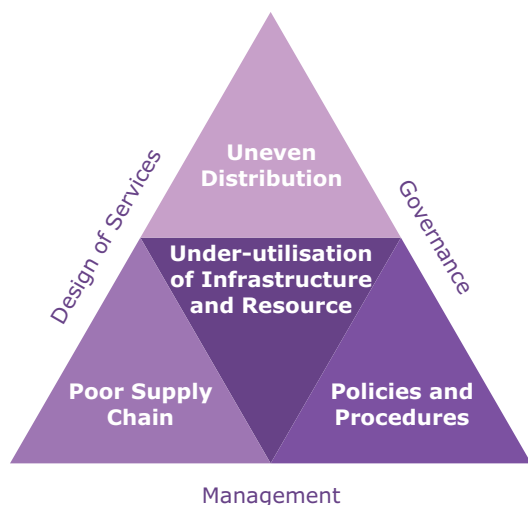
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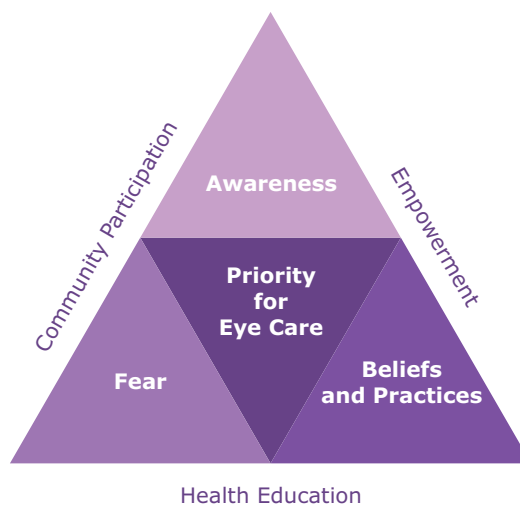
Need for a Tertiary Eye Care Manual

Eye care programmes nationally and regionally are now looking at developing tertiary eye care services in a comprehensive manner in line with the directions provided by the national five year plan. Similarly there is huge potential among many more eye hospitals to make a transition from a secondary eye care provider to a comprehensive tertiary eye care provider. It thus becomes appropriate at this juncture to make available a good planning document in the form of a manual that outlines a roadmap for setting up tertiary eye care services – either for an existing secondary eye care provider transitioning to tertiary eye care or setting up a new full-fledged tertiary eye care centre.

Essential Characteristics of a Tertiary Eye Care Centre

The essential characteristics of a Tertiary eye care centre would essentially involve
- Patient care for all eye diseases with appropriate clinical specialist - personnel, equipment, space, special facilities etc
- Training facilities for internal and external personnel of all cadres including library, teaching halls etc.
- Research facilities with both in-house and academic linkages
- Support facilities for
  o Clinical care – like microbiology, clinical laboratories, general physician support, radiology with related equipment specialists (in-house or outsourced)
  o Clinic related services like dietary services,

optical dispensing, dispensary etc.
  o Nonclinical services like house keeping, cafeteria, equipment maintenance, I.T facilities, medical records
  o General management- administration with finance, stores, security, transport, reception, communication etc.
  o Public relations for external referrals, media updates, patient education, awareness promotion etc.

A tertiary eye care institution has the scale of operations as well as the access to resources that can contribute to eye care at a higher level. It has the potential to contribute to the human resource pool through training as well as by engaging in research that can contribute to the body of knowledge that can shape and improve eye care services in the future. Table 1.2 shows the current deficiency of the eye care workforce in the country. Tertiary centers can grow further into training centers – this not only contributes to the larger human resource pool but also ensures its own supply of human resources that is crucial for sustainability. Table 1.3 illustrates the lack of research activity that has the potential to produce lessons and evidences that are suitable for eye care delivery in developing countries.

Development of the Manual

When Sightsavers first mooted the idea of developing the tertiary manual it stemmed from the belief that there were several secondary eye hospitals which were ready to make the transition to a tertiary eye care

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Table 1.2: Human Resource Needs in the Country

Category	Current	2005	2010	2015	2020	Output p.a	No. of training institutions
Ophthalmic Surgeons	12,000	15,000	18,000	21,000	25,000	1,200	150
OA's (Community)	6,000	10,000	15,000	20,000	25,000	1,200	50
Ophthalmic Paramedics (Hospital)	18,000	30,000	36,000	42,000	48,000	1,500	50
Eye Care Managers	200	500	1,000	1,500	2,000	100	5
Community Eye Health Specialists	20	50	100	150	200	10	5

Table 1.3: A Comparison of Research Publications

Journal	Total Articles	Developed Countries	Developing Countries	Joint contribution from both regions
IOVS	1,336	1,269	40	27
Ophthalmology	923	775	93	55
AJO	937	865	59	13
Archives	1,081	1,042	37	02
BJO	913	834	55	24
Total	5,190	4,785 (92.2%)	284 (5.4%)	121 (2.3%)

This shows that even though the developing countries have a large burden of blindness they are poorly represented by the meager number of publications in peer-reviewed journals.

Source : The contribution to ophthalmic literature from different region of the world, Kaveri Mandal, Sarah Benson & Scott G. Fraser, International Ophthalmology 25:181-184, 2004.

The decision to develop tertiary services was made mainly as a retention strategy for ophthalmologists as they preferred a comprehensive eye care facility. There was also at the same time an increased demand for such services from the community.

- Dr. Jain, Sadguru Netra Chikitsalya

centre. However they required the guidance of how to make the transition rather than it be a trial and error exercise. There is currently no manual which shares the knowhow of what it takes to make this transition. This manual is being developed to fill this void. It has been developed taking the experience that several eye hospitals have gone through. The leadership of HV Desai Eye Hospital, Pune; Sadguru Netra Chikitsalya, Chitrakoot; Netra Nirmay Niketan, Chaithanyapur besides Aravind Eye Hospital have been kind in sharing the process that they underwent. This manual is interspersed with the advice that we received from them.

Outline of the Manual

This manual is divided into 8 chapters. While the first chapter provides the macro picture for the need of a tertiary eye care centre, the second chapter looks at the patient volume requirement to have a well-functioning comprehensive tertiary eye care centre. This provides several pointers to make a sustainable tertiary care facility. The third chapter delves into the details of the requirement for well-functioning sub specialty clinics and the fourth chapter details the requirements for support facilities. The fifth chapter explores the management aspects of a tertiary eye care centre. The sixth and seventh chapter examines the details for setting up the training programmes and for conducting researches in a regular manner. The final chapter addresses the question of what next, after becoming a good tertiary eye care centre.

We made the transition at a stage where we faced an increased volume of patients with various different non cataract problems, and we had identified a good number of children with neglected cataract in the CBR project. We also found a relatively higher prevalence of glaucoma in the service population. This was done out of personal interest and the initiative of individuals.

- **Dr. Asim Sil**, Netra Nirmay Niketan

2
Patient Considerations for Establishing Tertiary Eye Care Services

Like all things in life, there is a hierarchy of needs and it applies to health care and eye care as well. Not all eye conditions require the most advanced treatment facilities and likewise neither can all eye care be addressed by averagely equipped facilities. The concept of primary, secondary and tertiary levels of eye care was born out of this. When designed and executed properly, this hierarchy in services can ensure both timely and cost-effective treatment. This will also ensure that the investments in infrastructure, equipment and in the eye care personnel are utilised optimally at all levels. This principle is being widely advocated over the last decade since the launch of the global initiative VISION 2020 the Right to Sight in the design of eye care infrastructure.

Thus by design, those requiring and seeking advanced treatment for their eye conditions, will have different characteristics from the others both from a demographic as well as clinical perspectives. The purpose of this chapter is to bring out those differences in order to guide the physical planning of tertiary eye care centres and equipping them to address the challenges of providing advanced treatment to the community. This would apply equally to either setting up a new tertiary eye care centre or upgrading an existing secondary care facility. Such careful consideration is important recognizing that establishing a tertiary eye care involves significant amount of investment and effort. It is assumed that in most settings, the patients would be mostly walk-in and would be either self or physician referred.

Population Base and Geography Mix

In most settings in developing countries, the patients tend to self-select the hospital that they go to. Functional referral systems are rare. Yet there is a pattern that we need to understand. Patients with relatively simple conditions like refractive errors or cataract, can visit a primary or secondary level facility. Some patients visit tertiary care facility on their own either because of the proximity of the facility or the belief that they will get better care in an advanced facility. Also by nature of law and definition, the advanced conditions will be relatively rarer and thus would require a larger population for the required economies of scale. A larger population base in most settings would also translate into wider areas and distances that the patients would need to travel. The following analysis highlights the differences from the perspective of distances travelled between patients coming to a tertiary centre as compared to a secondary centre.

The outpatients coming for the first time to the hospital were grouped as those coming from "within" the hospital's local reach (within 50 kms range), those coming from "neighbourhood" areas (50 to 100 kms range) and "far" (beyond 100 kms). The analysis in the following chart shows that 77% of the patients go to a secondary centre come from

Dr. Jain recommends that an institution performing about 10,000 to 14,000 surgeries per year should consider diversifying into a tertiary centre as a strategy to retain its ophthalmologists. However, Sadguru Nethra Chikitsalya was doing about 18,000 to 20,000 when it made the transformation

local areas (within 50 kms range), while this proportion is only 38% in the tertiary centre. On the contrary 25% of the patients come from long distances to the tertiary facility as opposed to a mere 3% in the secondary facility.

Fig. 2.1: Graphic Mix of New Patients Registered
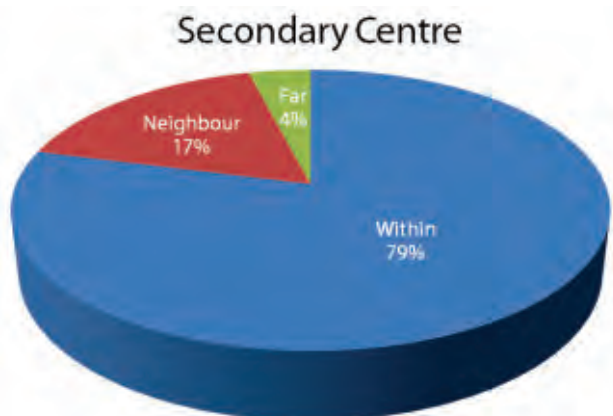
There is also a strong correlation between the distance travelled and the level of complexity of their eye condition as shown in the following graph (Fig.2.2). Of those coming from far distances 71% of them require specialized eye care services.

Fig. 2.2: Proportion of patients between Specialty and General
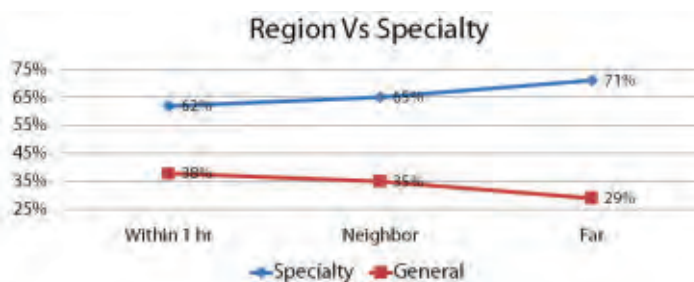
The tertiary hospital needs to recognize that a significant number of their patients would have arrived after travelling long distances and are anxious because of the seriousness of their eye condition. This has some design implications covering all aspects - facility, equipment, staffing and patient flow processes. Such patients would deeply appreciate facilities to freshen up, cafeteria and rooms to stay if the diagnostic, surgery or follow-up is spread over several consecutive days. If for some reason it is not possible to provide these within the hospital for space or other constraints, it would be desirable to have staff who make such arrangements at hotels and other facilities nearby. The patient flow process should attempt to complete the examination of outpatients from long distances sufficiently early so that they can find public transportation to return the same day.

New Vs. Review Oputpatients

The patient examination protocol differs for examining a new outpatient or seeing a patient for routine follow-up. The former requires a very detailed examination and investigations to make the right diagnosis and decide on the treatment plan. However, for the latter, the examination is more focused to monitor the efficacy of treatment and the status of the condition. This has implications on the time the patient has to spend in the hospital, space and other requirements. Hence it is important to understand the mix of new and review

Fig. 2.3: New and Review Patients Load
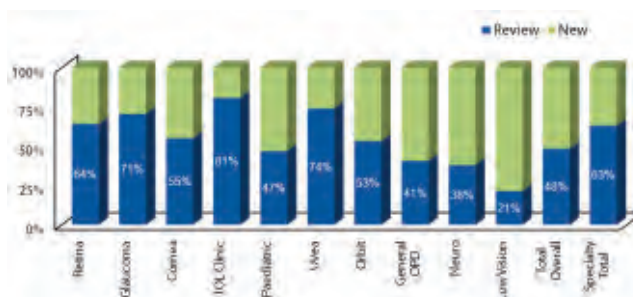
patients. In a secondary eye hospital, the new patients are likely to be larger than the follow-up patients. This is because conditions like cataract, refractive errors or conjunctivitis are amenable to onetime intervention with minimal or no follow-up requirement. While for those with subspecialty conditions, the treatment goal often is to prevent or control the condition. Thus, these patients have to come to the hospital repeatedly as advised, literally lifelong. So the proportion of review patients attending subspecialty clinics tends to increase

over time. The following chart (Fig.2.3) illustrates the proportion of new and review outpatients in Aravind Eye Hospital at Madurai, a long standing large tertiary hospital.

In this instance, the Cataract clinic preoperatively examines only those patients with complicated cataracts, while post-operatively it examines all cataract operated patients. Hence, the proportion of review patients is over 80%.

Case Mix and Workload Implications

Not all new patients coming to a tertiary care facility will come with a definitive diagnosis. In fact, in the early years of a tertiary hospital, most patients are likely to be self-referrals. This would mean that most of the new patients would first need to undergo comprehensive eye examinations to determine the sub-specialty to which they have to be referred to and the investigations that have to be carried out. Some hospitals schedule the visit to the subspecialty clinic if indicated, to another day. But this inconveniences the patient and adds significant costs as well. So it is desirable to complete all investigations on a single visit. Hence, in a tertiary centre, the patients will be examined in more than one location depending on their problem and undergo advanced investigations like ultrasound, field of vision assessment or optical coherence tomography. These additional workup will be more time consuming. So while designing tertiary centres, one should expect the patient to be spending more time especially on the first visit, undergoing tests in multiple locations. This would have implications on the space planning including the waiting areas which should ideally be distributed in proximity to the examination or investigation areas.

Even in a tertiary centre, one can expect the cataract workload to be at least 50% of all surgeries. Similarly in the outpatients too, roughly 30% to 50% of the patients would be for cataract, refractive errors and such conditions which can be handled by a general ophthalmology service. In tertiary eye care centres, this is not only the reality assuming that patient access is not regulated, but also a necessity for training purposes and for revenue generation. Among the sub-specialties, the higher volume ones would be Retina, Glaucoma, Cornea and Paediatric Ophthalmology. Orbit and Oculoplasty,which is normally combined as a single subspecialty, would be somewhat lower, followed by

subspecialties such as Uvea, Neuroophthalmology and low vision with much lower patient attendance. The following table gives a likely distribution of patients for a daily outpatient load of 300 which is a minimum desirable number to aim for in a tertiary care facility to justify the investment.

Table 2.1: Clinic Attendance

Clinic Attendance:	%	No.
Retina	15%	45
Glaucoma	10%	30
Cornea	10%	30
Surgical Cataracts	5%	15
Paediatric	15%	45
Uvea	3%	15
Orbit	10%	45
General OPD	40%	120
Neuro	2%	5
Refractive Error & General Ophthalmology	33%	100
Low vision	2%	5

Patient Type:		
New	40%	120
Review	60%	180

As a general rule, workup in a tertiary centre will involve 50% more examinations and investigations, since the patients are likely to be examined in more than one clinic. This is reflected in the table (Table No.2.1) where the clinic level break up will add to more than 100% and the total number of patients will be more than 300. Such a table has to be constructed for each hospital at the planning stage. While constructing a similar table for a specific hospital, another reality and a very significant factor is the specialist ophthalmologist. If the hospital is employing a very well-known retina surgeon, the hospital would be getting a lot of patients with posterior segment disorders. Another factor to recognize is that the demand for sub-specialty care is not as developed as cataract services. This is why very few patients with conditions like diabetes, glaucoma are now seeking eye care, but this can be expected to change in the future. The hospitals also have to proactively develop this through creative strategies. The overall trend in the years to come would be that space requirements for outpatient and surgical services will continue to grow in a tertiary eye hospital while it would be on the

decline for inpatient services. All these factors will need to be considered in facility and staff planning.

Conclusion

In this section, we detailed the macro factors to consider while developing a tertiary level facility, trends in outpatients, investigation and treatment procedures. An indicative break-up by disease is given for an outpatient load of 300 a day. While this table can be used as a guideline, it is important to develop a similar table of likely daily patient load specific to the tertiary level eye hospital being planned. The daily workload estimate (not monthly or annual), combined with other considerations will help in arriving at more accurate decision relating to space, equipment and staff requirements for each sub-specialty service.

3
Clinical Sub-specialties

Cornea

A. Scope of Services

A well functioning cornea service is an essential and integral subunit of a complete tertiary eye care centre. The spectrum of corneal disorders differs between regions and may vary from trivial disorders like allergic diseases to vision threatening conditions like suppurative keratitis. In addition, a tertiary care cornea clinic can also be expected to provide cornea based refractive services like Laser insitu keratomileusis (LASIK). Ancillary support services like a basic ocular microbiology laboratory and a well functioning eye bank are essential for the optimal functioning of the cornea department. Patients seeking refractive surgeries may be better dealt in a dedicated, but separate facility within or adjacent to the main cornea clinic, so that their expectations are met.

B. Patient Flow – The Process

a. Out patient flow: For practical purposes the patients seeking treatment from the cornea clinic are of the following broad groups:
  i. Patients with acute pain : Following trauma, corneal ulcers, conjunctivitis etc.
  ii. Patients seeking visual improvement for disorders like pterygium, keratoconus, corneal dystrophies, corneal opacities etc
  iii. Patients seeking refractive solutions including contact lenses and surgeries like LASIK
  iv. Patients on regular follow up following corneal transplantation procedures and those with chronic diseases like dry eyes, PUK (Peripheral Ulcerative Keratitis) who come for regular follow up.

Fig. 3.1: LASIK Machine

The treatment flow will differ between these broad groups. A common starting point for all these groups, however is a visual acuity estimation in a common measurement station, after which the flow will be determined by the clinical condition.

i. **Recommended treatment flow for patients with acute pain:** Trauma, conjunctivitis and corneal ulcers are the common conditions with acute ocular pain for which patients seek consultation. The clinic staff should be sensitive to attend to these emergencies as quickly as possible.

Trauma

The first step in any patient with a history of trauma is to assess his/her general condition. If the patient is otherwise fit, a full anterior segment and a dilated posterior segment evaluation should be performed after visual acuity measurement. Suspicion of an intraocular foreign body should always be kept in mind and looked for and ruled out. In cases presenting with opaque media, an X-ray or an ultrasonogram should be performed.

In conditions requiring surgical repair, the same should be performed as soon as possible. Patients requiring general anesthesia should be advised about preoperative starvation and assessed for anesthetic fitness.

Conjunctivitis

Patients with this acute condition should be isolated and offered treatment quickly to avoid contamination and spreading to other patients and health care personnel. Care should be taken to sanitize the instruments in order to avoid nasocomial contamination.

Corneal ulcers

A proper history eliciting is of paramount importance in patients with corneal ulcers, since history of agricultural activities might arouse a suspicion of a possible fungal aetiology. A background systemic evaluation, especially with regard to the diabetic status of the individual is important to assess the prognosis. An adnexal evaluation, especially with regard to lacrimal passage obstruction, is crucial to help in possible suspicion of the organism and for prognostication. After a detailed documented slit lamp examination of the corneal ulcer, a routine microbiological investigation should be carried out. The recommended protocol is to do an initial smear examinations which would include a Gram stain to identify bacteria and a Potassium hydroxide wet mount to identify fungi. This can then be followed with doing a culture plating in blood agar (to identify bacteria) and Sabouraud's dextrose agar (to identify fungi). Special stains and culture methods can be performed if necessary. The treatment can be performed, if necessary based on clinical and initial smear results and modified accordingly depending on culture results.

ii. **Recommended treatment flow for patients seeking visual improvement for disorders like pterygium, keratoconus, corneal dystrophies corneal opacities etc**

For this group of patients, a detailed refraction is performed to determine the amount of best corrected visual acuity and more importantly the effect of astigmatism. Pterygium is a very common condition for which many patients seek treatment. Surgical treatment can be advised for those having significant astigmatism and those seeking a cosmetic

benefit. Patients with keratoconus would need keratometry and topography to accurately assess, especially in cases with subtle presentation. A full evaluation should be performed for patients with corneal opacity and dystrophies and the clinician should contemplate performing keratoplasty, only if he/she is convinced that the corneal changes are proportionate to the drop in visual acuity.

iii. **Patients seeking refractive solutions including contact lenses and surgeries like LASIK.**

As mentioned before, these patients may ideally be managed in a dedicated facility with adequate time for counseling built in. These patients seeking LASIK surgery should have a manifest and cycloplegic refraction, keratometry, topography, a detailed anterior segment evaluation including the status of the tear film and a complete retinal evaluation. Counselling should be detailed in these patients to explain the possible risks, and benefits and should be reiterated, preferably by the surgeon himself/herself.

iv. **Patients on regular follow up following corneal transplantation procedures.**

This group requires special mention in that regular and timely follow up is extremely crucial to maintain the success of the corneal transplantation.

Table 3.1: Space Requirement

Facility	No.	Length (ft)	Breadth (ft)	Area (sq ft)
Reception	1	6	6	36
Fellows Cubicle	3	10	8	240
MO Cubicle	3	10	10	300
Scraping Room	1	10	6	60
Specular Microscopy	1	10	10	100
Counselling Room	1	10	8	80
Common Waiting Area	1	20	20	400
Total Area				1,216

Fig. 3.2: Model Layout

Total Area - 1250 sqft (50 x 25 ft)

Specular Microscopy – 10* 10 ft

Medical Officer Room – 10* 10 ft

COT

Scrapping Room –10* 6 ft

PG/ Fellows Room – 10* 8 ft

PG/ Fellows Room – 10* 8 ft

PG/ Fellows Room – 10* 8 ft

Medical Officer – 10* 10 ft

Medical Officer – 10* 10 ft

Counseling – 10* 8 ft

CMS – 6* 6 ft
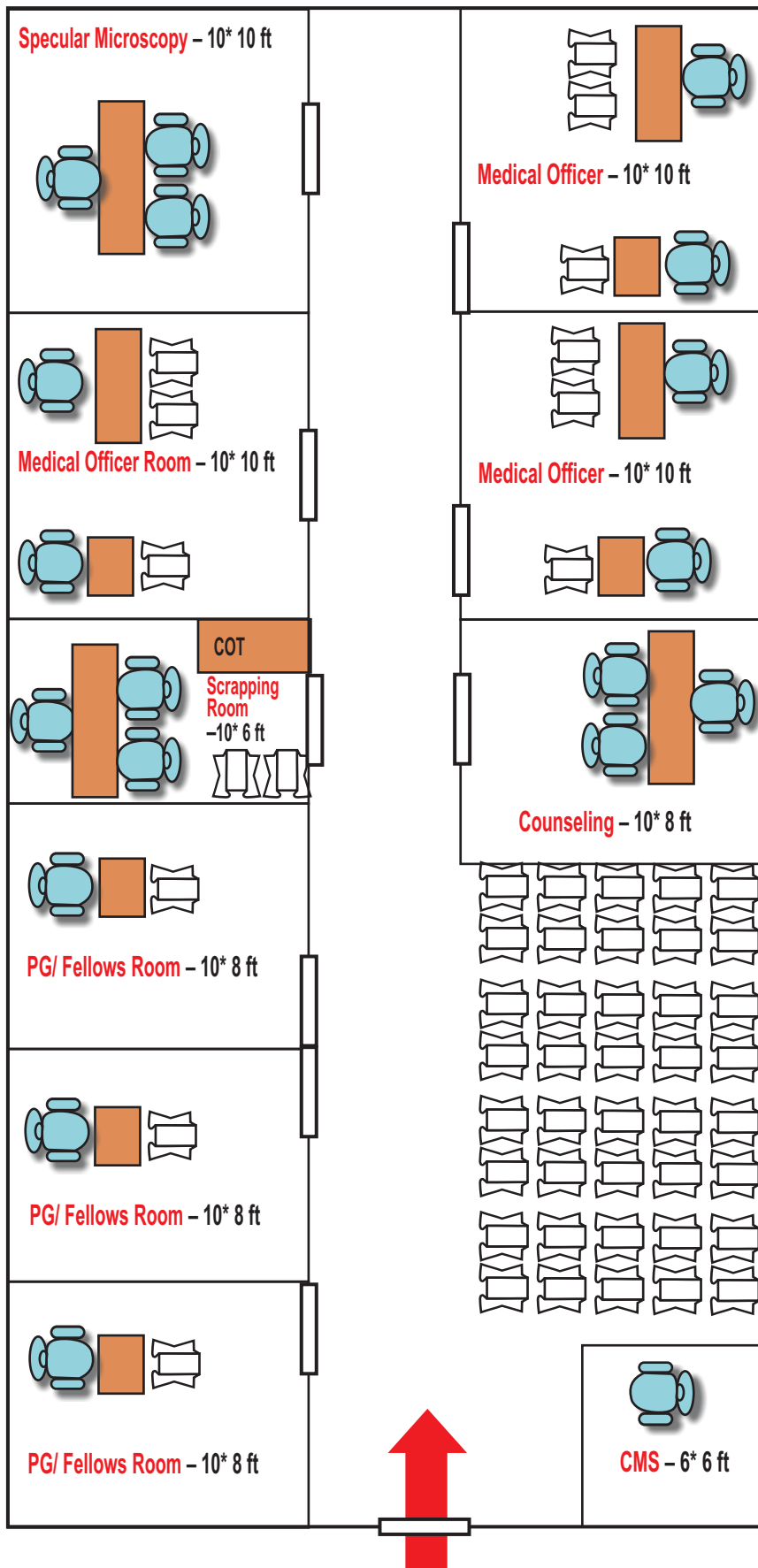
C. Equipment

- Common to all departments : Vision recording station and refraction cubicles.
- Exclusive for the cornea departments:
  - Slit lamps.
  - Corneal topography unit and aberrometry assessment unit.
  - Specular microscope for patient assessment and for donor cornea assessment.
  - Light microscope.
  - Basic microbiology instruments and supplies for basic smear and culture examinations mentioned above.

D. Human resources

A teritary care centre should ideally be a teaching centre, so that knowledge generation and dissemination can be integrated.

i. Ophthalmologists

The team of ophthalmologists would include cornea consultants (those who have been formally trained in a reputed cornea department for at least a year after their postgraduation) and doctors in training who will consist of fellows (those who have finished their post graduation in ophthalmology and aspiring to be a cornea specialitst) and residents. A consultant can ideally examine and treat 60-70 patients per day and for a workload of 150, ideally two consultants should be in the outpatient facility to examine this patient load. Another consultant can manage the operation theatre on rotation. Each consultant can be assisted by two cornea fellows, who can do the preliminary evaluation and perform relevant and necessary investigations. This means that a total of 3 consultants and six fellows are ideal to manage a cornea department which handles 150 outpatients
per day.

The ward rounds can be done by one fellow in a dedicated time period, which can coincide with the lean times of the outpatient department.

ii. Paramedical Team

a. Outpatient Area
The ideal paramedical team for the outpatient clinic, comprising 5 people can include the following persons.
a. Vision assessors : Two people can be employed, one of whom can double up as a refractionist.
b. MLOPs: Three people can be used to manage and allocate cases to concerned examination chambers.
c. Technician: One dedicated person to perform topography/ specular microscopy/aberrometry.

b. Ward
The ward can be managed by one senior MLOP with the help of a junior MLOP in rotation. The senior MLOP can be kept constantly in this position, so as to ensure continuity and also to train the junior MLOPs on rotation. Their role will be to ensure treatment compliance and
scheduling preoperative investigations, scheduling surgeries managing postoperative period and to ensure compliant followups.

c. Theatre
The cornea operation theatre can be staffed by two senior MLOPs and assisted by one junior MLOP who can function as a running nurse. The same staff can manage the refractive surgery theatre as well.

iii. Management team

This can consist of a receptionist to receive and allocate patients, an office manager to plan for optimum utilization of resources and two counsellors. One of the two counsellors can be exclusively used for counselling refractive surgery patients.

iv. Eye bank team

The eye bank should have an exclusive team comprising an eye bank manager, and two senior dedicated MLOPs. This team should not be changed frequently. The manager's role will be to ensure adequate procurement, optimize utilization and ensure equity in distribution.

E. Ward

Even in these days of outpatient prcedures, an exclusive ward of at least 10 beds is required for the inpatient management of patients with corneal disorders. Out of this, 50% can be reserved for septic cases like corneal ulcers, traumatic endophthalmitis etc, while the rest can be reserved for non septic cases like corneal grafts etc. The examinations for both the groups should ideally be done separately with adequate aseptic measures taken in between. Patients with corneal ulcers coming from a long distance and those with severe

pain can get admitted and treated as inpatients, at least till the culture results are available. This means that they have to be treated for at least 3 days as inpatients. The time can be utilised to explain the importance of compliance of using the medications. The same is true for patients undergoing keratoplasty also. Since the patients travel quite a far distance for getiting a keratoplasty done, it is ideal for these patients to get admitted for at least 3-4 days for stabilization of the graft and to get adequate post operative instructions.

F. Case Sheets

Please refer Annexure

G. Demand generation

1. Internal referrals
Patients with corneal ulcers and trauma will automatically be referred to the cornea clinic, because of the nature of the condition. However, the general ophthalmology clinics and personnel managing these clinics can be trained to identify potential candidate for refractive surgery. For example, candidate coming for general refraction can be informed about the other options including contact lenses and refractive surgery. Information regarding the same can be kept in the vision centres and outreach camps.

2. External referrals
This can be improved in the following domains.

a. Refractive surgery
The best service of an ideal department can provide in this area is to provide true and ethical selection criteria and also complete

counseling. Effective communication with outside practitioners about the facilities in house and also prompt acknowledgement of the referrals will help in getting more cases.

b. Corneal ulcers
Most of the patients in this category are referred for mainly microbiological diagnosis. A correct reporting of data and a treatment plan based on sensitivity patterns will help the referring doctor treat his patients effectively during follow up.
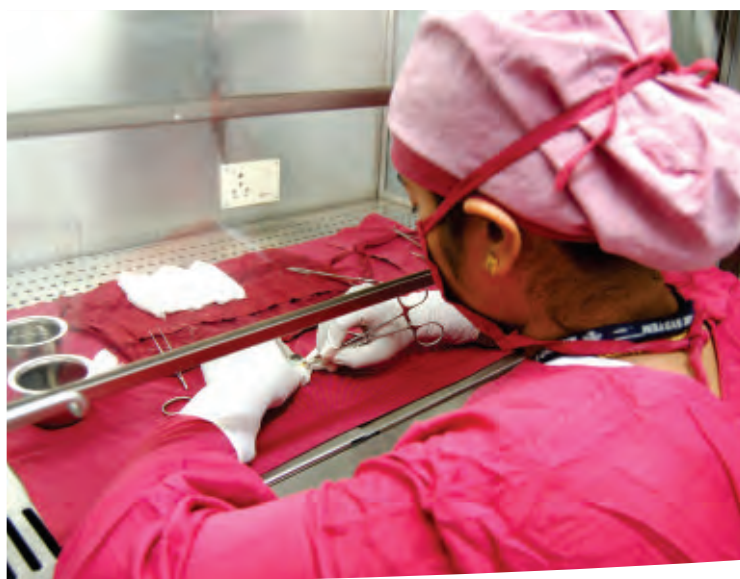
Fig. 3.3: Removing Cornea from donor eye

c. Eye donation
This is a very important area where the eye bank team can effectively forge an alliance between the institution and the society at large. Continuous liasoning with social welfare

MANPOWER	EBTC	EB	EDC
Board of Directors or equivalent Committee	Yes	Yes	No
Medical Director (MD) or equivalent	Yes	Yes	No
Executive Director(ED) or equivalent such as officer-in-charge	Yes	Yes	No
Eye Bank Manager (EBM) or equivalent	Yes	Yes	No
Eye Bank Technicians (EBT)	Yes	Yes	No
Eye Donations Counselors (EDC)	Yes	Yes	No
Adminstrative Secretary cum telephone operator	Yes	Yes	No
Panel of Registered Medical Practitioners to enucleate round the clock	Yes	Yes	Yes

Table 3.2: HR Requirements in Eye Bank

For further details please refer the NPCB medical standards in the link given below:

http://npcb.nic.in/writereaddata/mainlinkfile/File176.pdf

Table 3.3 Major Equipments and Instruments for Eye Banks

S.No	Description	Nos.
1	Refrigerators – 260 liter capacity (Frost Free)	1
2	Topcon Slit lamp	1
3	Laminar Air Flow hoods/ Biological safety cabinets Class II Type – A containment facility (Tissue processing lab)	1
4	Surgical instruments: Enucleation: i. Enucleation spoon ii. Enucleation scissors iii. Clark eye speculum iv. Strabismus muscle hook v. Westcot Tenotomy scissors vi. Fix. Forceps 1*2 teeth vii. Needle holder heavy viii. Mosquito artery forceps ix. Eye jars (steel)	6 sets
5	Surgical instruments: Excision instruments i. Artery clamps-4 ii. Fix. Forceps 1*2 teeth iii. Westcot tenotomy scissors iv. Castroviejo corneal scissors v. Iris forceps 1*2 teeth straight	6 sets
6	Specular Microscope – Konan EKA-10 with software	1
7	Autoclave	
8	SS Bins/Trays	6 sets
9	Linens to be prepared as follows: i. Pants & Shirts ii. Gowns iii. Two hole drapes iv. Bundle towels v. Instruments pouch with 8 packets vi. Lab coats (White) vii. Cap & Masks	
10	U.V. lamps with fittings 4 sets	4
11	Thermometer	1+1
12	Computer with printer	
13	Furniture's & Filing cabinets	
14	Air - Conditioning(1.0 T)	3
15	Room Partition work	

clubs such as Lions, Rotary etc and also a good relationship with other general hospitals will ensure adequate procurement of donated eyes.

A dedicated telephone line and an access to manpower to assist in quick response to eye donation call will itself ensure continuous referral from members of society.

Physical facilities

Ideally the space required for an Eye Bank is 600sq.ft. This includes space for front office / reception, tissue processing lab, instrument maintenance (cleaning) and isolation and preparation and shipping area. The whole area must be air-conditioned.

Refrigerators – 2Nos (One for storing blood samples for serology to rule out infectious disease such as Hepatitis B and C, HIV 1 and 2, and Syphilis and the other for storing corneas and MK medium).

Blood Testing Equipments

Serology testing - serum report must be obtained from the NABL approved laboratory whether outside / inside the hospital. In case of using the serology kit only the NACO approved kit must be used to perform HIV, Hepatitis B, Hepatitis C and Syphilis tests. It is mandatory to perform HIV, HepB, HCV and Syphillis test. The blood testing equipments are necessary in case of ELISA test. Serology identification of HIV and Hepatitis B from the donor sample is mandatory for all corneas being used before performing the transplantation surgeries.

Autoclave for sterilisation of surgical instruments

Autoclave: If the eye bank is attached with the eye hospital, the central autoclave in the operation theatre can be used to sterilize the instruments; however, the number of instruments and other accessories sent for the autoclave must be documented.

Laminar Air Flow hood / Biological safety cabinet: It is compulsory to process eye balls whether excision (Separation of cornea from the eye ball), sclera process etc. to be done under sterile condition. This sterile environment could be maintained under the Laminar Air Flow hood.

Slit Lamp for evaluation of corneas: A gross evaluation of the cornea must be done under the slit lamp and documented. A slit lamp is therefore essential in an eye bank.

Stainless steel bins/trays are used to sterilize the instruments: The instruments must be maintained and preserved in a rust free tray. The instruments tip must be well protected using a plastic cap to maintain the sharpness of the instruments. After every usage the instruments must be soaked in clean solution for an hour and gently scrubbed using a soft bristle tooth brush and rinsed thoroughly. The cleaned instruments must be dried and wiped using clean cloth or tissue paper and then arranged for autoclave packing.

U. V. Lamps: are used to decontaminate the lab site on a daily basis – The ultraviolet lamps must be fitted in the ceiling of all the laboratory areas and switched on for ½ hr daily to destroy the micro organisms. The procedure must be documented daily.

Computer with printers are exclusively for donor and recipient data maintenance. The eye collection, distribution and discarding must be documented both manually in different formats and the data can be maintained in the computer for easy access.

Other Consumables

Gauze, Balanced salt solution, Betadine swabs, Alcohol swabs, Broad spectrum antibiotics, Styrofoam Containers/Shipping boxes, Eye jars with cage, Vacutainer (for storing of donor blood sample), Sterilization indicators and tape wrappers to pack and transport corneas to the Eye Bank or Corneal surgeons and transplant centres are essential.

Human resources requirements

Eye Bank Training Centres (EBTC), Eye Banks (EB) and Eye Donation Centres (EDC) should have the following personnel as detailed in table No. 3.2.

(Government eye banks should also set up a team within their administrative framework and designate the responsibilities as per the requirements and at the discretion of the head of the hospital or institute as applicable). An eye bank can designate and delegate multiple responsibilities to a person as appropriate if necessary.

Glaucoma

Magnitude of the Problem

Glaucoma is the second most common cause of blindness throughout the world and is a significant cause of irreversible blindness in India. It has been estimated that the global prevalence of glaucoma is 60.5 million, 10% of which are irreversibly blind. The prevalence of glaucoma in the world is estimated to be around 80 million by the year 2020, principally due to change in the demographic profile of the population. A majority of those with glaucoma live in Asia with women predominantly more affected. Angle closure disease will account for more than half of those with glaucoma. Glaucoma has been identified as a priority requiring urgent and appropriate public health measures and intervention to decrease the burden of blindness in the community, in the global initiative of Right to Sight by the year 2020 (VISION 2020).

Several epidemiologic studies conducted in India have revealed glaucoma to be prevalent in about 2.6-3.4% of the population aged forty and over. These studies also reveal that only a small percent (7%) of those with glaucoma in the community have been detected and a much smaller proportion of those with glaucoma have actually accessed and utilised the available eye care resources. These population based studies have estimated 12 million in India to have glaucoma, 21% of those with glaucoma are blind in one eye and an additional 14% with glaucoma are bilaterally blind.

Glaucoma is a disease not easily amenable to detection by community/mass screening. Glaucoma is a disease with a relatively low prevalence and there are no efficient screening devices with good positive predictive value for effectively detecting the disease especially in its early stages. Nevertheless, early detection and appropriate institution of therapy in glaucoma is essential to prevent needless blindness. Glaucoma is also largely asymptomatic and requires indefinite monitoring on a periodic basis to detect progression. It has been recognized that opportunistic screening for glaucoma either in community outreach programs to address cataract blindness or in the ophthalmologists' clinics and eye hospitals where patients report for other routine ocular problems and

Fig. 3.4: Field Analyser Examination

refractive errors provide an occasion to screen for glaucoma and probably represents an ideal setting to screen for those at risk of glaucoma. To ensure equitable access and availability of eye care resources to combat glaucoma blindness, eye care providers need to be equipped with the trained manpower and infrastructure to be able to effectively address the problem.

A. Scope of Services (both outpatient and IP services)

A well equipped Glaucoma Care Services is an essential and integral part of a tertiary eye care provider. The proportion of those with glaucoma in the new patients reporting to a tertiary care centre varies from 2-5% depending on the referral pattern and the infrastructure and the expertise available. Patients diagnosed with glaucoma vary in type and severity depending on the geographical location of the eye hospital and the major ethnic group sub-served. Whereas angle closure disease is relatively more common in populations of Asia and Mongolian descent, open angle glaucoma is relatively common in Caucasians and those of African descent. The severity of the disease may also be dependent on the racial predilection, eye care resources available and accessed within communities. The disease is in general more progressive and severe in the developing communities of Asia, Africa and South America. Secondary glaucomas such as those from neglected and hypermature cataracts is also higher in the developing world. It is crucial to equip the glaucoma services with the training, infrastructure and the expertise to address the problems specific to the community.

Apart from ophthalmologists, optometrists and supportive paramedical personnel, ancillary services like patient education and counselling and low vision aid services add value to patient care in a tertiary glaucoma service.

B. Patient Flow – The Process

Patients attending glaucoma services in a tertiary eye care centre fall into one of the following broad groups:

1. Patients referred with suspected or confirmed glaucoma for work up, diagnosis and advice on management, education on compliance to treatment and regular follow up.
2. Review patients for periodic monitoring for progression of disease
3. Patients scheduled for investigations (Visual fields, Nerve fibre analysis or fundus photography) and minor treatment procedures (laser iridotomy, laser suturelysis, diode cilioablation, or Bleb Needling)
4. Patients on review visits following surgical procedures (Trabeculectomy, glaucoma triple procedures, shunt procedures, etc)

The patient flow processes will slightly differ in each group of patients and it is better to segregate patients falling under each category into separate streams of flow so that their care is best streamlined. All patients will require visual acuity assessment and intraocular pressure estimation after which they can be segregated into flows based on the purpose of their visit:

1. New patients or Glaucoma suspects require thorough anterior segment evaluation including pupil reflexes, corneal thickness assessment and Gonioscopy, dilated posterior segment examination and if required, ancillary investigations like fundus photography, visual field and nerve fiber analysis. These ancillary investigations can also be scheduled on a review visit on a subsequent day subject to discretion of the examining ophthalmologist and convenience of the patient. All new patients have to undergo detailed patient education and counselling regarding treatment and regular follow up.
2. Review patients, will be seen by ophthalmologists after visual acuity and IOP estimation for assessment of progression of disease and ascertaining compliance to treatment, and brief questioning regarding drug induced adverse events, quality of life/ vision and any other issues that require clarification. Emphasis on treatment compliance and follow up is stressed. Ocular examination includes IOP estimation, fundus evaluation and review of target IOP. Treatment is continued if target IOP is reached. Failure to achieve target IOP is followed by review of visual fields,

Fig. 3.5: Patient Flow

New patients and patients referred from other specialties

Registration: 5 minutes

⬇

Preliminary examination: 10 min + 5-8 min (if refraction is needed)

⬇

(15-20 min for dilatation if needed)

⬇

Final examination: 10- min

⬇

Counselling and follow-up advice 5- 10 min

Review Patients and direct walk in patients

Registration: 5 minutes

⬇

Visual acuity: 10 min + 5-8 min (if refraction is needed)

⬇

Intra ocular pressure estimation using non contact tonometer (5 min)

⬇

Investigations advised during previous visit (Humphrey visual field evaluation, ONH imaging)

⬇

Preliminary examination

⬇

(15-20 min for dilatation if needed)

⬇

Final examination: 10 min

⬇

Counselling and follow-up advice: 5- 10 min

18

assessment of optic nerve head and retinal nerve fiber layer and switch over to more aggressive therapy which may be medical, surgical or laser.

3. Patients scheduled for minor treatment procedures /investigations are escorted by paramedical staff to respective areas for ensuring that the procedures are carried out without delay. Ophthalmologists will review the patients after investigations. Patients undergoing minor procedures will be counselled for treatment and follow up.

4. Patients reporting after surgical procedures are screened and examined for the efficacy of the surgical procedure and exclusion of any untoward or adverse event/complication following surgery. Bleb modulation strategies like laser suturolysis or bleb needling may be recommended on the discretion of the examining ophthalmologist. Examination by ophthalmologists will be preceded by visual acuity and IOP estimation.

List of major surgeries/procedures – diagnostic as well as clinical management

Diagnostic

1. Investigations
   a. IOP measurement using Goldmann applanation or Perkins tonometer
   b. Pachymetry
   c. Humphrey Visual Field Analysis
   d. Fundus Photography

   Optional: Nerve fiber layer analysis using the following:
   a. Glaucoma diagnostics (GDx)
   b. Optical Coherence Tomography

2. Clinical management
   a. Medication (eye drops)
   b. Laser surgery:
      1. Laser iridectomy
      2. Laser iridoplasty
      3. Laser suturolysis
      4. Laser vitriolysis
      5. Laser hyaloidotomy
   c. Examination under general anesthesia for pediatric age group
   d. Surgical procedures
      1. Trabeculectomy
      2. Trabeculectomy + Trabeculotomy.
      3. Trabeculectomy with anti mitotic agents like Mitomycin-C or 5-FU
      4. Trabeculectomy with collagen implants
      5. Valve implants
      6. Combined trabeculectomy with IOL

implantation.
7. Bleb needling , bleb repair/ revision
8. Non penetrating glaucoma filtering surgeries : deep sclerectomy (including laser assisted), visco canalostomy, canaloplasty

Ward (Post-op examination and no. of days stay)

- In tertiary eye care unit, about 2% of total surgeries performed are due to glaucoma (trabeculectomies, combined procedures, shunts, diode laser cilioablation, and minor procedures like bleb needling). Practically all these procedures could be performed as outpatient daycare procedures, if patients are willing. Presuming 10-15% of patients will choose day care operations, and also presuming 2-3 days of stay for each glaucoma surgical procedure, about 5% of the total bed capacity need to be earmarked for glaucoma patients.

- Evaluation in the post operative period include slit lamp examination to assess corneal clarity and anterior chamber depth, applanation tonometry, and assessment of function of filtering bleb. Release of suture and/or laser suturolysis to enhance graded filtration is performed accordingly based on need and clinical assessment.

The Refraction sections could be shared across the departments.

C. Equipment

Essential Equipment (Regular)
1. Slitlamp with Goldmann Applanation Tonometry
2. Diagnostic lenses (90 D, 20D, 78D) / Optional (20D, 78D,60D)
3. Gonioscope (single or two or three mirror and a four mirror sussman or Zeiss gonioscope)

Specific to Glaucoma Department
1. Goldmann applanation tonometry.
2. Perkins tonometer (needed for the evaluation pre or intraoperatively)
3. Pachymetry
4. Humphrey Visual Field Analyzer

Optional (can be procured at later periods)
1. Stereo disc imaging
2. Glaucoma diagnostics (GDx)
3. Heidelberg retinal tomography (HRT)

4. Optical coherence tomography (OCT)
5. Anterior segment OCT
6. Ultrasound biomicroscope

(equipment that could be shared between multiple departments)
- Non contact tonometry: Any other subspeciality/ general OPD
- Perkins tonometer:
- Pachymetry: Cornea
- Optical coherence tomography (OCT): Retina
- Humphrey Visual Field Analyzer: Neuro ophthalmology
- UBM (cornea and anterior segment)
- Slit lamp photography (Cornea, cataract and Anterior Segment)

D. Human Resources (for 150 outpatient visits per day)

Ophthalmologist	: 3 – 5 (anytime 2 to 3 ophthalmologists managing OPD & 1-2 ophthalmologists managing the theatre and ward)
Paramedical staff	: 6-9 paramedical staff (one for registration, 4 to 5 staff to manage OPD and 2 to 3 in Theatre)
Counsellor	: 1
Administrative staff	: 1
Optometrist (optional)	: 1

Minimum skill sets required

- Ophthalmologiost: Post graduation in ophthalmology with a work experience in glaucoma for at least one year

(Recommended).
- Preliminary examination can be done by postgraduates or fellows or a general Ophthalmologist.
- Paramedical staff: A person having a minimum of 2 years full time training at any tertiary eye care institute and 6 months of orientation in glaucoma services is preferred.
- One Counsellor: A person having a mimimum of 2 years full time training at any tertiary eye care institute and 6 months of orientation and observation in glaucoma services is preferred.
- One administrative staff optional: Qualified in Hospital management.
- Optometrist (optional): Qualified or trained in Refraction with good skills and familiarity with investigative procedures like perimetry, pachymetry, fundus stereophotography, and RNFL analysis)

E. Space requirement and Layout

Operation Theatre
Preferably a separate operation theatre is advised. It can be shared with other sub-specialities excluding infective cases.
1. Common area
   a. Wash room : 50 sq ft.
   b. Changing room : 50 sq ft.
   c. Autoclaving : 50 sq ft.
   d. Entrance and exit : 50 sq ft.
   e. Patient preparation room: 70-80 sq ft.
2. Theatre: 150-200 sq ft.
- Total area required: 420-480 sq ft.

F. Case Sheets (both paying and free)

Specific case sheets for surgical procedures as required. The case sheet is specific for Glaucoma speciality. It becomes an attachment

Table 3.4: Space Requirement

Cubicle	No. of cubicles	Space required		Area
		Length (ft)	Breadth (ft)	(sq ft)
Registration	1	6	6	36
Preliminary Examination Room	3	10	8	240
Final Examination Room	2	10	10	200
Counselling	1	6	6	36
Pachydermy	1	6	8	48
Humphrey Visual Field Analyser	1	6	8	48
GDx and (or) OCT	1	6	8	48
Yag PI	1	6	8	48
Total Waiting Area				250
Corridor Space				145
Total Area				1,121

Fig. 3.6: Model Layout

Total Area - 1150 sqft (46 x 25 ft)

GDX – 6* 8 ft

HFA – 6* 9 ft

YAG PI – 6* 8 ft

PG Room – 10* 8 ft

PG Room – 10* 8 ft

PG Room – 10* 8 ft

Medical Officer Room – 10* 9 ft

Medical Officer Room – 10* 9 ft

Counselling - 6* 8 ft

Registration – 6* 6 ft
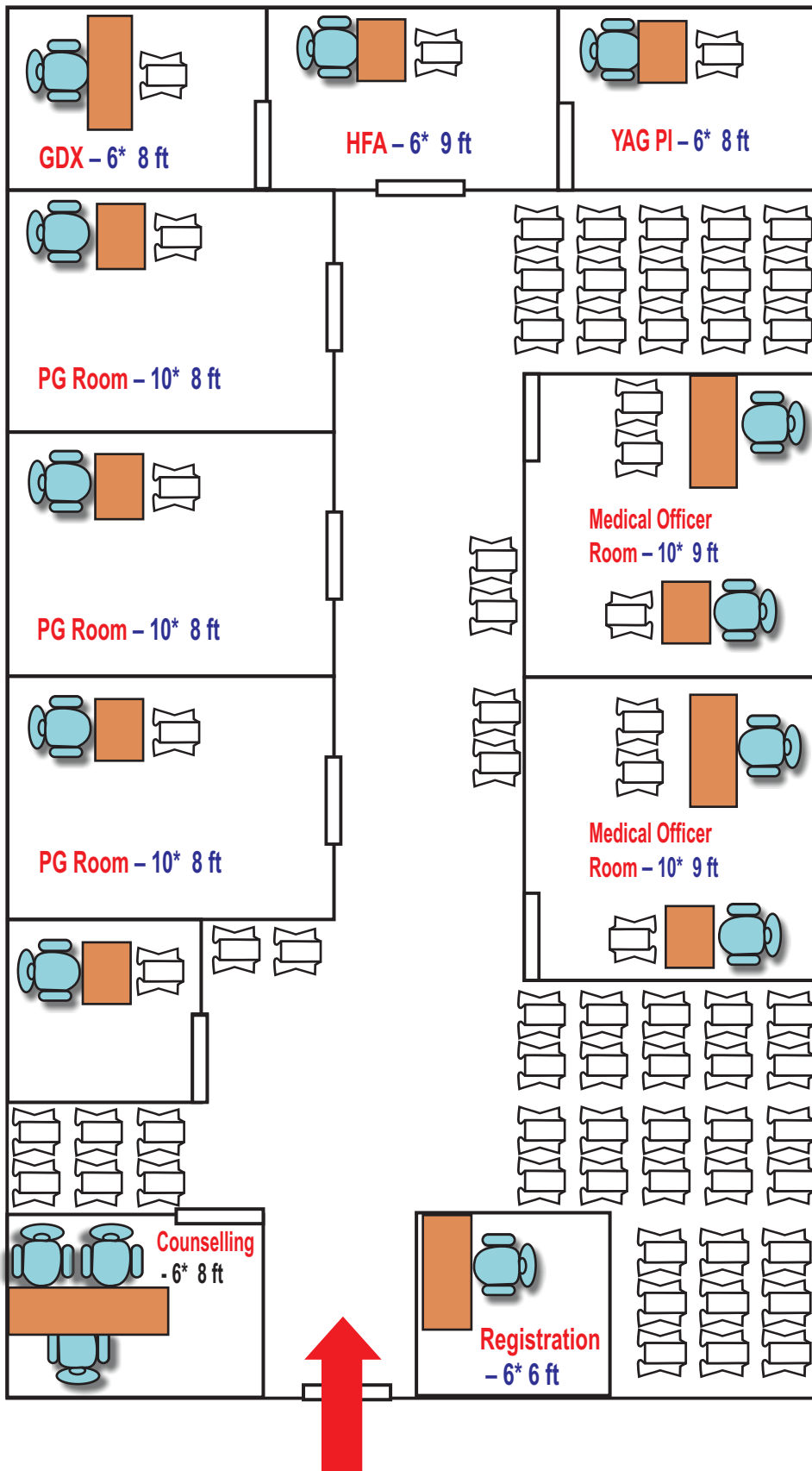
to the general ophthalmic case sheet once the patient is diagnosed to have glaucoma in Glaucoma speciality clinic. The speciality clinic case sheets can be enclosed in folders of different colours to have an easy access at a later date in the medical records department. (Refer annexure for the Glaucoma speciality case sheet).

G. Demand Generation

Linkages to generate demand.

1. Internal referrals
a. Within the hospital - process involved. Any patient who is diagnosed to have glaucoma previously or having clinical features suspicious of glaucoma will be referred to the glaucoma department from other sub-specialities and general ophthalmology.

There should be periodic distribution of leaflets regarding the newer trends in the management of glaucoma, to the doctors of other sub-specialities and general ophthalmology to enhance patient care services. Periodic updates/ CMEs for ophthalmologists in general ophthalmology/sub specialties on recent trends in glaucoma diagnosis and management also needs to be conducted.

Dr. Jain emphasizes that it is essential that the service is both affordable as well as of good quality. It is only the positive word of mouth from a satisfied patient that will bring more patients to the hospital.

2. Outreach Eye Camps
a) Conducting glaucoma screening on special days (World Glaucoma Day). This should preferably be done by Glaucoma specialists along with trained counsellors who play a major role in the patients understanding of glaucoma.
b) Adjunctive to the clinical evaluation, a portable slit lamp and a hand held applanation tonometer (Perkins) can add to the better evaluation of the patient.
c) Patients who are diagnosed or suspected of having glaucoma either in glaucoma screening camp or other eye camps will be referred to the base hospital with a special card for the further evaluation and management.
d) Display of banners containing information about glaucoma disease at the camp site

e) Distribution of leaflets to the patients by the trained counsellor at the camp site
f) Conducting group education programmes by demonstrating the disease progression in model eyes or charts at the camp site
g) Displaying banners containing the camp information at camp site and the local area, one month ahead.
h) Field workers can play a role in motivating the rural people to attend the glaucoma screening camps.

Opportunistic eye screening to exclude glaucoma in comprehensive eye camps/geriatric general outpatient units can be specifically used to screen for patients with possible glaucoma. All family members of individuals with glaucoma (first degree relatives, siblings and parents) to be educated on periodical screening to detect and treat glaucoma early.

3. Vision Centres
a) Trained technician can check the IOP using applanation tonometer and can detect suspicious cases of glaucoma having shallow angles, Pseudoexfoliation, high IOP and refer these cases to the base hospital
b) Diagnosed cases of glaucoma under the vision centre coverage will be called periodically to the vision centre for follow-up and glaucoma specialist will visit the vision centre and examine those cases. Field workers can help in motivating these patients to attend the follow- up at the Vision centre by visiting door to door.
c) Distribution of leaflets to the glaucoma patients for family awareness regarding the disease.

2. External referrals
a) Conducting periodic CMEs or distribution of leaflets among the doctors of the other sub specialities of the same hospital and outside practitioners regarding the recent investigative or therapeutic techniques available in the field.
b) Sending letters to the local ophthalmologists regarding the recent advances available in the department for the benefit of the patient.
c) For every referral from local ophthalmologists a reply letter will be sent containing the information regarding the particular patient.

- **Health Education**
- Information through internet (website)
- Distributing leaflets containing disease information and preventive measures

through regular eye check-up to the patients and attenders attending general ophthalmic OPD and Glaucoma clinic.
- Conducting family screening and awareness programmes for the families of glaucoma patients at the base hospital periodically and an exhibition and display of Glaucoma awareness materials including videos in the base hospital.
- Conducting awareness programmes and screening programmes on special days (World Glaucoma Day, World Sight Day etc.,)
- Display of posters and banners within the hospital premises
- Sending SMS about glaucoma to mobile subscribers
- Display of glaucoma awareness message in cinema theatres
- Attach flyers in leading newspapers – national and local dailies.
- A live talk show / interaction with patients on radio and glaucoma awareness messages in radio for the entire fortnight before special days (like World Glaucoma day).

Counselling
- A counselor in glaucoma department can be preferred to give counselling to the new and review patients
- A newly diagnosed glaucoma patient has to be

Fig. 3.7: GDx Examination

given the disease information through videos or by demonstrating on flip charts
- Counselling regarding the instillation of medication or postoperative care or follow-up
- Counselling regarding the screening of the family members of the glaucoma patients.

h. Referrals for Low Vision Rehabilitation

a) Patient with low vision and who needs low vision rehabilitation screened at eye camps or vision centres or at sub-specialties or general ophthalmology at base hospital will be referred to the low vision clinic with special card further management.

Low Vision Clinic

A. Scope of services (Both outpatient and inpatient)

The scope of the vision stimulation centres is multi dimensional. The underlying theme starts with emphasizing the use of residual vision and how effectively this vision could be used with adaptations suiting personal needs in daily living activities. The mandate is broad and will not only be limited to providing low vision aids to vision impaired people but also include, rehabilitation of the blind which will encompass counseling and guidance to various services as vocational rehabilitation Centres, District Rehabilitation Centres for availing Government disability benefits etc. Visually impaired children are counselled and guided to integrated education schools.

The scope of the services can be divided into 3 age categories namely,
i.   0 – 5 years,
ii. 6 – 15 and
iii. Above 15 years

In the 0 – 5 years category, the cause for visual impairment is mostly due to congenital conditions such as Lebers congenital amaurosis, Retinopathy of prematurity, etc. These children will be benefited by early intervention programme with vision stimulation exercises.

In the 6 - 15 age category, low vision supporting services have to be integrated to their needs based on school going activities. They have to be provided counselling and guidance on appropriate type of assistive devices. Children who are multiple handicapped such as hearing impaired and/or, mental retardation will require inter speciality supportive services.

In age category above 15 years to 40 years consists of patients in their active life with low vision. This is the age group which requires active intervention either with low vision aids, counselling guidance on adaptation suiting individuals needs or both.

Fig. 3.8 : Low Vision Testing

In the age group of above 40 years majority of low vision will be due to ocular disease like diabetic retinopathy, age related macular degeneration or glaucoma. Supportive low vision services should go along with primary ocular treatment.

B. Patient flow – The process

The out patient flow will start with the registration of details of the patient with Name, Age, Gender, Medical record Number, Old or New and the referral department. Majority of the patients will be referral patients either from within an eye hospital or from other service agencies and other ophthalmologists.

After registration, the patients may be scheduled to be seen by an ophthalmic technician, optometrist refractionist or a rehabilitationist as the case may be. A preliminary history will be elicited about the complaints and the background details of the clinical history and the disease is studied. Details about the present visual problems with specific queries with reference to distance, intermediate and near vision are documented. A history on occupation, education and their stated visual needs are collected. Following this low vision assessment is done using a logmar chart. Depending upon the patients requirement, low vision aids as telescopes for distant and magnifiers for near work is given for trial. Based on the patients need suitable aids for distant or near vision are recommended. They are counselled on effective use of residual vision using appropriate aids. Apart from low vision aids

Fig. 3.9: Patient Flow in Low Vision Clinic
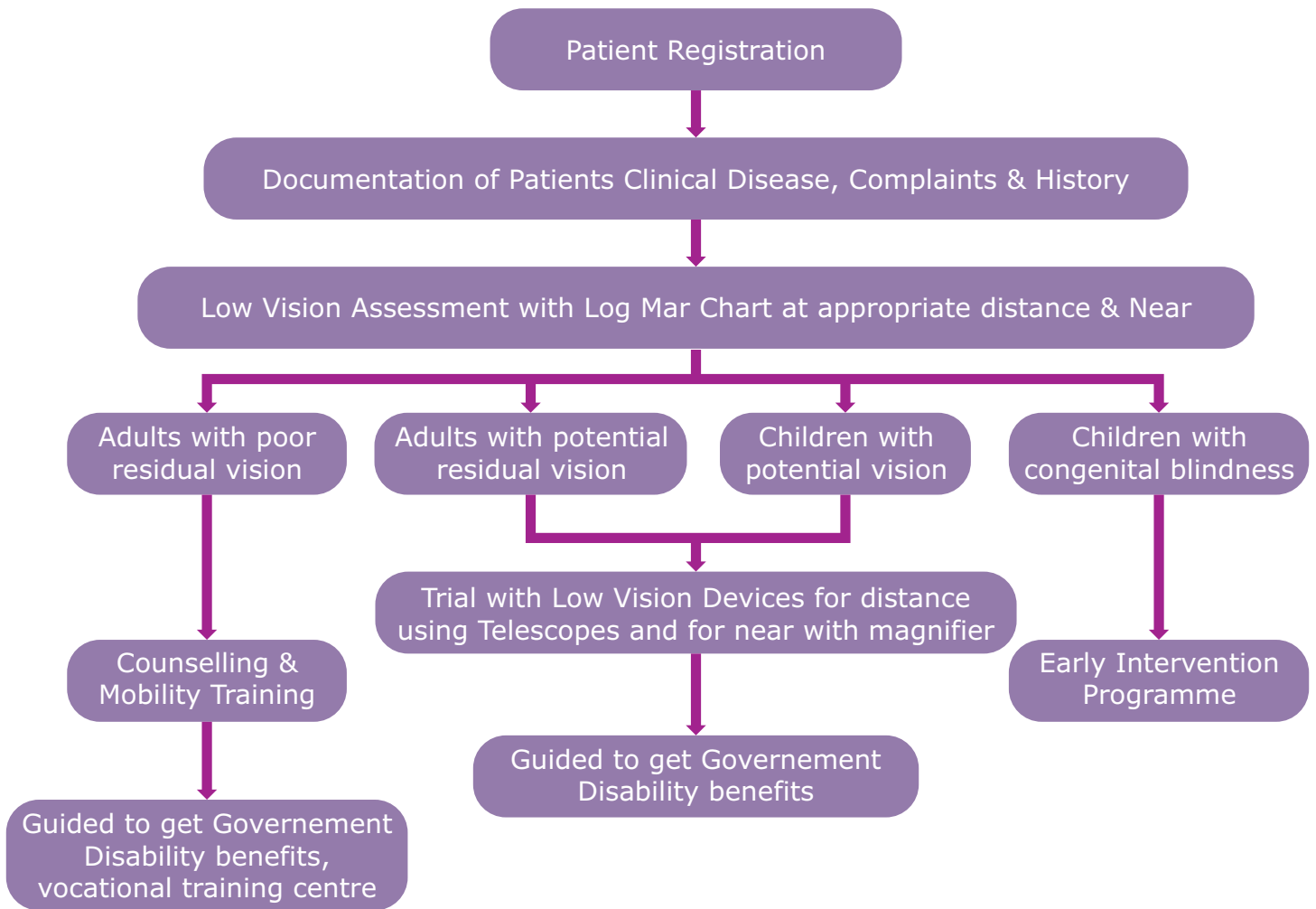
patients with poor residual vision are guided for vocational rehabilitation depending on their educational background and economic status. If they are from a poor socio economic status they are guided to get the Government disability benefits after getting a national disability card.

Children with congenital blindness and with a potential to enhance the vision are taken up for an early intervention programme. After a functional vision assessment, the parents are counselled and the programme is customized and may run for several weeks as a structured course till they achieve certain visual targets. School going children when prescribed aids such as telescopes are provided enough time to use them in a simulated class room using a black board.

Fig. 3.10: Patient using Hand Magnifier

C. List of Equipments

List of Equipment	Usage
Log Mar vision chart (Retro Illuminated) for Distance	Vision assessment
Near vision test cards	Vision assessment
Optical Aids for distance 1. Telescopes 3x,4x,6x	For improving distance vision

Optical Aids of near spectacle magnifiers
1. Prismosphere +5.0D, +8.0D, +10.0D
2. High spherical glasses
   +16.0D, +18.0D, +24.0D
3. Hand Magnifiers
   1. Illuminated
   2. Non Illuminated
4. Stand Magnifiers
   1. Illuminated
   2. Non lluminated
	For near vision

1. Non Optical Aids
   1. Typoscopes
   2. Bold Tip Black Pens
   3. Table Light
     Supplement Optical Aids
	Supplement Optical Aids

D. Human Resource

The average time taken to care for a low vision aid patient far exceeds the time taken for a patient with routine ophthalmological problems. The team should be dedicated, patient and be receptive to the individual patient needs. A basic low vision service will essentially require an ophthalmologist, optometrist and a rehabilitationist for establishing a comprehensive low vision service. Additional human resources which are required on a part time basis will include mobility instructors, psychologists, and vocational trainers.

Human Resources	Skill Set Required
Ophtalmologist	Proficiency and knowledge about disease causing low vision, Different types of low vision aids, their powers. Supervising a low vision unit and managing community based rehabilitation.
Optometrist	Skill in low vision refraction, giving trial with low vision aids, Knowledge about Telescopes, magnifiers etc.
Rehabilitationist	Skill in counselling Guidance of visually impaired patients, Mobility training, Instructing patients with low vision aids, optical and non optical aids.

Fig. 3.11: Model Layout

Total Area - 1000 sqft (40 x 25 ft)

(Optional) Computer training room -6 * 8ft

Model Kitchen– 11 * 9ft (Optional)

Vision Stimulation room – 10*12ft

Counseling room – 8* 9 ft

Low Vision Assessment Room – 10* 9ft

Refraction Room - 11* 6ft

Registration & Optical Dispensing -9* 6 ft
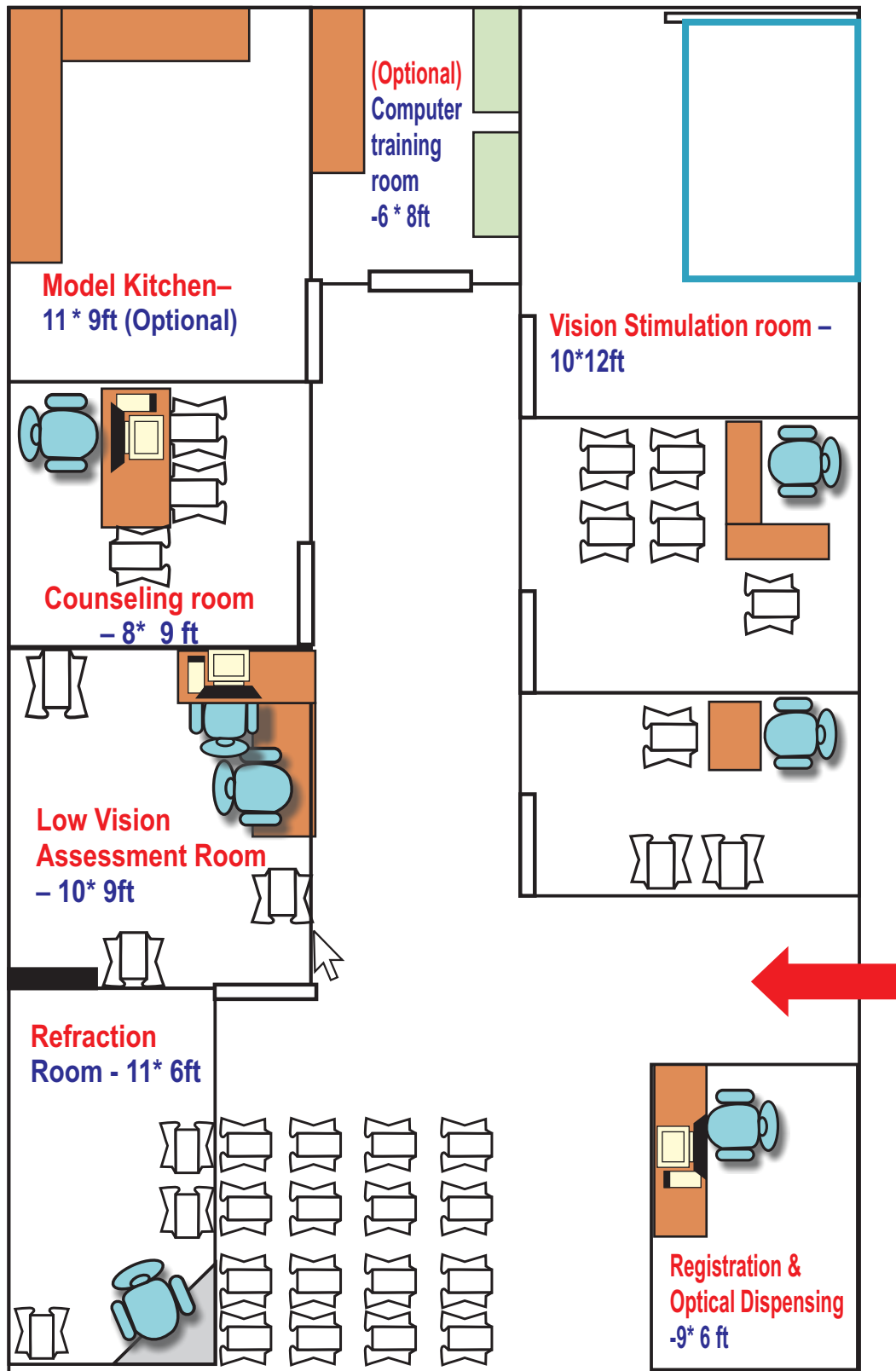
Table 3.5: Space Requirement				
Cubicle	**No. of cubicles**	**Space required**		**Area**
		Length (ft)	**Breadth (ft)**	**(sq ft)**
Registration & Optical Dispensing	1	6	9	54
Refraction (Cyber chart)	1	11	6	66
Low Vision Assessment	1	10	9	90
Counselling	1	8	9	72
Chief Medical Officer	1	10	8	80
PG/ Fellows	1	10	6	60
Computer training room	1	6	8	48
Vision Stimulation	1	12	10	120
Model Living room	1	11	9	99
Total waiting area	1	15	6	90
Corridor space				117
Total Area				896

D. Human Resource

The average time taken to care for a low vision aid patient far exceeds the time taken for a patient with routine ophthalmological problems. The team should be dedicated, patient and be receptive to the individual patient needs. A basic low vision service will essentially require an ophthalmologist, optometrist and a rehabilitationist for establishing a comprehensive low vision service. Additional human resources which are required on a part time basis will include mobility instructors, psychologists, and vocational trainers.

E. Space Requirements

A minimum of 1000 sq ft is required to set up low vision service with separate areas for patients waiting, registration, low vision assessment, refraction, counselling and a doctors counselling.

F. Case sheet

Please refer Annexure

G. Demand Generation

External linkage with other sub specialty primary and secondary services.

1. Internal Referral

The development of low vision service strongly depends on good networking and clinical systems that facilitate internal referral. Almost every patient who enters a low vision service is a referred patient. Self referral is seldom seen.

The process involves creation of awareness among the doctors and the paramedical staff and more importantly give feedback to them on these patients. If the hospital staff, who referred the patients feel that the low vision service improves the quality of life of their patients, it reinforces a positive outlook about low vision service. Conducting regular continuing medical education programmes, and inculcating low vision exposure in regular post graduate training also help in patient referral. Low vision case studies published in inhouse magazines can serve to educate doctors on the effectiveness of low vision aids, the type of low vision diseases that respond to low vision aids give some idea on what type of cases to be referred.

2. Outreach eye camps

Community out reach for screening low visionand blind patients has not been well explored in many eye hospitals. Primarily community outreach is more focused towards cataract screening only. Screening for such low vision disorders can be done in many ways, field workers will go for door to door survey and use simple vision testing charts at the site. Patients who fall under low vision or blind category are asked to come to the outreach eye camp for further examination for proper vision evaluation and refraction by an ophthalmic assistant, trained in low vision assessment and followed by a comprehensive ophthalmological evaluation. By this process treatable diseases can be eliminated. If the patients are totally blind with no residual vision, intervention is provided by rehabilitationist either by mobility training or guidance for vocational training.

Blind patients with poor socio economic status are guided to avail of Government disability benefits through district disabled Rehabilitation centres. Another novel method of screening blind and low vision patients will be using key informant method. The key informants will be panchayat president, anganwadi workers and school teachers, who may be aware of the blind in the local community. Based on the information provided by this key informants, the list of blind and low vision patients in a community can be collected who then may be brought to the camp for further vision rehabilitation and intervention.

3. Vision centres

Low vision services are currently available only in tertiary eye hospital and few secondary services. It may not be ideal to establish a dedicated and comprehensive low vision service at a primary level. The best alternative will be to utilize the developing vision centres at rural areas by many eye care institutions. These centres are manned by ophthalmic technicians who are skilled in doing basic refraction and prescribing glasses. These technicians can do the vision assessment for the low vision patient and provide simple high addition glasses and magnifiers. Basic information on availing Government disability benefits for the blind from poor socioeconomic status can be provided. Simple adaptation for using external light with magnifiers can be explained. Patients who may require magnifiers of higher power more than 5 diopters, and those who require assessment with contrast sensitivity and log mar charts can be referred to secondary and tertiary centre for further evaluation and intervention.

4. External Referrals

A strong network has to be created for external referral. Many private practitioners are not aware of the beneficial effects of low vision service which might improve the quality of life of these patients. Periodic news letters with case studies on low vision patients whose vision improved through the use of low vision aids can be provided. Information on the profile of possible patients who may benefit

Fig. 3.12: Testing with a Low Vision Device

from these aids and other visual rehabilitation services for the blind may be constantly shared.

Health education and counseling

Ensuring compliance to low vision aids is more important than the prescription of low vision aids. Proper instruction and convincing the patient in using the residual vision is very important. Adequate time and environment has to be provided for the patient to have an informed choice of the intervention he or she chooses. If the patients feel motivated and empowered then the compliance will be very good.

H. Referral for low vision rehabilitation

Most often vision impairment in children is associated with other disabilities such as hearing or speech impairment or mental retardation. Hence it is important that a network is developed with other NGOs, special teachers in integrated schools and professionals (such as paediatricians, psychologists, speech therapists etc) dealing with these disabilities for cross referral. This will also improve the popularity of low vision services. Peer group meetings with persons having similar eye problems like the Retinitis pigmentosa can help in referral of patients having similar problems who have not availed of appropriate medical help. Periodic and sustained networking among health care professionals is the prime requisite for a sustained number of referrals for a low vision rehabilitation service.

Department of Orbit, Oculoplasty & Oncology

A. Scope of Services

Orbit and oculoplasty is a super speciality with immense scope for growth and development. It goes beyond the boundary of the eyeball and deals with the problems of all the neighbouring structures that intrude into the eye. The orbit is the bony cage in which the eye is lodged and includes all its contents – the muscles, nerves and vessles of the eye. It is surrounded by the paranasal sinuses, the nose and the brain. Oculoplasty deals with the cosmetic and functional correction of the lids and the adjacent structures. Correction of drooping of the lid (ptosis), malpositions of the lid margins, common lid infections and lid trauma fall under its purview. The lacrimal drainage system is responsible for the clearance of tears from the eye. Disorders of this system including watering eyes and infections are also dealt with in this specialty. Aesthetic surgery for facial enhancement and correcting age related facial changes is an upcoming wing of the oculoplasty clinic. The orbit department requires the team work of multiple other specialties including radiology, plastic surgery, otorhinolaryngology, neurosurgery, dermatology and oncology.

Scope of Services (both outpatient and in-patient services)

Lacrimal drainage system
- Epiphora – congenital and acquired
- Dacryocysitis

Lids and adnexa
- Ptosis
- Ectropion and entropion
- Lid infections
- Blepharospasm
- Lid trauma
- Lid tumors
- Aesthetics

Orbit
- Infections
- Congenital malformations
- Tumors
- Inflammatory disorders – Thyroid eye disease,
- Pseudotumor
- Socket disorders

Prosthetics (optional)
- Shell fitting
- Custom made prosthesis

B. Patient Flow

New patients	Follow-up Patient
Registration (5 mins)	Registration (5 min)
Units (15 mins)	Follow up investigation
Speciality clinic	Preliminary work
Orbit clinic	Additional Investigations
Registration	Finals
Refraction / Vision (10 min)	Counselling
Preliminary workup (15 min)	
Investigations (30 mins)	
Final (10mins)	
Counselling (10mins) ± admission	

Procedures : (* - Procedures can be shared with other departments)

Diagnostic
1. Refraction *
2. Syringing
3. Probing
4. Hess charting, diplopia charting *
5. Central fields*
6. Colour vision*
7. Indirect ophthalmoscopy *
8. Imaging *

Ultrasonogram B-scan

Supportive services
- X-ray
- Computerised Tomogram
- Magnetic Resonance Imaging
- Biochemistry, Microbiology

Clinical Management (Outpatient clinic procedures)
- Punctal dilatation
- Suture removal
- Needling
- Shell fitting

List of procedures (Theatre procedures)

Minor
- Incision and curettage
- Incision and drainage
- Probing
- Lid tear repair
- Dacryocystectomy
- Wound cleaning/ debridement
- Small mass excision
- Injections: Botulinum toxin, Steroids (intralesional)

Major
- Dacryocystorhinostomy (DCR)
- Orbitotomy
- Lid reconstruction
- Enucleation, Evisceration with implants
- Exenteration
- Socket reconstruction
- Ptosis correction
- Ectropion, Entropion correction
- Orbital decompression
- Optic nerve sheath fenestration
- Blepharoplasty, Brow lift
- Floor fracture repair

Ward
Post -op stay 1-10days depending on the severity of the disease

C. Equipment

List of equipment - regular + specific
- Boiler
- SR-set
- Syringing set
- Hertel's exopthalmometer
- Epilation forceps
- Packing forceps
- Nasal speculum
- Xylocaine spray
- Scleral shells
- Ishihara's isochromatic plates

Shared between multiple departments
- Slit lamp
- Fluorescein strips
- Torch light
- Scales
- Indirect ophthalmoscope

D. Human Resources (for the outpatient load of 50

Ophthalmologists
- Medical Officers - 2
- Fellows   - 2

Minimum skills required
For an outpatient load of 50, the specialty cases can be worked up by postgraduates and fellows. The simple cases can be treated by senior fellows and the complicated ones can be discussed with the medical officers/ consultants. The two medical officers can be alternated between theatre and the outpatient clinic. The fellows can alternate for ward rounds, minor surgical theatre and the outpatient clinic. Orbit and oculoplasty is unique in that it calls for the expertise of other medical specialties – ENT, Neurosurgery, Oncology etc. These specialists can be visiting faculty and be on an on-call basis.

Paramedic staff
- Skilled   - 2
- Trainee   - 1
- Ocularist   - 1
- Counsellor   - 1

Minimum skills required
The paramedic staff take care of basic investigations like duct syringing, suture removal, recording blood pressure, pupillary dilatation etc. They also allocate cases to the doctors and escort them to the next station of examination or counselling.

An ocularist is an artist and a technician. She

counsels the prosthesis client regarding the process of custom fitting, explains the choices they have and works closely with them to give them the best possible results. The custom fitting is an in-patient procedure where each step requires the wearer's presence. The ocularist works with the oculoplastic surgeon to understand the end result that is desired and the restrictions that some sockets have in getting a good cosmetic fit.

The counsellor forms the bridge between the eye surgeon and the patient and explains the disease and its management to them. Her role includes explaining the surgical procedure, the end result expected, the cost involved and the period of stay. She issues the follow up date and ensures compliance to treatment, including on-date follow up.

Inpatient Staff
- Skilled MLOP   - 1
- Trainee MLOP   - 1

Minimum skills required
The orbit ward paramedic is skilled in securing intravenous line, giving intravenous and intramuscular injections and in surgical wound cleaning and dressing. She coordinates the preoperative investigations and the post operative advice.

Theatre-
- Skilled MLOP   - 1
- Trainee MLOP   - 1

Minimum skills required
The orbit theatre paramedic is oriented to general surgical concepts other than eye surgery alone. They are oriented to major and minor orbital surgeries done under general anaesthesia. An anaesthetist and support staff nurse are also required for such procedures. The senior MLOPs will assist in the surgery whereas the junior will function as the running nurse.

E. Space Requireent and Layout

Out patient area: 2,300 sq.feet
OT

Major OT	Minor OT
1 OT table	2 OT tables
2 GA equipments	

To design the layout, Senior surgeons and other staff of the hospital got together and put down their needs and requirements. We also received suggestion from external experts. - Dr. Jain, Sadguru Netra Chikitsalya

F. Case Sheets

Please refer Annexure

Surgical Procedures
- DCT/DCR
- Orbit surgery case sheet

Out Patient
- Proptosis and Ptosis workup
- Socket examination and prosthesis assessment

Table 3.6: Space Requirement

Cubicle	No. of cubicles	Space required		Area
		Length (ft)	Breadth (ft)	(sq ft)
Registration	1	6	6	36
Refraction	1	11	5	55
Preliminary	3	10	8	240
Medical officer	3	10	10	300
Procedure room	1	15	10	150
Counseling	1	10	8	80
Administration	1	10	8	80
Prosthesis centre	1	20	10	200
Oncology	1	10	10	100
Common waiting area		30	20	600
Total sq ft				1,841

Fig. 3.13: Model Layout

Total Area -1800 sqft (45 x 40 ft)

Medical Officer Room – 10* 10 ft

Oncology (Optional) – 10* 8 ft

Prosthetic Centre – 20* 10 ft

Medical Officer Room – 10* 10 ft

Preliminary Room – 10* 8 ft

Preliminary Room – 10* 8 ft

Procedure Room – 10* 15 ft

counselling – 10 * 8 ft

Refraction

Preliminary Room – 10* 8 ft

CMS – 6 * 6 ft
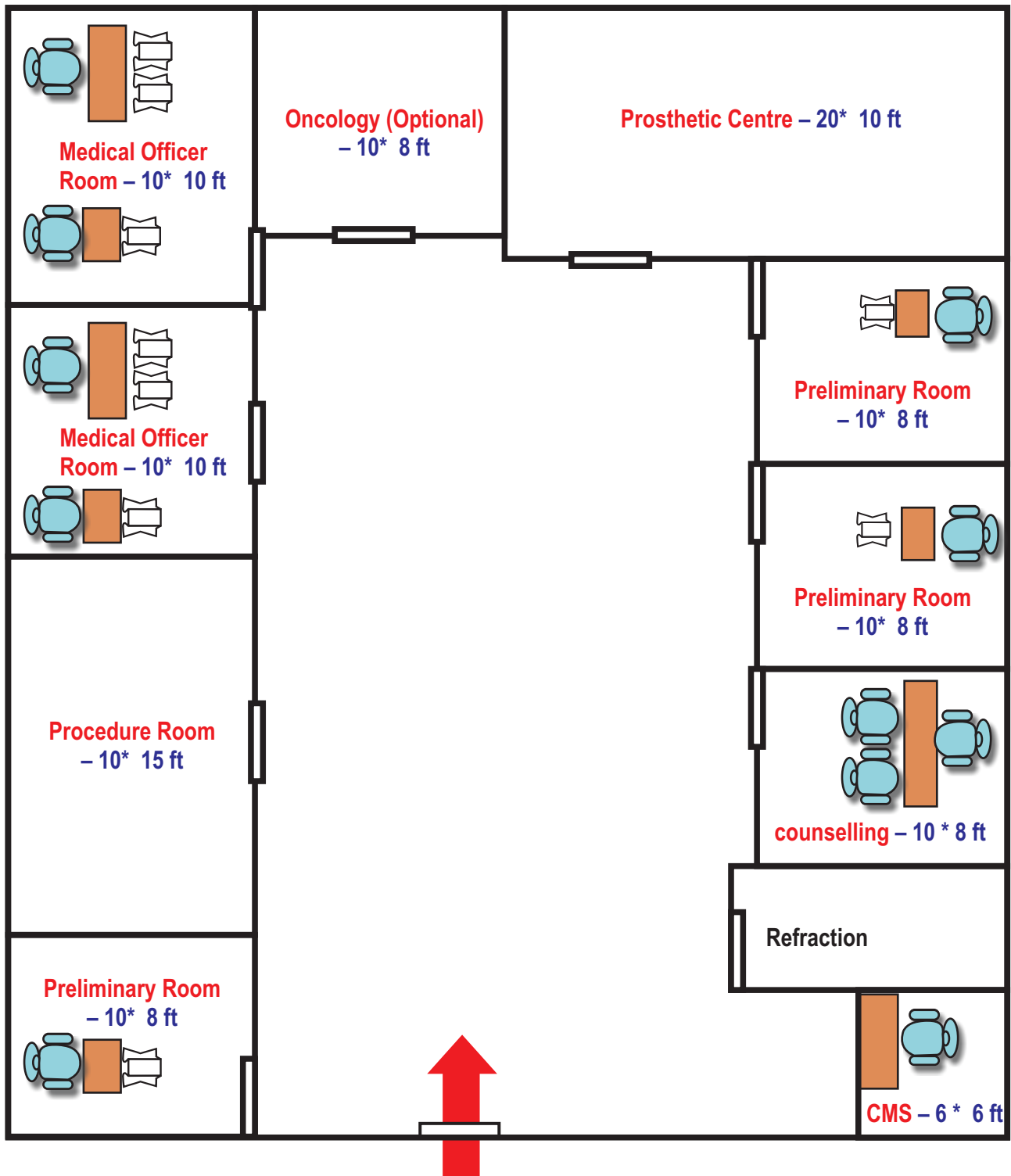
G. Demand Generation

Linkages to generate demand

1. Internal Referrals
1. Within the hospital – From the general outpatient clinic and other specialty clinics teleconferencing / telemedicine for peripheral centres
2. Outreach eye camps
   - Identification of cases and prompt referral
   - Social marketing strategies
   - Creating awareness of diseases
   - Posters for public view
   - Specialty Counselling
   - Brochures on common diseases of orbit and lids
   - Vision Centres
   - Identification and early referral
   - Management of minor problems
   - Basic pre-operative investigations
   - Brochure distribution
   - Posters

2. External Referrals
- Orbit and oculoplasty is dependent on referrals from ophthalmologists, general practitioners and other specialists (Neurosurgeons, ENT surgeons, General Ophthalmologists, Trauma centre, Dermatologists, Padiatricians and General physician).
- Creating awareness about the diseases in this specialty and sensitizing them about the choices of treatment are very crucial to generating patient load.

Strategies for referral generation
- Involvement of external specialties in management of disease
- Teleconference
- Organising CME on common orbit and oculoplasty diseases for non-ophthalmologists and general ophthalmologists
- Television programmes, doctor interviews
- Guest lectures, internal and external

Health Education & Counselling

1. Role of counseling
- Counselling should be done in patient's own native language
- Address the patients' questions / doubts regarding treatment
- Patient should be sent back do doctor if he is not convinced of the answers to his doubts.
- Maintain diary of medicines advised. Increase awareness about problem through brochures photos, posters.
- Past experience should be shared.
- Patients of similar problems can be grouped and doubts can be discussed among them.

2. Aspects
- Treatment
- Adverse effects of drugs
- Surgeries / admission / Post-op
- Prognosis
- Follow-up
- Dietary, advise personal habits

3. Approach
- Arrange CMEs
- Mass media programmes about various diseases. (Multimedia), short plays
- Announcement of local TV channels / Radio.
- Health cubicles with posters, brochures, glow signs at public places (Railway stations, Bus stand, Airport, Circles)
- Health education in schools

Paediatric Ophthalmology and Adult Strabismus Clinic

Fig. 3.14: Examining with Handheld Slit Lamp

A. Scope of Services (both outpatient and IP services)

Any paediatric ophthalmology service should have the capacity of examining and treating infants and children from birth to 15 years of age. The diseases include both treatable and preventable. For children with untreatable problems, the parents should be provided with adequate knowledge on their rehabilitation.

Outpatient services

The scope of the outpatient services will include;
i. Assessing visual acuity in all age groups
ii. Detecting strabismus and amblyopia or any other disease at the earliest
iii Recognising developmental disorders including pedigree drawing and genetic counselling
iv. Detecting and dispensing spectacles to all age groups with refractive errors,
v. Examining and treating all forms of allergic conjunctivitis, infections, injuries etc.

Depending on the number of patients treated and the institute's practice, problems like congenital cataract, congenital glaucoma, retinal dystrophies, Retinopathy of prematurity, Retinoblastoma, probing and ptosis correction can either be handled by the paediatric ophthalmologist alone or with the help of the concerned specialists like Retina, Glaucoma, Oculoplastics etc.

Inpatient services

- Cataract surgeries for paediatric patients starting from as early as 2 months of age under general anaesthesia
- Surgical correction of all types of strabismus under general anaesthesia
- Corrective procedures for nystagmus and paralytic strabismus
- Basic oculo plastic surgeries
- Surgical repair for penetrating traumas
- Examination under anaesthesia: For young children who are not cooperative for routine examination and in children where fundus examination, and measurement of IOP is necessary.
- ERG under short GA in retinal dystrophies. Lasers for ROP

Procedures

- Visual acuity testing using age matched test charts
- Binocular single vision and stereopsis
- Detailed evaluation procedures and measurement of ocular deviation in strabismus patients and patients with asthenopic symptoms
- Orthoptic exercises
- A-scan for infants
- ROP screening
- Indirect ophthalmolscopy
- HESS and Diplopic charting
- BSV Field plotting
- Promoting genetic work up in inherited diseases
- Examination under anaesthesia
- ERG
- VNG (Video Nystagmography)
- Measurement of IOP with Pulsair (Noncontact tonometer)

Ward (Post-op examination and no. of days stay)

On the day of surgery: All children are kept watched in the recovery room to the specified period by the anaesthetist before shifting them to their respective ward. Thereafter they are examined 4-6 hours after the procedure for vitals, pyrexia (Fever), vomiting and their ability for intake of fluids and solid food. Anaesthetist/ Physician are informed in case of emergency.

1st postoperative day: Children are examined in the morning with torch light and slit lamp and advised necessary postoperative medications and care. Children with increased inflammation are reviewed again in the evenings. Eye drops as advised will be instilled by the ward nurse. The same will continue on Day 2 and Day 3. After review, patient can be

Table 3.7: Post-op examination

Cataract patients	Postoperative period	2 to 3 days stay
Strabismus patients	Postoperative period	1 day stay
Surgery for nystagmus	Postoperative period	1 day stay 2 days stay
EUA and ERG	Postoperative period	1 day 1 day
Probing		1 to 2 days
Ptosis Correction		With other specialties
Glaucoma surgery		2 to 3 days
Corneal tear suturing		2 days stay
Other specialty cases		varies on a case basis

Patient Flow of Paediatric Clinic

Registration – 15 mts

⬇

Vision – 5 to 10 mts
(If there is refractive error)

⬇

above 5 years of age; Refraction 10 mts

⬇

Preliminary Examination – 10 mts

⬇

Dilatation with cycloplegics (Drops – 1 hr)

⬇

Refraction– 5 – 7 mts

⬇

Final Examination including indirect ophthalmoscopy – 8- 10 mts

⬇

Counselling – 5 mts

discharged. Discharge of any patient who has undergone surgery should ideally be done only by a consultant. The patient counsellor will give a briefing on the postoperative care to be followed at home, how and when to instil the drops and follow-up date according to the advice of a doctor.

Children who undergo cataract surgery with no IOL implantation (Aphakia) will be refracted on the second postoperative day and glasses ordered. The child wears the necessary glasses from the 3rd postoperative day.

B. Patient flow – the process

This department caters to all patients belonging to the the age group of 0 - 15 years. After registering in the general registration, the patients along with parents are directed to the department of paediatric ophthalmology. As the patient arrives, children between 1- 5 years examined by an orthoptist with special visual acuity charts meant for this age group. Visual acuity of Children above 5 years is measured by a Refractionist in a separate cubicle. After measuring the visual acuity, they are seen by the preliminary Doctor. Children below 1 year of age are directly seen by the Consultant.

Each disease has a different flow and each of which is mentioned in the form of flow charts.

**New Patients
Allergies, Infections,
Foreign Body, Simple Trauma**

Registration (15 mins)

⬇

Vision (5- 10 mts)

⬇

Preliminary / Final Examination (10 mts)

⬇

Counselling (5mts)

New Patients : Headache

Registration (15 mins)

⬇

Vision (5 - 10 mins)

⬇

Refraction & Muscle Balance (10 mins)

⬇

Final Examination (10 mins)

⬇

Counselling (5 mins)

Squint Patient

Registration (15 mins)

⬇

Preliminary Examination (10 mins)

⬇

Refraction (10 mins)

⬇

Squint Evaluation (15 - 20 mins)

⬇

Cyclo Refraction (If cyclo needed) 5 - 7 mins

⬇

Final Examination 10 mins

⬇

Treatment option: Surgery/Treatment for Amblyopia/Regular follow-up

Squint Patient: One month post-op

Registration 15 mins

⬇

Muscle Balance 10 mins

⬇

Final Examination 10 mins

⬇

Counselling 5 mins
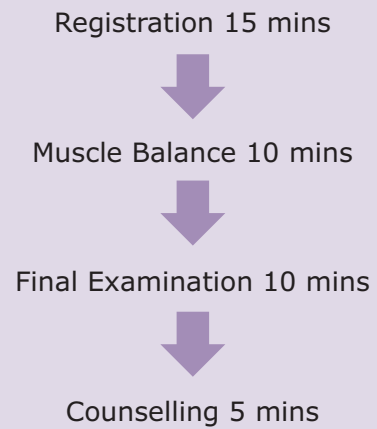
Note: Since this clinic is dealing with paediatric patients, time taken for each process will vary depending on the co-operation of the patient and between each process there will be an average waiting time of 10 – 20 mins.
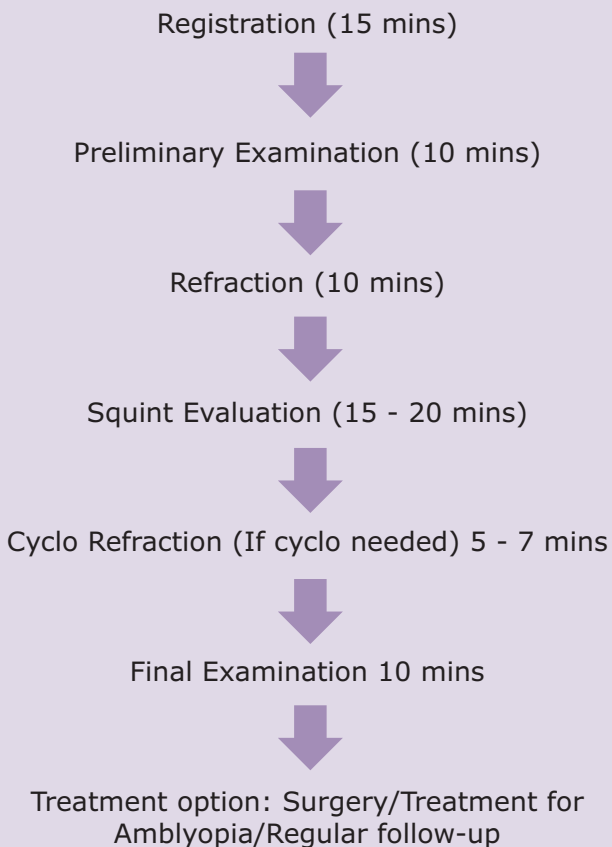
Fig. 3.15: Synophtophore

C. Equipment

Essential Equipment - regular

S. No.	Name of the equipment	Quantity
1	Snellen's acuity/ETDRS chart	10
2	Refraction set:	7
	Trial set (OPD and Camp)	3
	E-Chart	1
	ARK - 1	3-4
	CV chart	7
	Sterak retinoscope (OPD, OT, Camp)	7
	Indirect ophthalmoscope	2
	Direct ophthalmoscope	4-5
	TNO chart	1
	+90 D	2
	+20D lens	2
3	Torch, eye patch	20
4	Slit lamp standing	3-4

Essential Equipment - regular + specific to department

S. No.	Name of the equipment	Quantity
1	Hand held keratometer	1
2	Slit lamp hand held	1
3	Pulsair tonometer	1
4	Teller acuity chart	1
5	Cambridge crowding cards	1
6	Cambridge single card	1
7	Cardiff acuity charts	1
8	Cake decoration 4 box	4 boxes
9	Lea symbols	1
10	Prism set (loose Prism – 22) for Doctors and orthoptist	4 sets
11	Vertical and horizontal Prism bar	1 set
12	Synophtophore	
13	Fixation target & occluder	1
14	Worth 4 – dot test (distance: box, Near: Torch)	10 1
15	RAF ruler	2
16	Diplopia torch	1

Cataract

Preliminary examination: unilateral or bilateral. Healthy child with no systemic problems after preliminary examination and routine investigations, will be subjected to USG in unilateral cataracts and in some doubtful

Equipment that could be shared between departments

S. No.	Name of the equipment	Quantity
1	A scan (Shared with General ophthalmology)	1
2	B-scan with UBM (shared with Retina)	1
3	Hess chart (shared with Neuroophthalmology and orbit)	1

Equipment Optional: (can be procured at later periods)

1	ERG	1
2	VNG	1

Operation Theatre

S. No.	Name of the equipment	Quantity
1	Operating microscope	1
2	Instrument sets for: Cataract, glaucoma, ptosis (Shared with orbit, Glaucoma and General ophthalmology)	3 sets exclusively for paediatric cataract
3	Anaesthesia machine (Boyles)	1
4	YAG laser (shared with general ophthalmology & Glaucoma)	1
5	Vitrectomy machine (anterior) Vitrectomy probes (recurring cost) depending on the load	1 15-20 probes per year 2-3
6	Pulse oximeter Instruments for strabismus Probing set (dilator and probe set)	3 sets 1 set

bilateral ones, before proceeding with surgical counselling.

Children with systemic problems or genetic background will have specific investigations like TORCH titre, especially for Rubella, Homocystinuria, Marfan's etc, along with genetic workup when needed.

All children requiring surgery will be subjected to basic investigations towards fitness for general anaesthesia. Opinion of paediatrician or cardiologist will be obtained where necessary.

Children below the age group of 1 year, with CNS problems especially cerebral palsy and any other disability should be given priority.

D. Human resource required

Required staff for 150 OP visits per day

Outpatient Department: HR requirement

Paediatric Ophthalmologist
(full time)   - 2
Fellow/PG   - 3
Orthoptist   - 2
Refractionist   - 3
OPD nurse   2 Seniors
                                     3 Juniors
Counsellor   - 1
Consultant pediatrician
on call   - 1
Ward Nurse   - 1
Coordinator   - 1

Operation Theatre: HR requirement

Anaesthetist   - 1 (Part time)
Support staff for
anaesthetist   - 2
Nursing staff to assist
ophthalmologist   - 3
(2 to assist Dr, 1 running nurse)
Technician   - 1

E. Space Requirements and Layout

Outpatient area

Registration & waiting area : 20 x 20 = 400s.ft
Vision (2 cubicles)   : 6 x 12 = 72
Preliminary examination
(3 cubicles)   : 6 x 12 = 72
Diagnostic examination
area (indirect)   : 6 x 12 = 72
Refraction (3 cubicles)   : 6 x12 = 72
Orthopist room (1 cubicle) : 20 x 12 = 240
Hess chart/Diplopia
investigation   : 6 x 12 = 72
Final examination
(2 cubicles)   : 12 x 12 = 144
Counselling   : 6 x 12 = 72
Play area   : 10 x 12 = 120
Private room   : 6 x 12 = 72
Opticals   : 20 x 12 = 240
Common waiting area   : 1200 sq.ft

Operating theatre (separate area)
1. Common area:
   a. Wash room : 50 sq ft.
   b. Patient preparation room: 70-80 sq ft.
2. Theatre: 150-200 sq ft.
   Total area required: 420-480 sq ft.

Fig. 3.16: Model Layout
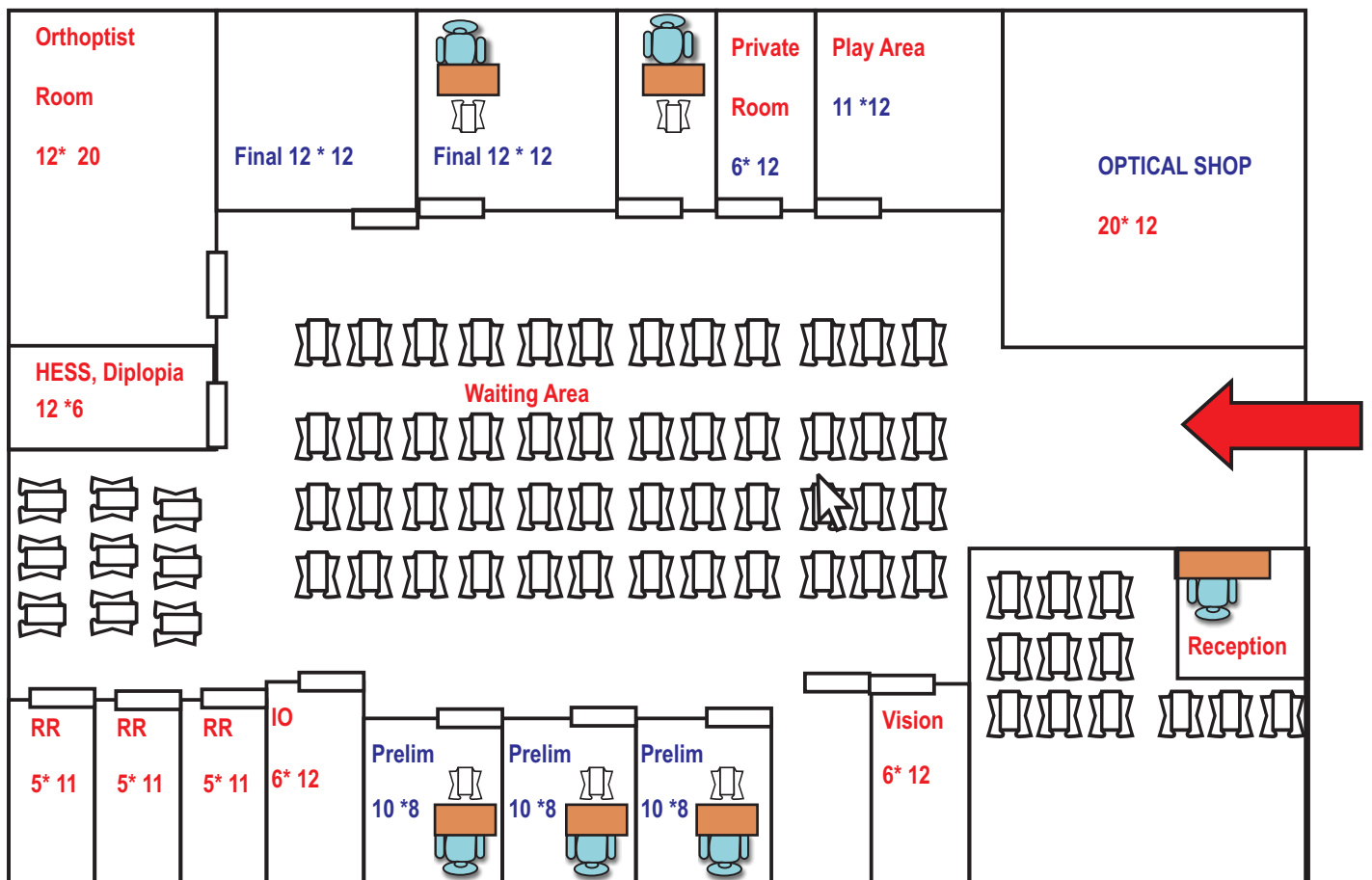
3. Outside theatre:
    Post operative recovery room: 15x20=300 sq.ft
    Store for instruments

F. Case sheets (both paying and free)
- Outpatient case sheet (diagnostic specific sheets), drawings etc.
- Specific case sheets for surgical procedures as required

G. Demand Generation

1. Internal referrals

a. within the hospital process involved
- Children between 0-15 years will be directed to the Paediatric ophthalmology clinic from the Medical Records Department.
- Cases of squints (comitant and incomitant) of all age groups from other departments will be referred to this department for opinion and investigations.
- Cases of ROP attending retina clinic will be referred to this department to rule out refractive errors and visual milestones. Children between 0-15 years with cataract,

Fig. 3.17: Handheld Slit Lamp

squint, amblyopia etc, will be referred to the department from the free hospital (if the hospital has a free section separately)Adults with asthenopic symptoms and strabismus, both concomitant and paralytic should be referred here.

Table 3. 8: Outreach Camps (HR, Equipment and Publicity Requirements)

Type of camp	Equipment	HR	Publicity
Comprehensive eye camps	Hand held slit lamp	HR as required for general eye camp with special focus on counselling and referral	As required for general eye camp
School screening camps	Refraction set, torch, retinoscope, ophthalmoscope, occluder, target, dilating eye drops, hand held slit lamp	Paediatric ophthalmologist–1 Fellow – 1 Postgraduate or general ophthalmologist – 1 (1Doctor/100 students) Nurse (Vision) - 1 to 2 Nurse (Drop room) – 1 OP Nurse - 1 Refractionist - 1 per 80-100 students) Counsellor - 1	No publicity required. Teacher's training programme conducted one week to ten days before the camp to identify the children with eye problems and vision less than 6/9.
Paediatric camps	Same as above	Same as above	As required for general eye camp with posters and publicity materials focusing on the age group and diseases that exist in this age group such as squint, refractive error, congenital cataract etc.,

b. outreach eye camps

The department will receive patients who are referred from all the three types of camps such as Comprehensive eye camps, School screening camps and Paediatric camps.

c. Vision Centres – Role of Vision Centres and that levels of services they could offer

All cases in the paediatric age groups can be referred to the base hospital and followed up at vision centres at the advice of the paediatric ophthalmologist or otherwise can be followed up at the base hospital only.

1. External referrals
- Identifying paediatricians, NICUs, Gynecologist
- Conducting CME on yearly basisSending information about the need for timely referral for different diseases, our services in different areas, along with the referral reply or greeting card sent on few occasions.
- Prompt reply system either by letter or phone.

Health Education and Counselling

Role of counselling to ensure compliance to medical advice

Recruit a person with effective communication skills and motivation with knowledge in aediatric ophthalmology (or capability to pick up the disease aspects in paediatric ophthalmology) for good counselling in order to have timely follow-up and compliance to the treatment advised.

Aspects that should be dealt with as part of counselling and approach involved in creating awareness to develop better understanding of the problem

The counsellor should go through the case sheet and understand the disease and advice by the doctor. Assess the understanding capability and socio-economic status of the parents. This will give an insight of how to proceed to counsel different strata of people. Utilisation of models, photographs, and IEC materials will enhance the understanding of the disease and importance.

Retina and Vitreous Services

A. Scope of Services

Retina as a subspeciality has had a phenomenal development over the past few decades. With a better understanding of the retinal disorders and innovations in retinal diagnostic procedures, it has become possible to treat a number of retinal diseases which were otherwise not treatable. The most recent among them is the treatment of age related macular degeneration with monoclonal antibodies. Since awareness of retinal disorders have increased among the primary care doctors and also among the patients, a tertiary care hospital should be well equipped with the necessary diagnostic and therapeutic equipments to meet the demand and the expectations. Various retinal disorders that are commonly encountered are diabetic retinopathy, age related macular degeneration, vascular occlusions, retinal detachment, retinopathy of prematurity and neoplastic retinal diseases.

B. Patient flow

Generally the patients who visit the retina clinic are patients who are referred from general OPD and other hospitals. After a preliminary examination of the eye as a whole (such as IOP and refraction) the pupil is dilated to facilitate a detailed retinal examination with indirect ophthalmoscopy and slit lamp biomicroscopy. Further investigations such as OCT, FFA or ultrasonography are done to substantiate the clinical findings. After explaining briefly about the nature of the condition and the prognosis a patient is treated either medically, or with surgery. The counselling department provides explanations to the patient regarding the Doctors advice, the expenses involved in the treatment as well as the hospital facilities and follow up requirements.

1. Ancillary investigations
- FFA
- OCT
- Ultrasonography

After necessary investigations final decision is made regarding the vitervention needed for the patient. They are again sent to the counsellor who explains in brief about any

Fig. 3.14: Examining with Handheld Slit Lamp

surgical procedure, intraocular injections, LASERS, medications and follow up.

- Blood investigations: Routine and specific investigations like HbA1C, renal function tests etc.
- Urine investigations: albumin
- Microbiological and pathological investigations

2. LASER Procedures
- Retinal LASERS (PRP, grid and focal LASERs)
- PDT
- TTT

3. Minor surgical procedures
- Posterior subtenon triamcinolone
- Vitreous tap and intravitreal injections for endophthalmitis
- Intravitreal triamcinolone, anti VEGF agents and gases

4. Surgical procedures
- Scleral buckling
- Parsplana vitrectomy and lensectomy
- Pneumoretinopexy
- Intraocular injections

5. Ward (Post of examination and no. of days stay)

- Stay in hospital depends on treatment modality.
- Post-op patients stay may be 1-3 days depending on the post op recovery.

6. Outpatient department

C. Equipments

- Cubicles for refraction and visual acuity - 2
- Slit lamps - 4
- Indirect ophthalmoscopes - 4

- Lens 90D - 4
- Lens 20D - 4
- Three mirror lens -1
- Applanation tonometer - 1
- Noncontact tonometer - 1
- Fundus camera - 1
- OCT - 1
- Ultrasonography – 1

7. Operation theatre

- Vitrectomy unit - 1
- Operating microscope, BIOM
- Boyle's apparatus
- Suction apparatus

D. Human Resources

This comprises of a team of ophthalmologists and paramedical team.

1. Ophthalmologists

The team of ophthalmologists includes retina consultants (those who are trained in a retina department for at least two years after post graduation), fellows (those who are receiving training in retina) and postgraduates. The out patient load is usually heavy in retina clinic. To handle numbers between 100 to 150 patients, ideally 2 to 3 consultants, 3 to 4 fellows and post graduates are required. Minimum 2 fellows are required for LASER. A consultant and a fellow can manage operation theatre by rotation.

The ward rounds can be done by 2 fellows during a particular time period which can coincidence with the lean times of OPD.

2. Para medical Team

Ideal paramedical team for OPD may include around 5-8 persons like MLOPs, refractionist and technical staff for FFA and OCT. The MLOPs function is to allocate patients to consultants and guide them to appropriate place as per advice. Ward can be managed by 1 senior MLOP with the help of 2 junior MLOPs. Their role will be to ensure treatment compliance, preoperative investigations, scheduling surgeries and postoperative care.

Theatre can be staffed by 1 senior MLOP, 1 to 2 junior MLOPs and 1 to 2 running sisters. Separate staffs are required for packing and autoclaving. The assisting sister should be well trained in sterile techniques and they should be able to train junior MLOPs.

Fig. 3.19: Ultrasonography in Progress

3. Management team

This comprises of receptionist to receive and register patients, office manager to plan optimum utilisation of resources and manpower and 2 counsellors. The counsellors should be trained in basic understanding of retinal diseases. The role of a counsellor is very important in explaining details of surgery to the patient briefly, post operative care, in the language best understood by them. They should be able to help the patients in scheduling up appointment for FFA, OCT and Laser treatments or appointment with consultants. They should send reminder card to the patient if he fails to come on the appointment day. They should provide psychological support in helping the patient to cope with the disease. They also should be aware of problems of retinal patients such as depression in chronic patients.

E. Space required

- Reception-cum-registration: 8 x 5.5 = 66sqft
- Common waiting area – OPD / FFA / Laser: 900 sqft
- Preliminary excamination room (4 cubicles): 8.5 x 8.5 = 72 sq.ft = 290 sq.ft

Investigations

FFA = 12 x10 = 120 sp.ft
OCT = 10 x 10 = 100 sq.ft
ERG = 10 x 10 = 100 sq.ft
Final examination rooms (2 cubicles) = 9 x 8 = 72 s.feet x 2 = 144

Note :
The ERG room should be electrically isolated to avoid interference during recording of electrical impulses from the eye.

Treatment

Laser = 10 x 10 = 100 sq.ft. Laser room should be closed adequately on all sides
Counselling room = 8 x 5=40 sq.ft

Referrals

Internal Referrals

Patients are referred to retina clinic from general ophthalmology OPD. These patients will come under category of 'New patients'. They contribute about 15 to 20% of daily OP.

Patients are also referred from other ophthalmic sub-specialties. They contribute about 5-10% of daily OP.

Minor contribution comes from referrals from other hospitals, community outreach eye camps and Vision care Centres.

External Referrals

Referrals are required mainly for postoperative patients, usually to glaucoma

Fig. 3.20: Performing Retina Surgery

clinic for managing secondary glaucomas. Other referrals are to cornea and uvea clinics. Patients with retinal disorders also have associated systemic disorders so, physicians advice before surgery is necessary.

For tertiary services that target specific groups – such as diabetics and children – we should network with the appropriate people in the community
Have a public relations person in the organization who can work on building a rapport with local ophthalmologists and phycisians. They can be invited as guests to the hospital on special occasions.
- Dr. Jain, Sadguru Netra Chikitsalya

Store Room
5* 9

Dilatation
(13* 9)

Dilatation
(13* 9)

Final
10*8

Final
10*8

FFA (10*12)

OCT (10*10)

Counseling
(10*10)

Reg
(7*6.5)

Prelims
(9*9)

Prelims
(9*9)

Laser
10*10

USG
(10*10)
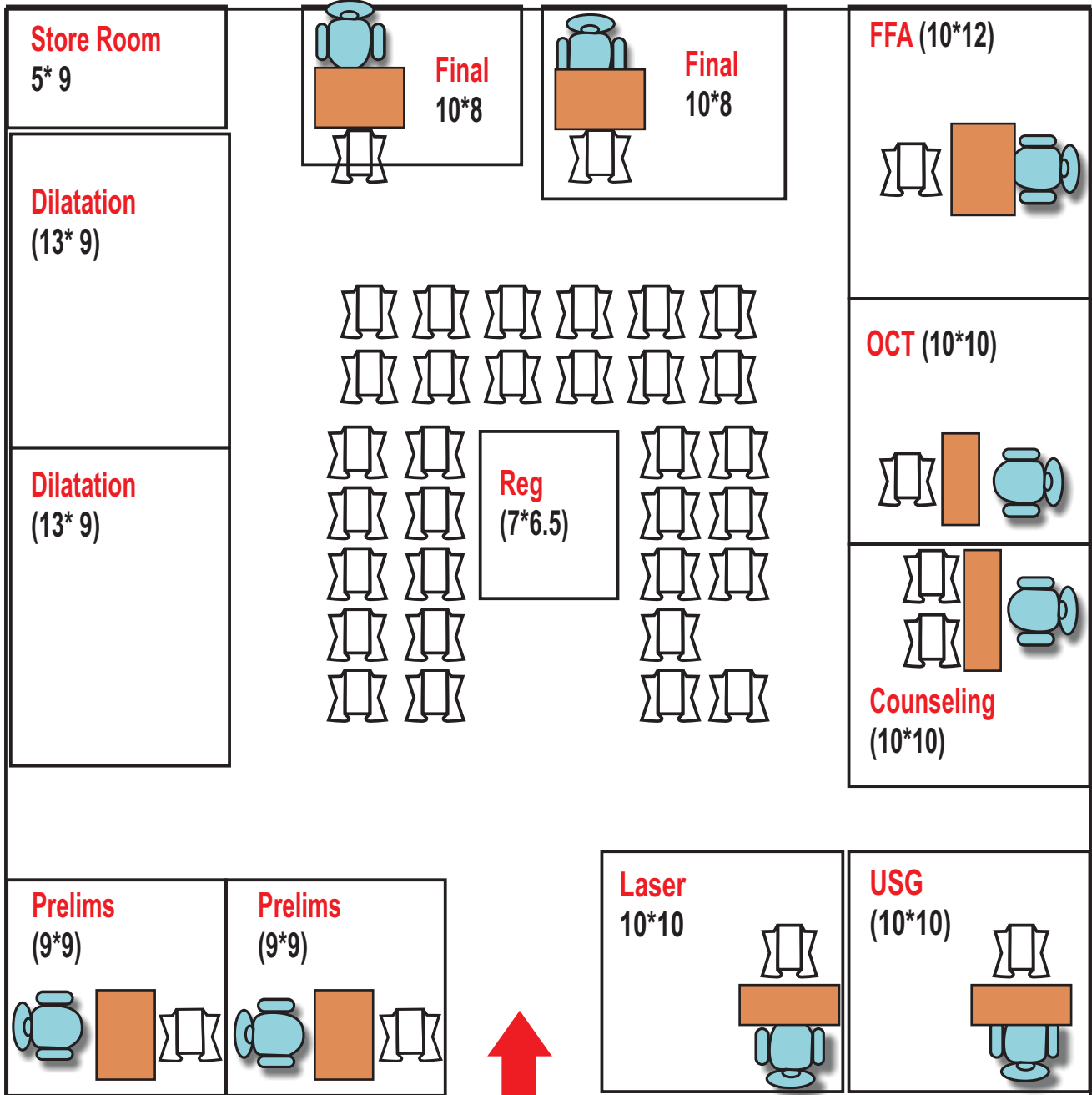
UVEA

A. Scope of Services

Uvea is an emerging subspecialty of ocular sciences, which needs special attention and management by a specialist. Since its awareness is increasing among primary care doctors and also among patients, the number of patients being referred to uvea clinic has also increased in recent years. Uveal disorders are found in anterior as well as in posterior segment of the eye. Intraocular immunological and infectious inflammatory disorders like iritis, vitritis, retinitis, choroiditis, vasculitis and endophthalmitis are dealt by uvea clinic. For diagnosis and management of these conditions, the clinic must be supported by facilities like B-scan, fluorescein angiography, optical coherence tomography, microbiology and pathology laboratories equipped with molecular diagnostic techniques like PCR. A tertiary care uvea clinic is also expected to provide facilities for performing intraocular tissue biopsies, complicated cataract surgeries, cyclitic membrane peeling, core vitrectomy, drainage of choroidal detachment etc.

B. Patient flow

Diagnostic procedures
1. Fundus fluorescein angiography (FFA), Indocyanine green angiography (ICG)
2. Ultrasound scanning(B-Scan and UBM)
3. Optical coherence tomography (OCT)
4. Blood investigations: Routine and specific serological investigations, liver and kidney function tests
5. Urine investigations: urine deposits
6. x-rays: chest and orbit
7. Microbiological and pathological investigations

Lasers
Panretinal photocoagulation, peripheral iridotomy

Minor surgical procedures
Anterior chamber tap, Vitreous tap, Incision and drainage of sclera abscess, Intravitreal injections

Major surgical procedures
Complicated cataract surgery, Core vitrectomy, Cyclitic membrane peeling, Choroidal detachment drainage, implantation of steroid

Fig. 3.22: Uvea patient being Examined

devices, Implantation of antiviral devices (Gancyclovir)

Ward (post op examination and number of days stay)
- Stay in hospital depends on the treatment modality.
- Patients on medical treatment (intravenous injections) may need a stay of 5-10 days.
- Post-op patients stay may be of 0 – 3 days depending on post op recovery.

Outpatient Department (for OPD of 70-80 patients per day)
- Slit lamp – 4 (with photographic camera – 1)
- Indirect Ophthalmoscope (with photographic camera-1)
- +20D condensing lens - 4
- +90D lens - 4
- Gonio lens - 1
- Goldman's applanation tonometer -1

C. Special equipment

- Fundus camera for florescein angiography and ICG - 1
- Ultrasonography machine with B-scan and UBM probes - 1
- Frequency doubled YAG laser - 1
- Non-mydriatic fundus camera - 1
- OCT - 1
- Non contact tonometer
- Laser flare photometer

Equipment that could be shared between multiple departments
- Fundus camera for florescein angiography and ICG - 1
- Ultrasonography machine with B-scan and UBM probes - 1
- Frequency doubled YAG laser - 1
- Non-mydriatic fundus camera - 1

- OCT - 1
- Non contact tonometer
- Laser flare photometer

Equipment Optional: (can be procured at later periods)
- Non-mydriatic fundus camera - 1
- Laser flare photometer

Operation theatre
- Boyle's apparatus
- Phaco-Vitrectomy console
- Endo illuminator
- Operating microscope, BIOM
- Suction apparatus

D. Human resources

i. Ophthalmologists
The team of ophthalmologists would include:
- Uvea consultant-1
- General ophthalmologist-1
- Fellows-2 (one senior and one junior)
- Postgraduate students-2-3

Distribution of the work will largely depend on the number of patients daily seen in the clinic. For a patient load of 50-70 per day, the work can be distributed in following way: New cases (generally 10-15% of workload) will be worked up by Postgraduates and junior fellows and will be discussed with senior fellows or medical officers for treatment. Follow up cases will be distributed among senior fellows and medical officers in 2:3 ratios. Difficult cases will be discussed with the consultants. Consultant, medical officer, and senior fellow can manage the operation theatre in rotation. Junior fellow will assist them on his/her theatre turn.

The ward rounds can be done by one fellow in a dedicated time period, which can coincide with the lean time of the outpatient department.

ii. Paramedic staff
a. Outpatient area
The ideal paramedical team for the clinic, comprising 8 people can include the following

Fig. 3.23: Model Layout
Total square feet = 600 (30 x 20)
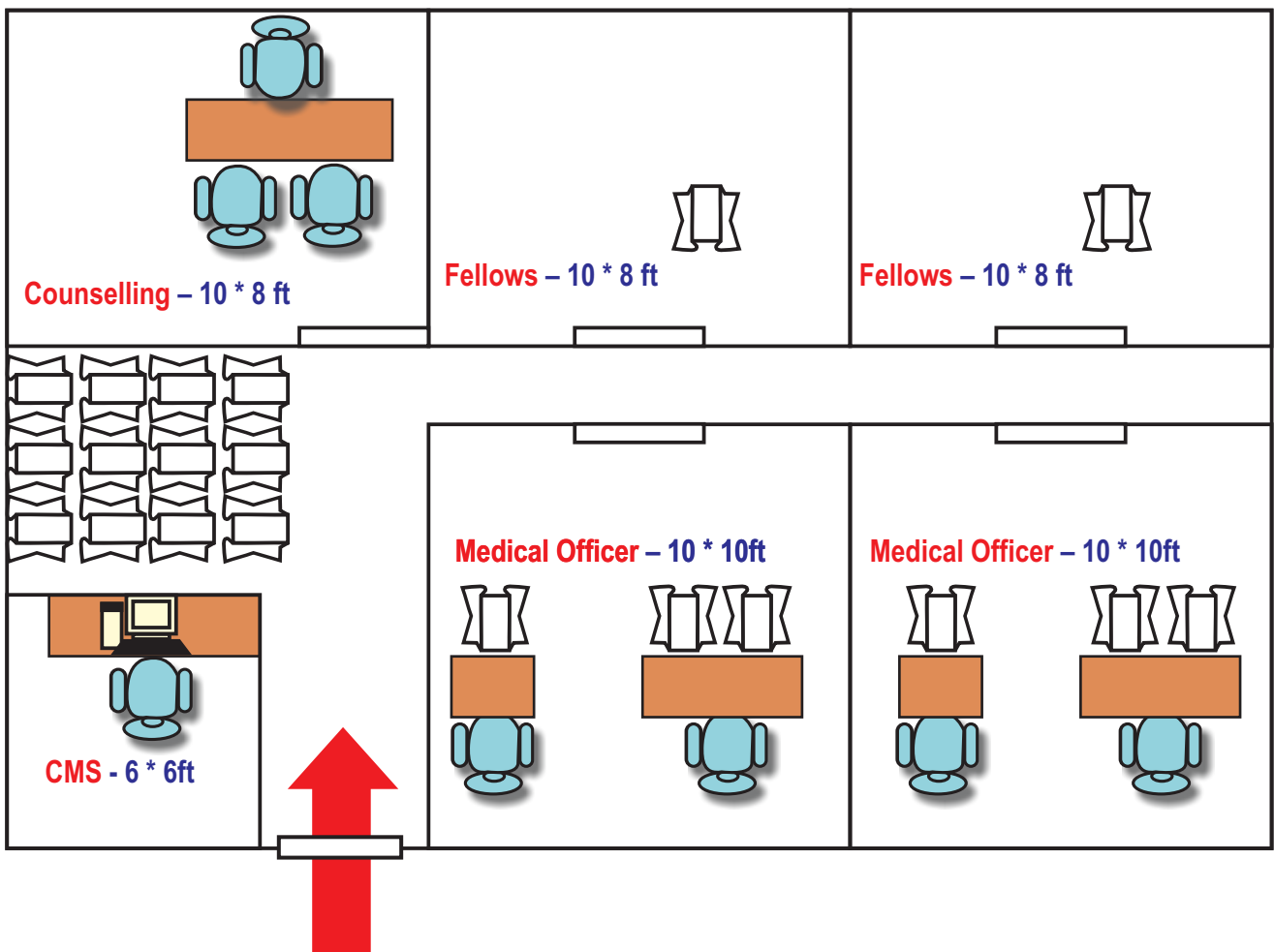
Counselling – 10 * 8 ft

Fellows – 10 * 8 ft

Fellows – 10 * 8 ft

CMS - 6 * 6ft

Medical Officer – 10 * 10ft

Medical Officer – 10 * 10ft

persons.
  a. Vision assessors: Two people can be employed, one of whom can double up as a refractionist (can be shared with other department).
  b. Mid level ophthalmic personnel(MLOPs): Three people can be used to manage and allocate cases to the concerned examination chambers. They will also assist doctors for examination procedures eg., removal of minor ocular surface foreign bodies, assisting scleral abscess drainage, preparing syringes for subtenon's injections, applying eye drops for these procedures, collecting reports of investigations (blood,urine,biopsy) and to check pupillary dilatation before indirect ophthalmocopy.
  c. Technician: Three dedicated persons to perform FFA/ B-scan/OCT (can be shared with other department Eg. Retina).

b. Ward (can be shared with other departments)

The ward can be managed by one senior MLOP with the help of a junior MLOP in rotation. The senior MLOP can be kept constantly in this position, so as to ensure continuity and also to train the junior MLOPs on rotation. Their role will be to ensure treatment compliance and scheduling preoperative investigations, scheduling surgeries, managing the postoperative period and to ensure compliant follow-ups.

c. Theatre (can be shared with other department)

The operation theatre can be staffed by two senior MLOPs and assisted by one junior MLOP who can function as a running nurse.

iii. Counsellor-1

To answer patient's queries and provide information on drug regime, investigative procedures, laser treatment, surgery, costs involved and the visual prognosis in a language familiar to the patients. Importance of regular follow-up visits is stressed and the patient is given an appointment for the same.

Role of counsellor in Uvea clinic

- To explain the nature of the disease and importance of follow up.
- To explain the preoperative intraoperative and post operative steps for patients undergoing surgery.
- Helping the patient in fixing up appointment for FFA, OCT and laser treatments or appointment with consultants.
- Sending reminder card to the patient if he fails to come on the appointment day.
- Providing psychological support in helping the patient to cope with the disease.

iv. Administrative staff

This can comprise a receptionist to receive and allocate patients, an office manager to plan for optimum utilization of resources in order to reduce patient's waiting time and to regulate patients flow.

Table 3.9: **E. Space Requirements**

Common waiting area	10x8=80 sq. feet
Uvea consultant-1	10x10=100 sq. feet
General ophthalmologist-1	10x10=100 sq.feet
Fellows /Postgraduate students-2	10x8=80 sq. feet
Counseling room	10x8=80 sq. feet
Corridor space	26x3=78 sq. feet
Total Sq. ft	518 sq. feet

F. Case Sheets

Please refer Annexure

G. Demand Generation

1. Internal referrals
  a) Patients are referred to uvea clinic from general ophthalmology OPD, when the ophthalmologist detects uveitis or want to rule out uveitis. These patients will come under category of 'New patients'. They contribute about 10-15% of daily OP.
  b) Patients are referred from other ophthalmic sub-specialties. They contribute about 5-10% of daily OP.
  c) Minor contribution comes from community outreach eye camps. Generally in these patients, uveitis is detected in pre-operative examination at the base hospital.

2. External referrals
Working up uvea case is a team work. Uveitis patients need multiple references to other specialities like: Rheumatology, Pulmonology, Gastroenterology, Nephrology etc. Apart from ophthalmic sub-specialists uvea person is closely associated with general physicians.

4

Support Services

Microbiology Laboratory

The organization of the Microbiology laboratory is dependent on the site (as part of a hospital, or independent laboratory) and the complexity of testing. Clinical microbiology comprises essentially seven subspecialty areas:

- Aerobic and anaerobic bacteriology
- Mycology
- Mycobacteriology (AFB)
- Parasitology
- Virology
- Serology
- Molecular diagnostics

Role of Laboratory services in tertiary eye care

Microbiology laboratory plays a major role in the identification of infectious agents in ocular samples. Diagnosis of infectious agent is mainly done by microscopically identifying the organism and culturing the infected specimens. Serological diagnosis of blood samples for identification of antibody production due to any infectious diseases is also done for identifying the causative agent.

Departments that use these services

All the departments in an eye hospital will use the services provided by microbiology laboratory. Samples from Cornea, Retina, Uvea and Orbit clinics are routinely diagnosed for microbiological and serological investigations.

Space requirements and organization of work flow

Depending on the complexity of testing and the type of pathogens sought, the laboratory space is organized based on the following

Fig. 4.1: Culture Analysis in the Lab

consideration:
- Organization and staffing
- Test to be performed
- Equipment that will be used
- All the equipments should be placed in designated area for special test
- Special electrical, plumping or air handling requirements
- Safety equipment
- Waste treatment requirements

Tests that are carried out – routine and specific tests

Routine Tests

The routine tests are mainly done for infective conjunctivitis, corneal samples from patients with infective keratitis, intraocular samples (Aqueous humor, Vitreous fluid) from endophthalmitis, scleritis, lacrimal gland infection, pus from abscess of the orbit, lid and adenexa, etc.

Staining : Grams staining, Giemsa staining, KOH wet mount, Calcoflour white staining and Lactophenol cotton blue staining

Culture : Culture media that are routinely used are blood and chocolate agar and brain heart infusion broth for routine bacterial identification and Sabouraud dextrose agar for fungal culture and non-nutrient agar with E-coli for suspected Acanthamoeba infections.

Specific Test

- Acid fast staining for identification of Acid fast bacilli
- ELISA test for identification of specific antibodies from infectious diseases like Rubella syndrome, HIV infection, etc,

Human Resource

It is laboratory director's responsibility to employ sufficient qualified personnel considering the volume and complexity of the work performed. In a tertiary eye care hospital, the microbiology laboratory should be employed with a chief microbiologist (MD or PhD), microbiologist, and three technicians for the routine work.

The trainees working in microbiology lab will undergo training for a period of one year to learn about ocular infectious diseases, sample collection, bacterial culture identification.

Methodology for carrying out tests

There are many procedures to carry out all the tests. For detailed description of the test, refer any standard microbiology text book describing the techniques.

Clinical Biochemistry

Fig: 4.2: Fully automated analyser

The clinical biochemistry tests are very useful in determining the severity of diseases of many organs such as liver, stomach, heart, kidneys, brain as well as the endocrine disorders and related status of acid-base balance of the body. It deals with the biochemistry laboratory applications to find out cause of a disease. The chemical constituents of various body fluids such as blood (serum / plasma), urine, CSF and other body fluids are analyzed in clinical biochemistry laboratory. These determinations are useful in diagnosing various clinical conditions such as diabetes mellitus, jaundice, gout, hyperlipidemia, pancreatitis etc. The clinical biochemistry tests in relation to the various clinical conditions can

1. Reveal the cause of the diseases
2. Screen for the presence of diseases
3. Suggest effective treatment
4. Assist in monitoring progress of a pathological condition and
5. Help in assessing response to therapy.

The importance of performing clinical biochemistry tests is to monitor the patients before surgery and to avoid complications during surgery. Specific test like ACE, GTT will aid the patients for their rapid treatment.

Space requirements and organization of work flow

Biolab should be situated near the outpatient department with the toilet facilities nearby. Biolab is divided into three types of subspecialty areas:
1. Biochemistry
2. Hematology
3. Clinical pathology

Tests that are carried out – routine and specific tests

Biochemistry deals with the non-cellular components. Hematology deals with cellular components. Clinical pathology deals with diagnosis of diseases through the body fluids such as urine and motion. Routine tests are Glucose, Urea, Creatinine, Serum total cholesterol, Lipid profile, Bilirubin, etc.

Biochemistry lab will do the special test such as ACE (Angiotensin Converting Enzyme), homocystine, CBC (complete blood count),GTT (Glucose tolerance test) LFT (Liver Function test) referred by the special department like Retina, Orbit and Uvea with ordinary test like blood sugar, urea, creatinine and total cholesterol.

Human Resource

The biochemistry lab should employ one biochemist with masters in biochemistry, and three technicians. Periodic evaluation should be done for all the technicians.

Pathology

Histopathology is the study and diagnosis of disease through examination of organs, tissues, body fluids, and whole bodies (autopsies). It refers to the microscopic examination of tissue in order to study the manifestations of disease. Specifically, in clinical medicine, histopathology refers to the examination of a biopsy or surgical specimen by a pathologist, after the specimen has been processed and histological sections have been placed onto glass slides. Areas of study include cellular adaptation to injury, necrosis, and inflammation, wound healing, and neoplasia.

Tests that are carried out – routine and specific tests

Haematoxylin and Eosin staining is the routine test done for all biopsy and smear samples. Immunohistochemical test is specifically done for the identification of antigens that may help in the diagnosis of particular diseases.

Human resource

Histopathology lab should employ one pathologist with MD, and three technicians. Periodic evaluation should be done for all the technicians.

Equipments and their maintenance: Common for all three laboratories

The equipment used to perform a test should function properly to generate reliable data. To verify that equipment is functioning properly, the laboratory should have a schedule for maintaining equipment. The schedule should include the setup, calibration, repair, record keeping, and normal operation of all equipment used in sample analysis. The results of all tests should be documented in an equipment logbook and/or electronic database. The logbook or database should be checked monthly by QC personnel or the laboratory supervisor, and any problems and corrective actions are to be noted. Equipment should be dedicated to a specific laboratory room, and the instrument manuals from the manufacturer should be available. Individual laboratories should decide which tests to perform to assess the functionality of the instruments and the frequency at which to test them.

Instruments needed for microbiology laboratory are

- Microscopes (Light and Fluorescent)
- Centrifuges
- Autoclave
- Dry-heat oven
- Incubators (non CO_2, CO_2)
- Refrigerators / freezers
- Biological safety cabinet
- Bacterial identification and susceptibility testing devices

Instruments needed for a Biochemistry lab

- Semi auto analyzer for clinical Biochemistry
- Colorimeter
- Centrifuge
- Needle destroye
- Incubator

Instruments needed for pathology lab
- Cryo microtome
- Hot plate
- Water bath
- Microscope

Best Practices

Standard Operating Procedr Manual

The requirement for a Standard Operating Procedure (SOP) manual is considered part of the Quality Control program. The SOP should define test performance, tolerance limits, reagent preparation, required quality control procedures, result reporting and reference. The SOP should be written in accordance to the standards that are followed in the country and must be reviewed and signed annually by the laboratory supervisor and director; in addition all changes must be approved and dated by the laboratory director. The SOP should be available in the work area.

Quality Control Measures

Quality assurance (QA) and quality control (QC) standards represent the procedures that laboratories establish to ensure that the patient results reported are accurate and timely, and assist the clinician in treating the patient.

Accreditation
Laboratory accreditation provides formal recognition of competent laboratories, thus providing a ready means for customers to find

reliable testing and calibration services in order to meet their demands. Laboratory Accreditation enhances customer confidence in accepting testing / calibration reports issued by accredited laboratories. The concept of laboratory accreditation was developed to provide a means for third-party certification of the competence of laboratories to perform specific type(s) of testing and calibration.

Data management (Record keeping)

Maintaining and proper storage of records of the laboratories serve as an important source of information for various purposes like research, analysis of trends in diseases patterns etc. The laboratory shall establish and implement procedures for identification, collection, indexing, access, storage, maintenance and safe disposal of quality and technical records. All records shall be legible and stored such that they are readily retrievable. Facilities shall provide a suitable environment to prevent damage, deterioration, loss or unauthorized access. The laboratory shall have a policy that defines the length of time various records pertaining to the quality management system and examination results are to be retained. Retention time shall be defined by the nature of the examination or specifically for each record.

Housekeeping Services and Dietary Services

Objectives of Housekeeping Department

The main objective of the house keeping department is to keep the hospital clean, safe and infection free and also maintain a pleasant and friendly atmosphere. Since it is hard for most people to judge the quality of medical practice in a hospital, opinion about a hospital is formed on the basis of its appearance and cleanliness. Good housekeeping is an asset and a powerful tool for public relations and has a direct bearing on the prestige and reputation of a hospital. As housekeeping serves all departments and areas of a hospital, minimizing the risk of cross infection and providing clean, safe and comfortable environment are fundamental to any good housekeeping service. Being a non-revenue producing service department its aim should be to have an efficiently run department with operating cost as low as possible. Housekeepers not only need to pay attention to the basic cleanliness and hygiene, but also help in the efficient functioning of the various sections such as linen, pest control, waste management, garden maintenance, electricity, water supply, carpentry and food distribution.

It is a difficult but important task to set up a housekeeping department in a hospital. The staff in other department can help to lessen the housekeeping department's workload by maintaining cleanliness in their respective areas and co-operating with the housekeepers in their day to day work. This can be done with the housekeeper's ability to communicate effectively. The size of the department will depend on the size of the hospital.

A small hospital will need a senior housekeeper with 3 to 5 years of experience and a trainee (first year). It will also need about 3 female and 1 male cleaners. The department will also need the support of an electrician, a plumber and a carpenter.

When considering the primary responsibilities of a housekeeper, there are certain main functions that have to be considered and also

Fig: 4.3: Dusting of bed in progress

several points that come under each of these functions.

Contribution to patient care
- Keeping all areas of the hospital clean, dust free and stain free
- Ensuring that bathrooms are clean and dry at all times
- Instructing the cleaners on the day to day activities and supervising them at intervals
- Planning the schedule for standard cleaning procedures and cleaning supplies used, and ensure strict adherence
- Seeking to improve methods of cleaning for better results
- Arranging rotation of cleaners and housekeepers in case of leave, absence or day off and assigning day and night shifts to cleaners and housekeepers
- Responding to patient complaints and assisting in patient care programs
- Ensuring total patient satisfaction

Daily Checklist

Preparing a check list which involves making a list of things (e.g. whether the place has been properly dusted, whether the tap is leaking or the fan and geyser are working) that the housekeeper has to check and make sure everything is in good working condition in the areas or rooms.

Managing the cleaners

- Involve in the recruitment, selection, training and management of cleaners by observing their work behavior and attitude towards other workers.
- Supervise sweepers by maintaining attendance records, wage sheets, and duty assignments, and follow-up regarding tasks.

Fig.4.4: Mopping in progress

Linen management

Providing clean and fresh linen is an important part of housekeeping. The housekeeper assigned to this department has the following roles to play.

- Maintaining a daily account of soiled linen received from the different areas of the hospital and fresh linen issued to different areas.
- Ensuring that the linen is washed under hygienic conditions and returns stain free from the washing area.
- Maintaining a stock register to record and repairing damaged linen immediately.
- Checking linen every month and separating the linen which needs to be condemned.
- Regularly checking on detergents and cleaning agents available in the market to ensure that detergents used are good and cost effective
- Stocking all the linen systematically in cupboards provided for the purpose.

Furniture management

Proper maintenance of wooden fixtures/furniture in a hospital is very important. It is important to note down the defects, if any, in the doors, windows, tables and chairs. Not only should the defects and faults be noted down, but the carpenter must be notified and repair work should be carried out as soon as possible. When purchasing furniture it is important to note that they will not collect dust and will be easy to clean.

Waste management

There is a lot of waste that is generated in the hospital every day. If decaying matter is not disposed of immediately, it emits bad odour, and generates disease causing germs that will affect the environment and our health. Segregation of waste is the key to the entire process of scientific waste management. The department has to make sure that waste is collected, segregated and disposed of in a proper manner.

Safety and security

It is the responsibility of the housekeeper to maintain a peaceful atmosphere in the hospital. The house keeper should make sure the place is accident free by keeping the floors dry and by keeping the cleaning materials away so that patients do not trip on them. Whenever there is a breakage or repair work done, the housekeeper should make sure that the place is cleared. If a suspicious person is spotted in the premises, the matter should be reported to the security personnel at once and the patients should also be warned to keep their belongings safely.

Budgeting

A well run housekeeping department runs at minimum cost to the institution. The housekeeper has to be good at planning and selecting equipment and supplies that are high in quality and moderate in price.

Secondary responsibilities

- Maintain housekeeping department and attend to phone calls in a prompt manner
- Audit cleaning agents and equipment and ensure proper usage
- Contribution to event management - A major role that the department plays is playing host to the various guests and volunteers who visit the hospital and in making appropriate arrangements for conferences, meetings and workshops that are a regular feature in the hospital. Each event is different and a service tailored to the needs of the particular event has to be created.
- Attend to any additional assignments from supervisor, managers or doctors regarding housekeeping
- To get necessary tailoring work done (e.g. stitching of curtains) on a need basis
- Maintenance of Registers/Reports
  - Stock register - Separate registers are maintained to keep track of the different kind and number of furniture, linen, instruments, equipment etc. Each time an item is discarded or purchased it has to be entered in the specific register. A register that will show all the cost of cleaning equipment and materials used each month should be maintained. This will help to keep track and control of the cost.
  - Key register to track the usage of the premises such as conference hall and class rooms

Working with other departments

Maintenance department
-
- One of the most important functions of housekeeping is the maintenance of furniture, fixtures and facilities in working order.
- Housekeepers need to constantly check on various things throughout the hospital on a daily or weekly basis and inform the maintenance department through a requisition form about any repairs that need to be done.
- The maintenance could cover a number of aspects such as plumbing, carpentry, electricity and civil work.

Stores department

- Coordination with the stores ensures availability of day to day requirements of housekeeping. Housekeepers can indent the materials on daily / weekly basis.

Nursing department

- Housekeeping department works with Nursing team to know about any housekeeping requirement from the patients, any emergency cleaning in a specific area
- To know about the discharge of the patients so that they can proceed with the cleaning of patient rooms.

Personnel department

Housekeeping department works with the personnel department in the following areas:
- Recruitment and salary administration of the department staff
- Leave and attendance administration of cleaners
- Promotion and exit formalities of cleaners

Periodic cleaning schedule

- Once a week
  - Switch board, Fan & light cleaning
  - Cobweb Cleaning
  - Removing stains
  - Glass Cleaning
  - Dust bin cleaning
  - Foot mat cleaning
  - Lift cleaning
  - Cleaning the flush tank

- Once in 15 days
  - EB panel cleaning
  - Fish tank cleaning
  - Terrace cleaning

- Once a month
  - Water filter & cooler cleaning
  - Water tank cleaning
  - Mosquito net washing
  - Removing salt deposits in shower heads

- Once a year
  - Polishing the floors

Evaluation of housekeeping staff

Housekeeper

- A housekeeper can be evaluated by the following criteria
- Their ability to organize the work assigned to them
- Ability to plan the task to be performed
- Ability to control workers and resources and cost of housekeeping work
- Ability to train newly joined trainees and cleaners
- Ability to handle challenging situations
- Attitude towards coworkers and other departments

Cleaners

- To ensure continuing efficiency, the cleaners have to be evaluated from time to time. To do that the following points should be kept in mind:
- Individual attention to each worker and supervision of their work
- Punctuality and regularity at work
- Observe if the worker completes assigned work in the stipulated time
- Observe attitude of worker towards others in the dept
- Ability to train newly joined cleaners

An efficient housekeeper must possess a high degree of tact as well as good organizing ability because of the need to work with other departments and with different people. When an electrical equipment is not working or a door does not close properly or when there is no running water, the housekeeping department notes the complaints and makes sure that the problem is rectified. Thus, the housekeeping department is an important and indispensable department for the smooth functioning of a hospital.

Radiology

Scope of Radiology

A tertiary care ophthalmic hospital needs a department of Radiology. An X-ray unit is the one that will be used most often for diagnosis of various diseases in the eye. Department of Neuro ophthalmology and Orbit need X-ray as part of the basic investigations. In neuro ophthalmology, X-ray of the skull is very important in certain disease conditions to confirm the diagnosis. In cases where an intracranial tumor is suspected, X-ray of the skull lateral view, in case of head ache and sinusitis, X-ray sinuses/PNS Water's view, in cases of traumatic optic neuropathy X-ray optic foramen are required. Department of Orbit needs X-ray of the orbit to rule out fractures of orbit, intraocular foreign body etc. Other departments that need the services of a Radiology department are Medicine, Uvea to confirm certain infectious conditions like pulmonary tuberculosis where an X- ray of chest will be helpful.

Human resources: As X-ray of the skull and orbits can be read by the ophthalmologist, a full time Radiologist may not be required. A radiology technician is needed to carry out the orders in ophthalmic set up, as the cases referred are limited in number.

External referral: X- ray department needs the support of all the above mentioned departments, and if any positive finding is diagnosed, they must have a link with a private or Government imaging unit which includes CT scan and MRI scan.

Opticals and Medicals

Fig. 4.5: Edging of Optical Glass

Spectacles dispensing

Given that the prevalence of refractive error is high and yet largely unaddressed it is the responsibility of eye care providers to offer refractive services in a way that they are accessible and affordable at all levels of service delivery.

Spectacles are the simplest solution to refractive error because they are cheaper, involve less technology and are easier to dispense than other correction options like contact lenses and refractive surgery. By dispensing spectacles we can ensure that patients receive the necessary correction and that the spectacles are of good quality (the correct power, appropriate lens and frames). As patients have been found willing to pay for this service, it also serves to generate funds which may be used to subsidize other services.

Typically one in five persons would need refractive correction. This large volume justifies a dedicated unit for dispensing spectacles. Today, setting up a spectacle dispensing unit is fairly risk-free as the spectacles market is quite well established, globally and requires minimal training for the staff. With many players in the market, both in the corporate as well as unorganized sector, the raw materials are available at economical rates.

Thus, with sufficient demand being created in-house and the low cost of goods, this could easily go beyond being a sustainable venture and generate a surplus.

Equiping an optical shop

Besides the infrastructure required to set up the sales showroom and the necessary shelving arrangement for the stock, a few equipment are also required for sales as well as for the processing of the lens. The set of equipment necessary for spectacles dispensing varies with the variety of products and range of services provided.

For sales and order taking, only basic instruments for taking the various measurements of the patient's face are necessary. This could range from a simple ruler to a sophisticated digital pupillometer.

Processing equipment include an edger to edge the lenses into the shape of the frame's rim. Edging is done on lenses that have the required power.

These lenses can be purchased from the market as:
- ready-to-fit lenses: for commonly occurring power ranges
- lens blanks: for those prescription powers that have to be made to order – these blanks are 'surfaced' or 'ground' to get the required power

Surfacing or grinding is usually done by an external contractor as it requires a large investment. However, where volumes can justify this, one can have a dedicated surfacing unit inhouse.

Both edgers and surface generators are available in a wide range of automation and sophistication. Manual edgers are available at cheap prices but the staff need to be trained well to use this. They are light and portable and can be used for spectacle dispensing in outreach programmes. Automatic edgers though expensive, are more efficient and can handle a large volume of work. Auto-edgers can be handled with basic training and are

Workflow in a typical optical shop

Receiving the Patient
- Verifying the prescription
- Counselling

Sales
- Displaying frames and lenses
- Order Entry

Lens Processing
- Use readily stocked lenses, if available
- Or else, process or place order for lens

Lens Fitting
- Edge the lens to fit into frame

Quality Control
- Check if spectacles matches the prescription
- Check for defects
- Make final adjustments

Delivery
- Cash collection
- Billing
- Counselling on maintenance
- Delivery or dispatch

suitable for large enterprises and for those edging plastic lenses. Other essential tools include:
- Trial lens set or lensmeter - to determine power of lens
- Marking, chipping and cutting instruments - to trace and roughly cut the lens to the shape of the frame before fine edging is done on the edger.
- Screwdrivers – to fit the lens into metal frames
- Frame warmer – to enable the lens to be fitted into plastic frames
- Adjustment pliers – for adjusting the frame

It must be noted that not all the above processes need to be part of dispensing. This will vary based on capacity and circumstance. The following units show the processes that can be outsourced.

The set up will vary depending on the number of spectacles we can expect to sell. In order to be sustainable, the resources employed must match the expected demand.

When should you outsource an activity or process?

In order to remain sustainable and to preserve focus, certain processes can be outsourced while some can be done in-house. The following factors might help decide the processes that can be outsourced:
- Volume: The volume of any activity must justify the amount of fixed investment that is incurred. For instance, if you are debating about setting up your own surfacing unit, you would want to look into the number of orders you receive and the number of orders that one would need to make.
- Delivery time: It is also necessary to look into the time involved in out sourcing an activity. It might be cheaper to get it done by a contractor but it might take a longer time. In order to save on time it can be done in house.
- Quality and reliability of contractors: To maintain the quality standards of the product, check if the contractor is able to deliver equal or better service than if it were done in house. The service would have to be reliable.
- Cost of outsourcing: Cost of outsourcing the process must ideally be less than or equal

Table : 4.1 The following table offers recommendations for setting up a dispensing service based on expected demand

No. of orders per day	Space msq.ft	Staffing	Inventory	Process
Fewer than 10	50 - 100	1 sales person	Frames only	Sales only
10 to 25	200	2 sales person 1 technician for edging	Ready lenses and Frames	Edging and fitting Outsource surfacing
25 to 100	400	4 to 5 sales persons 3 to 4 technicians for edging 3 administrative staff	Ready lenses and Frames	Edging and fitting Outsource surfacing
Over 100	600	8 to 10 sales persons 4 to 6 technicians for edging & surfacing 4 Administrative staff	Frames, ready & Blank lenses	Edging and fitting Surfacing

to an in-house arrangement.
• Capacity to manage: Sometimes, cost and volume might dictate that a certain process can be done in-house but the expertise or the capacity required to manage may be deficient or lesser when compared to the outsourced contractor.

The trade off on all these factors will help decide which activities to be outsourced and which to be arranged for within your set up.

Era of plastic lens

Glass lenses were predominantly used for spectacles. However, only plastic lenses are dispensed in almost the entire developed world and they are rapidly taking the place of glass lenses in most developing countries also. Glass lenses are heavier and shatter easily when compared to plastic which is shatter-proof and only half the weight of glass, making it more durable and comfortable. Plastic lenses are more susceptible to scratches, but recent advances in scratch-resistant coatings have made them durable.

Plastic lenses have lesser shelf life and need more sensitive handling. Thus the decision to dispense plastic lenses can have implications on the nature of equipment used.

The supply chain

The spectacle goods market has evolved over the years making lenses, frames and equipment accessible and affordable even for developing countries. However, small retailers will have to be aware of huge mark-ups down

the supply chain that can escalate the prices. Thus, the closer up the chain, cheaper it is. With a large number of players in the unorganized sector, price regulations are absent. However, cost is controlled by a very highly competitive environment. Today, China has become a major source of good and inexpensive frames and lenses.

Human Resources

Spectacles dispensing involves human skills in two major areas:
- Counselling and salesmanship
- Technical skill for fitting and surfacing

Thus, training will have to be structured for both categories of staff. It must include:
- Order taking
- Salesmanship
- Product knowledge
- Vendor relationship management
- Inventory management with an understanding of the latest trends and fashion so that appropriate frames are stocked

It is equally important to continuously update the staff on new developments, products and techniques.

Dispensing Spectacles at Outreach Programmes

Outreach programmes make eye care accessible to rural and remote areas. Thus, it is essential that the service offered are comprehensive and complete. About 10-20% of the patients at outreach camps need

Fig. 4.6: Medical Shop

refractive correction (this percentage is higher if the average age is in the presbyopic age: between 40 and 60). It is not adequate to simply give a prescription for spectacles. As eye care providers, one should ensure that the patient actually procures a pair - ensure that the patient has access to good quality affordable glasses – this is done easily by dispensing readymade and custom made spectacles at the camp site.

The following resources are required for spectacles dispensing at outreach camps:
- Sales staff
- Technician for edging and fitting the lenses
- Inventory of
- Frames
- Lenses
- Readymade spectacles (reading glasses)
- Edging and Fitting equipment and tools
- Display enhancements (mirrors etc)

Pharmacy

The pharmacy at a tertiary care centre should be equipped to provide the varied needs of each department. It should also be stocked to address the common systemic conditions that patients present with. The pharmacy should be easily accessible and located at a prominent location. It should be open during extended business hours and should also be available for emergency purchases.

Staffing

It is mandatory that a pharmacy employs a qualified pharmacist. In addition, the other staff should be trained in the basics of pharmaceutical dispensing. They should be trained to read prescriptions and explain the application procedure and dosage to the patient. In addition the staff should be trained in maintaining inventory and book keeping.

Stocking

Stock should exceed expected demand so that shortages never occur. An experienced pharmacy supervisor should monitor purchasing and inventory to minimize loss due to spoilage. Bulk purchasing will help keep costs low. It must be ensured that stock is verified regularly to ensure that medicines are sold well before the expiry date. In certain cases, the medicines may need to be combined in a prescribed combination. This should be done by a trained staff.

Equipment Maintenance

Role

Medical equipment plays a very significant role in the healthcare delivery system. A wide range of ophthalmic equipment is available for diagnosis and treatment of eye disorders. Especially in ophthalmology, there has been a major increase in the use of sophisticated instruments and equipment in the last decade. This has led to a higher quality of eye care service, resulting in an increased demand for eye care service from the general public. At the same time, this has created a higher dependency upon the proper functioning of such equipment. This instrumentation is also quite expensive. A major part of any hospital project cost, which could go up to almost 60 per cent consists of biomedical equipment, ward equipment, service support equipment, utilities, hospital furniture, etc. Of this, biomedical equipment could account for nearly 40 per cent of the cost. Keeping this in view it is essential to ensure proper selection and maximum utilization of the equipment with minimum downtime. Rapid advancement in technology is making the entire management of equipment a complex task.

It is well known that keeping instruments and equipment in our homes or anywhere in good working condition is very important. In service sectors like hospitals it is even more important so that patients whom we want to serve are not inconvenienced due to instruments that are not functioning. A statistics of World Health Organization says that at any time nearly 50% of hospital equipment in any developing country is not in good working condition. In eye care, to meet the deadline of VISION 2020: THE RIGHT TO SIGHT, to eliminate needless blindness on a global level by the year 2020, the need for keeping all available instruments in very good working condition is very important. The maxim "An instrument repaired is an instrument gained" should be well understood.

Fig.4.7: Training in Instrument Maintenance

If not planned and executed properly, acquisition of capital equipment may result in serious short and long-term problems that an institution or a practitioner must live with for many years. Poor decisions can affect the competitive position in the market and the longterm viability of the Institution. With more and sophisticated apparatus being added every year, it is imperative that instrument maintenance facilities are created in every large hospitals or a group of institutions. An in house facility for instruments maintenance is the most appropriate arrangement.

Essential items for the instrument maintenance facility

It could be a room or at least a desk in the corner of a room for maintenance work. Some of the essential items that the facility should have are:
1. Shelf space for keeping the instruments manuals of all instruments in the hospitals.
2. Shelf space for all the trade brochures and publicity materials on instruments for eye care
3. A set of tools (refer appendix) in a suitable tool box with good supply of soldering lead, flux, insulation tape, insulation sleeves etc.
4. Shelf space for keeping essential spares (bulbs, fuses etc) of all instruments and hardware items (springs, bolts, nuts, 'O' rings, washers, gasket material etc.)
5. A work table with power connection and a convenient chair for the person

Human resources and skills

It is very essential to have at least one person dedicated for instruments and equipment maintenance. There will be a need for a full time person in a tertiary eye hospital. If it is felt that there may not be work for a full time person, an electrician or a senior nurse can be entrusted with the job on a part time basis. The six week training course like the one offered in Lions Aravind Institute of Community Ophthalmology (LAICO) Madurai, India, will be adequate for such a person.

Best practices: Instruments need constant care and attention. The care includes

1. Protection from dust: Dust spoils the appearance and may carry some infection. More than these, dust is abrasive in nature and cause wear and tear of moving parts in instruments. Keeping instruments covered when not in use prevents accumulation of dust. Keeping and using the instrument in a clean, dust free area prevents accumulation of dust on instruments. Having a well maintained lawn around the hospital will keep the dust level low. In spite of all these there will be some dust deposited on instruments and this has to be removed with care periodically using clean moist cloth. Dust on optics has to be removed a little more carefully using a soft brush. Cotton swab and distilled water or a mild soap solution can be used to remove dust stuck on optics.
2. Protection from moisture and stain: Instruments get moisture and also get stained due to discharges from the eye of patients and also by the drugs (drops) administered. The persons handling them may leave their stain due to perspiration and it is important to remove the moisture and stain as and when they happen to avoid any infection being passed on from one patient to the next.
3. Protection from misuse. Sometimes instruments get misused. This should be avoided.
4. Protection from electrical fluctuations: In most places the voltage available in the hospital fluctuates. This affects the functioning of instruments. Sudden increase in voltage may cause the bulb and fuses in the instrument to be blown off. Some instruments like the lasers are designed to work in a very narrow range of voltage and any fluctuation beyond that range may stop their functioning and some time the damage may be more severe. To avoid these,

instruments should be provided with voltage stabilizers. Computerized instruments may have to be provided with an uninterrupted power supply.

5. Protection from mechanical shocks: Instruments should be moved with care. Dropping them accidentally or knocking them against walls and doors may cause some mechanical shocks and consequent damage. Some instruments are provided with castor wheels for easy shifting of their location. Those wheels should be well cleaned and lubricated periodically for smooth movement. Hard movement or no movement of the wheels may transmit vibration to the instruments and in case of optical instruments, the alignment of optics may get disturbed.
6. Protection from thermal fluctuations: The location of instruments should be such that the temperature of the location does not vary considerably during a day. Lenses of optical instruments are usually made of compound lenses (more than one lens cemented). Wide fluctuations in temperature may cause the lenses to get detached and their optical properties may change.

Attention on instruments includes

1. Protection from pilferage: Instruments or sometimes part of instruments may get stolen and there should be constant watch on them.
2. Preventive maintenance: Instruments should be checked periodically, dust should be removed, moving parts to be gently lubricated and electrical connections checked. These can be done periodically once a week or once in ten days depending on the location.
3. Predictive maintenance: Instruments that may be working well needs to be checked for possible breakdown after some time. This is best done when the instrument is not in use. At Aravind predictive maintenance is carried out on Sundays.

Breakdown Maintenance (Repair and replacement of parts)

Instruments well taken care of and subject to good preventive and predictive maintenance seldom breakdown. Yet a bulb in them may be fused or a fuse in them may get blown of a due to aging or overload, or a person may have not used the instrument correctly. These lead to break down and should be attended to immediately.

Appendinx

List of tools required:

1. Wire Stripper	- 1	
2. Spanner set of 8 spanners	- 1 set	
3. Line tester	- 1	
4. Allen key set of 10	- 1 set	
5. 6" S. S. scale	- 1	
6. Ball Pin Hammer	- 1	
7. Nylon hammer	- 1	
8. Flat File 6" with handle	- 1	
9. Junior Hacksaw frame	- 1	
10. Hacksaw Blade (10 Nos.)	- 1 set	
11. Needle file set 12 Nos.	- 1 set	
12. Cutting pliers	- 1	
13. Nose Pliers	- 2	
14. Screw driver	- 2	
15. Screw driver (Philips)	- 2	
16. Drilling machine	- 1	
17. Watch makers of screw driver set of 6 (ordinary & Philips)	- 2 boxes	
18. Baby vice	- 1	
19. Drill bits	- 3	
20. Soldering iron	- 1	
21. Soldering iron stand	- 1	
22. Digital multimeter	- 1	
23. Electric Torch	- 1	
24. D.C.Power supply	- 1	
25. Suit case	– 1	

Medical Records Department

Fig. 4.8: Outpatient Enquiry Counter

Role of Medical Records

Medical records management involves the functions of creating, administering, retaining, submitting and destroying records. Medical records play an important role in the functioning of any hospital in terms of giving vital information regarding patient care, for conducting research, providing statistical data on utilization of hospital services, mortality and morbidity profiles, and to evaluate performance of clinical facilities.

Good medical care generally means a good medical record, while inadequate medical record may reflect poor medical care. Medical records store the knowledge concerning the patient and his/her care. To be complete, the medical record must contain information to clearly identify the patient, support diagnosis, justify the treatment provided, and should record the results accurately.

Value of the Medical Records

The medical record contains information acquired in a doctor - patient relationship, which is generally considered to be confidential. The hospital is responsible for preventing access to patient's medical record by non-authorised persons from the time the medical record is initiated, during hospitalisation, as well as after discharge. Identification data unrelated to treatment are generally considered non confidential and may be released without the consent of the patient. Release of this information, however, should be carefully screened and given out only in response to proper enquiry. Medical records are used for the following purpose:
To record the patient's problem, history, and treatment given either as out-patient or inpatient.
• To form a bridge between the doctors and other paramedical professionals contributing to patient care
• To give continuity in treating the patient during subsequent visits or admission

• To assist in protecting the legal interests of the patient, the hospital, and the doctors
• To provide data for any research, study or education
• To review the quality of treatment given by doctors, nurses and other paramedical professionals
• To provide data for any third party agencies connected with the patient, doctor and hospital.
• The content of records may not only aid in diagnosis of a specific case, but may aid in the treatment of another case, and it is also of legal value.

"The record is of value to the patients, the hospital the physician, and for research and teaching."

Statutory Related: Medical Records

The medical record, although kept for the benefit of the patient, the physician, of the hospital, is the property of the hospital. Therefore, the hospital may restrict the removal of the record from the medical record files or hospital premises. It is recommended that complete patient medical record in a hospital usually be retained, either in original or reproduced form, for 10 years (depending upon workload). According to the Medical Council of India, every physician shall maintain the medical records pertaining to his / her indoor patients for a period of 3 years from the date of commencement of the treatment in a standard format.

Human Resources

Line of Authority

Within the hospital, it is necessary to have a definite organizational plan describing the lines of authority and responsibility. The medical record coordinator should in turn be vitally concerned with establishing clear lines of authority and responsibility for other people in the department.

Organisational chart

An organizational chart is a good means of informing others about such relationships. This will ensure there is no ambiguity in understanding either the line of authority or the duties and responsibilities of staff members. In a medical records department procedures may be written for every job performed.

Procedure Manual

Written procedures which have been gathered together into a procedure manual provide a valuable tool for two reasons. First, it provides an employee who regularly performs a procedure with an exact picture of what is expected. Secondly, it is an invaluable aid in training. It is helpful for a supervisor to go through a procedure with the employee at least once before the employee attempts to follow it by himself or herself. The manual should include samples of all the forms used in procedures which have been correctly filled out according to the procedural descriptions.

Job Description

When a procedure is reviewed, the job description for employees who carry out that procedure should also be reviewed.

Roles and Responsibilities of the medical records coordinator

- To update codification of medical records diagnosis wise and surgical wise everyday.
- To prepare statistical report surgery wise and doctor wise everyday.
- To ensure that medical records are processed serially and filed everyday.
- To generate statistical data on a daily, monthly and yearly basis to submit to authorities.
- To ensure daily and monthly bills of the sponsored patients are sent to the accounts department.
- To procure and keep all forms and stationary needed for the week from stores.
- To solve problems and grievances (if any) of patients and to ensure patient satisfaction.
- To ensure medical records are inactivates and disposed based on the inactive policy.
- To ensure adequate space and racks are available to keep medical records every month.
- To ensure missing medical records or wrongly filed medical records are searched and taken out.

Table : 4.2 HR Requirements in MRD

S. No.	Category	Bed		
		100	250	500
1	Medical record officer	1	1	1
2	Medical record technician	2	6	12
3	Asst. Medical Record Technician	10	23	44
4	Other staffs	2	4	7
5	Quality Assurance specialist	1	1	1
6	Grand Total	16	35	65

Source: http://www.v2020eresource.org/newsitenews aspx?tpath=news82006

Planning the work environment

Part of the planning function is providing medical records staff with proper working environment. This includes planning for office space and location, office furniture and equipment, and spatial conditioning factors such as good lighting arrangements and colour.

Location and space requirements

The medical record department is in constant communication with the registration departments of the out-patient and in-patient care units. Every day, many doctors visit the medical records department for completion of medical records or for records reference. The medical records department must be located in an area near the new and review registration counter and admission and discharge office. It should be located within easy walking distance from the admitting or outpatient department to ensure that the staff can easily refer files and

retrieve records on an emergency basis. Security surveillance for safeguard of medical records information and equipment when the department is closed should also be considered.

Space allocation should be determined by the departmental services to be provided, the equipment and computer systems to be used and the daily workload to be handled. Although services vary somewhat from hospital to hospital, services and tasks to be considered when allocating space include record filing cabins, coding and indexing desk, medical records sorting and arranging desk, outpatient registration area, and admitting and discharge office.

Design and aesthetic

Proper layout of the medical record department adds to its efficiency and attractiveness. The key consideration in layout is workflow i.e.: the flow of record from desk to desk. Desks should be arranged so that, as far as possible, records move in straight lines and only a short distance at a time.

The proper use of colour is another important consideration in office design. Effective use of colour not only gives a good and bright appearance to an office, but also improves working conditions. White colour is preferred.

Lighting is another environmental factor, which cannot be overlooked. Light sources on the ceiling can usually provide enough light for the entire office area at a prescribed level of illumination.

Open Shelf Filing Unit

Open-shelf filing units are the most commonly used storage system for medical records. They are less expensive. Medical records staff can file or retrieve records faster. Most importantly open shelves are space savers, accommodates more records in a given floor area. Open-shelf filing equipment may consist of 7 or 10 shelves with a height of 9 to 10 ½ feet depending upon the number of shelves. 7 open shelves having 3 feet long and 1 feet width each with dividers can house an average of 750 outpatient records in one compartment, thus housing 5250 records in a single open-shelf filing unit.

Record dividers should be placed throughout the files to speed up the retrieval and filing process and finding of records. The number of dividers needed depends upon the thickness of the majority of the medical records in the shelves. For medical records of medium thickness, a divider for every hundred and fifty records is adequate. When purchasing dividers, durability and quality should be the primary concern. To determine the total number of dividers needed, the following formula may be used:

$$\frac{\text{Total number of medical records}}{\text{Total number of medical record between each divider or pigeon box}}$$

If the total number of records is not known, an estimate may be made by multiplying the filing inches by the average number of records per inch.

Several shelves of records should be counted to determine the average number of records per inch. Open shelf filing unit is designed to reach the maximum height of medical records filing room in order to save the space available. When medical records are placed at more than the height of 5 feet or 6 feet, it may be difficult to retrieve them. Hence, hospitals use various types of climbing devices to reach the medical records kept at a height of up to 8 or 9 feet.

Climbing Device

An aluminium ladder with rubber bush at the bottom of the leg or a step type steel ladder will be of greater use to the retriever to file or retrieve the records easily avoiding unnecessary accidents. Aluminium ladder will be less in weight and easy to carry inside the medical records room. The rubber bush avoids ladder from slipping down. The step type steel ladder will be easy to climb exclusively for female staffs.

Best practices in Medical Records Management

Development of Medical Records Forms

Medical record forms are a piece of paper or card on which a formal arrangement of information is designated usually with spaces for the entry of additional data. Each hospital has the responsibility to develop medical record forms to suit its needs. Well-designed forms are easier to fill which will provide uniformity in paper work.

Designing forms and registers

- A uniform size of paper should be used. Although standard size (8 ½ -inch –by 11-inch) paper is most commonly used, 8-½ -inch-by-5 ½ -inch papers could be used to reduce waste.
- A uniform binding edge should be maintained, either a top or side binding.
- A uniform margin that is based on the binding edge should be maintained. Chart folders on the nursing units should accommodate the uniform margins.
- For top binding, information on forms that are to be printed on both sides should be correctly placed on both sides for proper assembly in the chart. For side binding the two sides should be placed head-to-head.
- Line spaces should be assigned on the basis of whether the forms are to be typewritten, handwritten, or both.
- The quality and weight of paper should be selected according to the expected life of the record, the amount of use it will receive, and whether both sides are to be used. If both sides are to be printed, the paper must be heavy enough to prevent the ink from showing through.
- Coloured forms should be selected carefully because problems can occur in photocopying or microfilming coloured sheets. White paper with colour-coded borders will prove more effective for quick identification of different forms in the hard-copy record.
- When feasible, using a rubber stamp on an existing form can eliminate the need for special form that is not used regularly.

Numbering and filing systems

Medical records in most health care institutions are filed numerically according to patient's medical record numbers. In the past, some hospitals have filed records according to patient's names, discharge numbers, or diagnostic code numbers. Alphabetic filing by patient names is more cumbersome and subject to more error than numerical filing. Three types of numbering systems are currently used in health care facility.

Unit numbering

Unlike the serial numbering systems, the unit numbering system provides a single record, which is composed of all data gathered on a given patient, whether an outpatient, inpatient or emergency patient. The patient is assigned a medical record on his first visit, which is used for all subsequent visits and treatments. His entire medical record is thus in one folder under one medical record number which is recommended as a preferred method.

Straight numeric filing

This refers to the filing of records in exact chronological order according to registration number. Thus, consecutively numbered records would be sequenced on the file shelves. Obviously it is a simple matter to pull fifty consecutively numbered records from the file for study purposes or for inactive storage. Probably the greatest advantage of this type of filing system is the ease with which personnel are trained to work with it. This approach to filing has, however, certain inherent disadvantages. Because a staff must consider all digits of the record number at one time when filing a record, it is easy to misfile. If the number of digits exceeds more than 5 digits, chances are there to do wrong filing since the filing staff will feel it a little difficult to file in the correct shelf. Transposition of numbers is common: record 65424 can be misfiled as record 56524. A more serious drawback to straight numerical filing is that the quality control of filing is difficult with this system. Since staff are usually filing in the area of the most current records, it is not feasible to fix responsibility for a section of the file to one staff.

Tracer cards

Despite the extensive measures adopted to have good control of records, some percentages of records are not found where they are supposed to be. This could be due to non-receiving, not keeping in appropriate place, or misfiling. Under these circumstances, tracer cards are the only source of information to the medical records assistant to track the exact location of the medical record taken. The tracer card contains three columns. The first column denotes the date, second column denotes the number of the record and third column denotes the signature of the retriever. Tracer card can be used in different colours to differentiate between records retrieved for patient visit and, records retrieved for study or research purpose. After the medical record is replaced in its original location, tracer card can be pulled out.

Coding and indexing system

Use of standardized terminology to describe clinical progress and treatment procedures is a means for ensuring that all people involved in patient care have a common understanding of the patient's disease. Coding is the translating of narrative descriptions of diseases, injuries and procedures into numeric codes. The coding process involves assigning numbers to disease and procedural terms. The principal source of coded information is the medical record. The face sheet lists final diagnoses and operations and is completed by the attending physician.

International Classification of Diseases (ICD) and Procedures (ICP)

ICD & ICP refers to the International Classification of Diseases & the International Classification of Procedures. It permits systematic recording, analyzing, interpretation, and comparison of morbidity and mortality data collected in different countries or areas and at
different times. Based on the official version of WHO's 9th revision of ICD, the USA National Centre for Health Statistics published the Clinical Modification of (ICD - 9CM) in 1978. In this version, diseases were further classified or sub classified for more specificity. At present ICD-9 CM 2007 version is available in US for classifying diseases of eyes.

Manual indexing system

An important function of the medical record department is the compilation of patient care data from medical records. This means that certain information about patient care is extracted from medical records and hand posted on ledger sheets or cards.

The disease conditions for which patients were treated were coded and then posted on a set of index cards, which comprised the "disease" index. A disease index lists diseases and conditions according to the classification system or code numbers assigned by medical record department personnel.

Similarly operations and treatment procedures are coded and posted on another set of cards from the operations index. The operation index comprises of a listing of surgical and procedural code numbers. While there are many manually maintained indexes still in existence, the trend is the increasing computerization of this activity. Hence indexing manually means that disease and operation code numbers are entered by hand or posted

on each appropriate disease or operative index cards.

Statistical analysis

Statistics are facts set down as figures. Preparing statistics involves the collection, analysis, interpretation, and presentation of facts as numbers. The hospital administrator and governing board use statistics to compare current operations with the past and as a guide in planning for the future. Keeping up with current reporting needs will save a great deal of unnecessary work. This will help to modify the collecting techniques so that information kept will be accurate and useful. Medical records are the primary sources of data used in compiling medical statistics.

Daily, Monthly and Annual Reports

The daily, monthly analysis report concerning the care rendered to patients may indicate the number of patients registered newly as out patients, and the number of patients registered as revisit patients. This will include reports of admission, discharge, number of surgeries performed and, the number of patients occupied as inpatients on a given day or month. This report may be combined with a comparative report of the previous year, the same day and same month. If this is done on a routine manner, the necessary additional data can be compiled on a daily, monthly and yearly basis and the information will be available when it is needed. The monthly analysis and comparative reports are important to hospital administration & governing board for future planning and control of activities.

Out-patient Services

Out-patient services data is extracted from the registers or systems maintained at the registration counters in the out-patient department, speciality clinics and emergency services. The data will be useful to the extent that these registers or system contain pertinent information. Commonly used statistics pertaining to outpatient services are,
1. Number of new cases
2. Number of revisit cases
3. Speciality wise break-up of cases
4. Unit wise break-up of cases
5. Age and sex wise distribution of cases and
6. Out-patient Diagnostic statistics.

The formula for deriving this can be computed as follows:

Daily average out-patient visits

$$\frac{\text{Total number of outpatient visit during the period}}{\text{Number of OPD working days during the period}}$$

Weekly Predicting Reports

In order to create awareness among the staff of the hospital, a weekly report predicting the number of out-patients, in-patients treated and surgeries performed in the last year can be generated. This statistical report can be prepared by adding 3% to 5% to the actual data of the last year. During this preparation one has to keep in mind about the discrepancy between days and festivals of previous year and the current year. This can be corrected by comparing with the last 3 year statistical data and anticipating the actual number of patients for the particular day or the week. This predicted report will be useful to create awareness among the working staff to plan for each week and post human resources accordingly.

Fortnight Report

Based on the predicted weekly report and the actual number of patients treated in the week, a comparative report can be prepared to know about the present growth trend of the hospital. This report can be prepared by collecting the number of out-patients, in-patients and the surgeries performed within a fortnight. This fortnightly report can be prepared by comparing the actual patient visit of the last year with the number of patients anticipated this year and the current number of patients treated this year. This report will be helpful to the hospital authorities and the working staff to know the growth trend of their hospital.

Preparation of prediction calendar

"Where there is a will there is a way". As the Institution grows, it becomes absolutely necessary to predict the number of patients visiting the hospital every day. This workup can be done by developing a daily calendar which can be further developed on a monthly basis for twelve months in a year. This daily predicted data for the upcoming year can be even printed as a book with the predicted data on one side and the actual number on the other side. Festivals, national holidays and all important events of hospital which are going to take place in the new year can also be included in the prediction calendar. A column can be drawn in the calendar to compare the actual number of patients versus the predicted number. A comparative report with actual number of patients treated for the past three years with the current year can also be prepared for every month to know the growth trend of the hospital.

Common hospital percentages and rates

The term ratio is frequently used instead of percentage. A ratio expresses the quantitative relation of one thing to another, such as the relation of births to deaths or of deaths to discharges. Careful attention must be given to all figures. Many errors in arithmetic occur because of misplaced decimal points. There is one bit of common sense reasoning that will help medical record in-charge when computing a rate. A rate should be considered as the number of times something did happen compared to the number of times something could have happened. When expressing this ratio as a percentage, the number of times a thing happened is divided by the number of times it could have happened.

Death rate

Death rates can be computed for deaths occurring both before and after 48 hours of admission, and are often requested by reporting agencies. However, as an indicator of hospital care, it would probably be more useful to examine all deaths that occur regardless of how soon after admission the patient dies. The same concept can be applied to postoperative deaths, which are usually considered to be deaths that occur within 10 days following surgery. Here it would probably be more useful to examine the relationship between deaths and surgical operations by selected groups of patients operated on, rather than to lump all patients and kinds of operations together to compute a postoperative death rate.

Hospital death rate (gross death rate)

The proportion of inpatient hospitalizations that end in death is usually expressed in percentage. The percentage is computed as follows:

$$\frac{\text{Number of deaths of inpatients in a period}}{\text{Number of discharges (including deaths) in the same period}} \times 100$$

Net death rate (institutional death rate)

The ratio of the total number of deaths occurring in the hospital, 48 hours or more after admission, for a period to the total number of discharges and deaths, 48 hours and over, for that period. The formula for figuring the percentage is

$$\frac{\text{Deaths (including newborn) minus those under 48 hours for a period}}{\text{Total number of discharges (including deaths and newborn) minus deaths less than 48 hours for the period.}} \times 100$$

Infection rates

Hospital by law should specify that there be a hospital- wide committee charged with the responsibility to investigate, control, and prevent infections. The primary purpose of evaluating infections is to determine the cause so that repetition may be avoided. Medical judgment is needed to establish the incidence of infections and proper control measures are taken. The hospital committee charged with infection control should set up procedures for the surveillance and reporting of infections.

Postoperative infection rate

This is the ratio of all infections in clean surgical cases to the number of operations performed in a particular period. The postoperative infection rate may also be required on statistical reports. If a wound infection rate is needed, it must be specified if this is to be computed out of all operations or out of all clean operations.

$$\frac{\text{Number of infections in clean surgical cases for a period}}{\text{Number of surgical operations for the period}} \times 100$$

Length of stay calculations

The length of stay (for one inpatient) is the number of calendar days from admission to discharge. To compute a patient's length of stay, the date of admission is subtracted from the date of discharge when the patient is admitted and discharged in the same month.

The average length of stay (average duration of hospitalization) is "the average length of hospitalization of inpatients discharged during the period under consideration"

The formula for computing the average duration of inpatient hospitalization is

$$\frac{\text{Total length of stay}}{\text{Total discharges}}$$

The average daily inpatient census (average daily census)

The average daily inpatient census records the average number of inpatients present each day for a given period of time. To arrive at the average number of inpatients in the hospital, the total inpatient service days for the period must first be determined. The formula to obtain the average daily inpatient census for a whole hospital is

$$\frac{\text{Total inpatient service days for a period}}{\text{Total number of days in the period}}$$

Inpatient bed occupancy ratio

The inpatient bed occupancy ratio can be computed at any specified point in time or for any specified day. To compute the percentage for a specified day, the inpatient service days for that day are multiplied by 100 and divided by the inpatient bed count for that day. To obtain the inpatient bed occupancy ratio as a daily average in a longer period, the formula is

$$\frac{\text{Total inpatient service days for a period} \times 100}{\text{Total inpatient bed count days} \times \text{Number of days in the period.}}$$

Presentation of quality control data

Feeding patient information into a computer for processing and storage does not diminish the medical record department's responsibility for the accuracy and reliability of collected data. In a manual system, evaluation of the percentage of clerical error is an important consideration. Routine quality control studies can ensure that the necessary collection of statistical information is done in an effective and cost-efficient manner.

The reports from the medical record department to the hospital administrator are

forms of communication. One needs to keep in mind that reports should be simple, highlighting important facts, and to make them as readable as possible. The medical record In-charge who supplements these tables with such visual aids as graphs, bar charts, and pie diagrams, or any other pictograph that illustrates clearly what the figure indicate, is to be admired. This additional effort makes a report much more interesting and attractive and easy for the reader to review and interpret. Each and every report must be titled and dated with short and clear information.

5

Management

Why Manage?

Business doesn't run itself. It requires a variety of management activities in order to operate properly.

Why structure in larger organizations required?

In a small organization, top management will be able to see what is happening. Extensive measures and indicators are not necessary because management can view overall operations. But in large organizations, top management must use the management control system to understand what is going on. In other words, to view operations, management must use measures and indicators because he or she can't get a first hand and overall picture of the total organization. In the context of healthcare,

therefore a one physician practise could use an informal method. But a hospital system must use a formal method of management. The different functional areas of the tertiary care eye hospital are required to be managed professionally.

Hospital Administration

The core function of the hospital administration team is to make sure hospitals operate efficiently and provide adequate medical care to patients. This can be achieved by the coordination of the various activities in a hospital. The focus of the functional departments would be on the functional areas and thus aligning those to the organizational goals and meeting the hospital mission will have to be carried out by the hospital administration team. The major activities of the hospital administration will be as follows:

Fig: 5.1: Physician's Office Organisation Chart
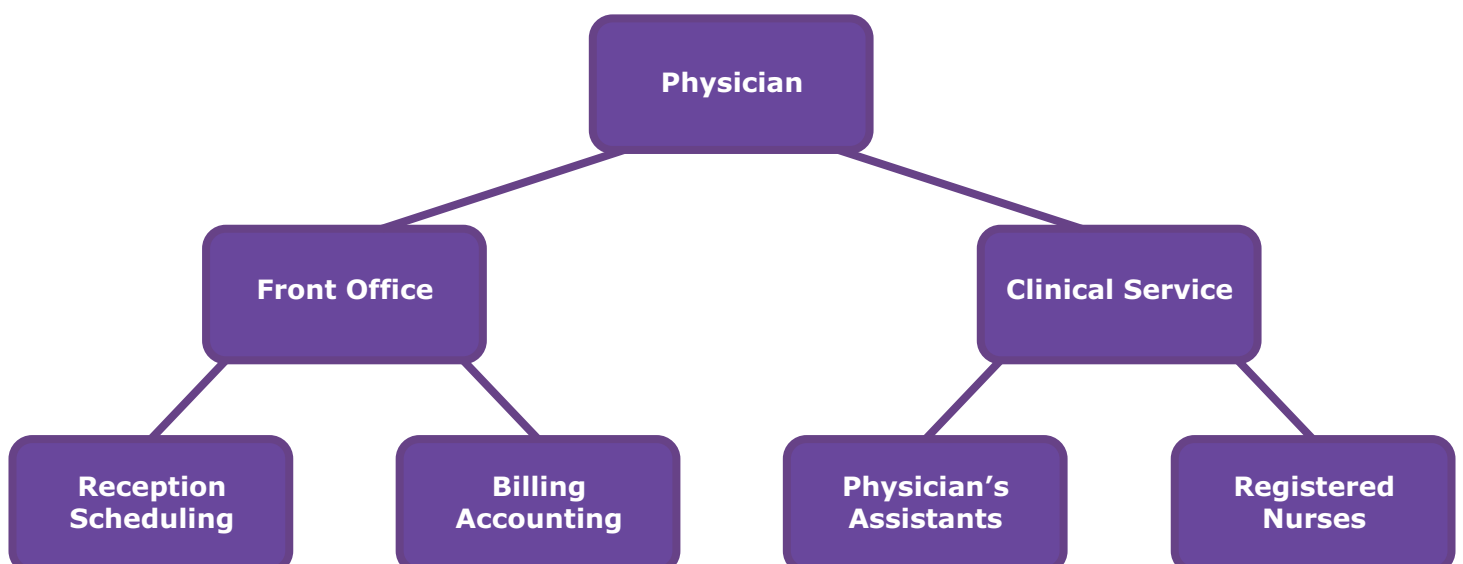
- Implementing policies developed by a board or governing body
- Overseeing day-to-day operations of the organization by supervising other managers or performing some functions themselves
- Developing policies and procedures and seeing that they are observed
- Developing short-range and long-range plans for hospital growth and development
- Managing budgets and overseeing financial operations
- Identifying areas for possible expansion or reduction reduction

Developing good MIS / dashboards to have all relevant information real-time at finger tips would enable the administration staff to have control over the activities of the different departments. Benchmarking the performance of the different departments and ensuring the compliance of desired level of results will help in smooth functioning of the hospital.

Addressing to the grievances of the patients and ensuring that the patient has the best experience in the hospital will help in identifying the areas for possible expansion and introduction of services. Organizing meetings with the key stake holders and addressing the issues related to the management of the hospital and giving direction for growth needs to be an important function of the hospital administration team. Understanding market scenario and planning for the changes will have to happen from Hospital Administration team.

Manpower

- Hospital Administrator
- Manager Patient Care
- Manager Specialty Clinics

Space Requirement

A room of 10' x 8' dimension would be required for each of these staff. They will have to interact with patients, well wishers and staff. A computer system and the MIS need to be available for each of these staff to have the information at their finger tips.

Why Financial Management?

The primary role of finance in hospital as in all business is to plan for acquiring and utilizing resources to maximum with efficiency and with addition of value to the enterprise. The two broad areas of finance – accounting and financial management are

separate functions in large organisations. Although billing and collections remains important, to be of maximum value to the enterprise today the finance function must support cost containment efforts, managed care and other payer contract negotiations, joint venture decisions and integrated delivery system participation. In essence, financial management must be planned to help organisations into the future rather than merely record what has happened in the past.

The four segments that make a hospital finance system work are:
i. The original records: Provides evidence that some event has occurred
ii. The information system: It gathers this evidence
iii. The accounting system: Records the evidences
iv. The reporting system: Provides reports of the effect

Any institution needs to know that these elements exist and that they work together to an end result.

Human resource: Finance Management

1. Manager – Accounts
2. Accountant
3. Cashier

Space requirement

The books of accounts need to be maintained for 7 years. Thus necessary space should be identified to store these files apart from the office for the employees. The files within 3 years can be stored in the space allotted for the Finance and Accounts department. The files whose age is more than 4 years can be

Fig. 5.2: Cash Collection in Accounts Department

kept at a location away from the regular filing area. Open-shelves filing equipment can accommodate 10 files in one row. Each of which can be 5 shelves high. 8 – 10 such shelf can be planned for the storage of which 4 can be planned along with the Finance department and the rest can be at a different location.

Why Information Technolgy and Systems Department?

Of late, the leading hospitals have been found making the services more productive with the support of a technology driven information system. It is a device to help hospitals in the formation of policies, setting of objectives, scheduling the order of priorities, formulation of strategic decisions for plan implementation and evaluation. It is quiet natural that information needs of all the organisations can't be uniform. The hospital needs different types of information for different purposes, different personnel and different department. The doctors performing the role of clinician needs information related to diagnostic services and other patient data generally made available by the nurses and sisters. The managers of the hospital need information about patient data on the basis of clinical investigations, treatments, etc. and about the pressure of work on the different category of hospital personnel. The financial information would help them manage finance – maintaining cash flows, identifying financial irregularities, fraudulent practices, etc. if any. The process of gathering, integrating, comparing, analysing and dispersing internal and external information helps the employees in increasing the level of efficiency. Thus we find the system acting as a guide. In innovating different types of services, the hospital managers use information system. When evidence is available, it is easier to go make strategic decisions.

The aforesaid factors make it clear that hospitals needs different types of information. In this background all hospitals would require to consider for a well-developed and a

technology driven information system for hospitals. From a manual management information system (MIS) to a technology driven MIS, the contours of development have undergone radical changes. Speed, accuracy, memory have been significantly increasing in the technology driven systems which paved copious avenues for its multi-dimensional uses. Qualitative transformation in computers made information technology an integral part of the MIS and it was against this background that almost all the organisations evinced their interest in using information technology.

System requirements: IT & Systems

Hospital with 500 – 800 OPD / day having fullfledged Retina, Cornea, Glaucoma and Paediatric Ophthalmology would require 35 computers.

- Computer Configuration: Core 2 Duo Processor, 2 GB Ram, 15.6" TFT monitor
- Server Configuration: 4GB RAM, QUAD Core Processor, 1066 FSB, RAID I – 5, HDD 3 + 1, 250 GB
- Internet Connection: Broadband up to 2Mbps
- 12' x 12' room would be sufficient space for the IT department

Fig. 5.3: Medical Records Department uses IT

Human Resource: IT & Systems

- Manager IT - 1
- IT Technician – Networking – 1

Why Quality Assurance Department?

Today, quality is the single defining factor which distinguishes one service provider from another. Developing standards for good quality of care is becoming vital. Standards of performance of activity or activities for all prime jobs of clinical and nonclinical aspects need to be set.

Standardized clinical examination, surgical protocols, standards of cleanliness, standards of attitude of staff etc need to be developed for key result areas. Productivity governed by management systems and standard clinical protocols sharpen the clinical skills. Quality means different things to different people. It covers clinical outcomes, training competence, patient satisfaction, employee satisfaction, financial viability, efficiency and productivity of the resources. It is vital to understand the balance between these key parameters.

Eight Major Types of Hospital Indicators Are

- Structural Indicators: Information that represents the capacity and capabilities of a hospital's facility and the abilities of its staff
- Service Quality Indicators: Measures of the "hotel" features of a hospital, including amenities, comfort, timelines of care, privacy, friendliness / helpfulness of staff, depth of information, etc.
- Appropriateness Indicators: Indicators that reflect whether a hospital is providing 'too much" care. i.e., a level of resource utilization (particularly for costly procedures) beyond what would be considered necessary)
- Basic Clinical Indicators: Relatively 'crude' measures of the most extreme outcomes of medical care
- Sophisticated Clinical Indicators: Measures that represent the range of relevant clinical outcomes beyond basic clinical indicators
- Functional Status Indicators: Patient-reported measures of health and well being, designed to reflect the patient's perception of physical and emotional outcome of care
- Access Indicators: Information that measures how easy it is for a patient to gain access to medical services
- Clinic Quality Improvement Indicators: Interim process and outcomes measures that can be used to pinpoint problem areas in the process of care

Fig. 5.4 : Paramedical Training in Progress

Human Resource : Quality Assurance

Separate committees are recommended for Quality improvement and Infection control committee. The Infection control committee should not be confined to operating theatre but has a hospital wide approach. A dedicated infection control nurse has to be designated to coordinate all the infection control aspects. Considering the complexity of the quality dimensions and external pressures from institutions like accreditation and certifying agencies, it is appropriate to have a Manager for Quality. The key role of this person is to define the quality indicators, develop systems to capture and monitor the identified parameters, and develop strategies to continuously improve the quality of care.

Materials Management

In the hospital on an average 30 – 40 percent of the total budget is spent on hospital materials. Hospital personnel will fail in delivering quality medical services if administration fails in delivering good quality materials. A large number of materials of diversified nature and character are used to get the quality services. Thus we find that management of materials and stores needs to be carried out in a scientific way so that the financial losses and irregularities can be avoided and good sound inventory management practices can be followed. The objective of the materials management department would be to provide the user departments with right quantity of materials at the right time with the right quality at the right price.

The mismanagement of inventory increases the cost of healthcare services. In an age of information technology and high competition, it is easier to manage the inventory in a most effective way. The main principle of inventory control is that items for which the annual

consumption is high, orders are placed frequently so that the inventory level is as low as possible.

Given the complexity of a hospital, its supply systems and materials management programs, a comprehensive set of policies and procedures serves as both a useful guide and an educational and reference source. Compliance can be determined by auditing what is being done and comparing it to what is stated in the procedure.

Materials management performance can be defined, evaluated, and managed from different perspectives:
• Financial
• Customer Service
• Quality
• Operational

Facilities, Space and Location of Store

A materials management program that is both effective and efficient will allow the best possible use of limited physical space;
• McGlbany (1969) recommends an area of 20 sq ft per bed
• Housley (1979) recommends 1000-1500 sq ft area for a central store

The entire space allotted for store can be considered with following facilities:
• Manager's office
• Secreterial and cleroical area
• Vendor / visitor's waiting area
  - Central store
  - Medical Store
• Nonmedical
• Receiving and unpacking

The location of the store should be decided after considering the following points:
• Easily accessible to receive and issue materials
• Materials are saved from unnecessary pilferages, theft and fire
• Unnecessary fatigue and monotony is avoided

Human Resource : Material Management

Purchase, stores, receiving and distribution may all be integrated into materials management under a Materials Manager. The materials manager in hospital should possess sound knowledge of the concepts of purchasing, inventory control and distribution of materials within the hospital as well as product evaluation, standardization and vendor

Fig. 5.5: Store Department

evaluation. Apart from the Materials Manager, two store keepers - one for non medical and the other for medical and a computer operator / clerical staff would be a minimum requirement for the functions of the materials management department. The main duty of the store keeper will be to make sure that the receiving and issuing of materials are systematically done after cross checking the necessary documents related to each procedure.

Equipment

Materials management functions are being increasingly computerized. Computers are used for almost every activity from ordering to management of the store. The web enabled supply chain management is now gaining importance which optimizes purchase management inventory management and other logistic functions.

Why Marketing Department?

Service delivery care focuses on the product or service and delivering it to those who need the service. A market orientation means focussing on the needs and demands of the target markets and providing the products and services they need. However, some health service organisations are neither primary service nor need based, but market driven. The market driven are sales oriented organisations that focus on stimulating interests of a target group in buying the organization's services. From the patient's perspective, it is important to have access to care that will improve or maintain health. Access to care includes the five A's of availability, accessibility, accommodation, affordability and acceptability. Providing access to care for people who are in need should be an objective of health service organisation.

Table 5.1: Material Management

Storage Location	Pro	Con

On-site	• Customer proximity
	• No duplication of inventory at distributed location
		• Location within site controversial
		  - Cost of space very high
		  - Construction
		  - Opportunity or impact on other functions
		• Poor storage space utilization
		  - Low clear height
		  - Internal obstructions reduce layout efficiency
		  - Adjacencies to other materials management functions usually difficult
		  - Expansion usually difficult; contraction creates space that is sometimes usable

Off-site	• Low space cost • Construction on lease • Annual maintenance • Flexibility for future planning • Expandable • Contraction easily acheieved • Can utilize existing infrastructure • Transportation • Communication • Efficient use of resources	• Perception by certain customers that off-site is 'lower' customet service • Transportation network can require additional resources • Backup cache of supplies needed on-site to provide expedited 'sta' supply

Reference: Managing Hospital Materials Management Kowsalski-Dickow Associates, Inc in cooperation with American Society for Healthcare Materials Management of the American Hospital Association.

Achieving access and the five A's translate into marketing from the institution's perspective. Many health service managers today have this sales orientation of marketing. However many hospitals seem to be taking a sales approach to hospital survival, that is what new products can they sell or how can they repackage services to increase patient volume in competition with other hospitals. They do not focus on community needs and the possibility that the community's health may be better without them.

Why Human Resource Department?

Research has shown that the human aspect of resources within an organization contributes approximately eighty percent of the organization's value. This implies that if people are not managed properly, the organization faces a serious chance of falling apart. The Human Resource Department's main objective is to bring out the best in their employees and thus contribute to the success of an organization. One of the studies says that if the hospitals spend even 10 per cent more on employees (including doctors), they are 50 per cent more efficient when compared to the struggling hospitals.

Human resources, when pertaining to health care, can be defined as the different kinds of clinical and non-clinical staff responsible for public and individual health intervention. Hospital is a place where, on one hand, we have highly skilled personnel such as doctors and on the other, we have unskilled workers

"To attract and retain doctors", says Dr. Asim Sil, Netra Nirmay Niketan "they should be given an opportunity to learn, train in some other institution and to continue to maintain a comfortable working environment. We should encourage scientific work, involving them in decision making, offer financial benefits as far as possible and maintain transparency especially in financial matters. Sometimes we should also look after their personal issues."

such as sweepers and therefore the role of HR department and its head has a role cut out and exclusive. To add, the advent of technology, modernization, computerization, newer diagnostic and intervention techniques, has not reduced the need of human labour in hospitals, which is now an industry. On the contrary, there is a quantum growth in the need to appoint specialized manpower at various levels of patient care, which has emanated from the thought process of those professionals and promoters, who are enlightened with the need to induce quality in patient care.

Active involvement by the Human Resources (HR) Department is a necessity, not an option. HR must facilitate demands for leadership and communication, represent an extraordinary opportunity to reinvent its own processes and create a sustained competitive advantage for the organization.

Functions of HR Department

Both the number and cost of health care consumables (drugs, prostheses and disposable equipment) are rising astronomically, which in turn can drastically increase the costs of health care. In publicly-funded systems, expenditures in this area can affect the ability to hire and sustain effective practitioners. In both government-funded and employer-paid systems, HRM practices must be developed in order to find the appropriate balance of workforce supply and the ability of those practitioners to practice effectively and efficiently. In any health care setting, the Human Resource department fills a variety of personnel needs that both employers and employees encounter. The role of this department is to manage all aspects of operations that are personnel related.

The specific functions of Human Resource department are:
• Human Resource Planning
• Recruitment and Selection
• Employee Orientation
• Personnel Management

• Maintains organizational charts and staffing patters
• Keeps complete personnel files of all employees
• Developing procedures to control absenteeism, turnover and sick leave
• Benefitsand Compensation Management
• Counselling
• Employee Claims Handling
• Organising professional Development Programs
• Providing work place safety and sanitation
• Labour relations
• Administration – Employee Meetings
• Promoting staff morale and retention
• Overseeing employee's health programmes

Human Resource Requisites

For a HR department in a 500 bedded hospital, the following human resource would be required.
• Employment, Training and Employee relation manager - 1
• Personnel manager -1
• Secretary - 3
The role of the HR manager in a hospital is multifaceted and complicated too. Manpower planning and recruitment involves a lot of thought process. Training and development has to be a qualitative and quantitative activity, especially for those who are employed as junior doctors, nurses, front office staff, ward staff, housekeeping/ward attendants etc.

Location

A street level entrance is recommended for this department. The HR department works so closely with the hospital CEO/Director and hence the HR Department location should be easily accessible to the CEO/Director's office. It should also be close to the administrative offices. It should be accessible to the employees as well.

Space Requisites

• Managers office - 2
• Secretarial and clerical area – to accommodate 3 persons and the employees files and other statutory documents
• Waiting area for applications
• Multipurpose room for Training and Orientation programs and lectures

6

Training Eye Care Professionals

Key

Recognising that adequately trained human resources are the core component in the prevention, treatment and rehabilitation of avoidable blindness, VISION 2020 The Right to Sight encourages the development of human resources for eye health at various levels of the health care system. Emphasis is placed on midlevel personnel, defined differently in different countries, who form the backbone of eye care service delivery. A good tertiary eye care centre should offer training for all cadres of eye care staff particularly for the ophthalmologists as well as the ophthalmic technicians who form the mid level personnel.

Challenges for Developing Eye Care HR

Even though human resource development is a mandate of the VISION 2020: The Right to Sight, producing sufficient well trained human resources continues to be a challenge. The lacunaes in the current training programme are:
• There are few opportunities to deveop surgical skill competence.
• The training programmes are of long duration with no concurrent impact on skill
• The current training mechanism is not able to produce the required number of eye care staff for the region.
• There is gap in range of courses to cover all eye care team.
• Short term skill oriented course for ophthalmologists and paramedical staff is also less.
• Geographic coverage of training centres are not available resulting in skewed geographic availabilty of skilled staff.

A training programme defined for the purpose

Fig. 6.1: Training programme for doctors

of this chapter as having following three characteristics:
• Specific learning objectives
• Is a scheduled structured activity
• Conducted by lecturers, trainers or facilitators

This definition excludes training for the primary purpose of personal growth, on the job technical assistance, learning among peers, and events whose primary purpose is networking rather than learning.

To make training an integral part of the hospital service delivery process, the following points are of paramount importance:
1. Incentives and compensation system must favour training: In a hospital environment which rewards individuals for the volume of work done, the doctors no matter how senior, are reluctant to train others as this means reduction in their incentives.
2. Mindset of the leadership needs to be, that by offering training, patient care can be improved.
3. The hospital leadership should view the trainees as an extra pair of hands so that

greater volumes of patients can be seen.

4. The trainers should NOT be resource persons hired to provide only training. The trainer must be part of the hospital team and an integral part of the patient care delivery process. This way they will be much better exposed to practical difficulties in the work. They will also have a better idea about the latest changes in process as well as technology and how to handle different situations.

To set up a training centre the following aspects need to be looked into:
1. Developing the training content
2. Administration of the training programmes
3. Leveraging technology while offering training
4. Sustainability of the training centre

Whether the hospital is ready to become a training centre depends on the following factors:

• **Patient Care Process:** The hospital should be seen as a model of patient care to demonstrate and share best practices.

• **Human capacity for training:** Besides the skills and knowledge of individuals working in the organisation, they need to be developed in their training skill.

• **The resources of the organisation like:** the staff, both trainers and administrative support, equipment, and finance availability ensure training is provided well.

• **Institutional support:** The formal and informal support for this venture which could be internal or external to the organization that can facilitate or obstruct the running of the training centre. Internally it could be the leadership support and externally it could be the ease for trainees to attend.

These above mentioned four dimensions are highly interdependent. Trained individuals can be effective only to the extent that organizational resources and institutional incentives enable them to apply what they learn. Because of the interrelation, evaluation of the impact of training must go beyond simple testing of learning or asking the participants about their level of satisfaction with the training. While designing the training, it is critical to keep this component in mind and design the training so as to maximally ensure that the participant can actually apply it in the workplace.

The training centre should be clear about
• The list of courses that they can offer
• Following a step by step approach of converting the training idea into reality
• It is also important to understand the other requirements needed to support this activity including
  - Plan for developing trainers
  - Equipment and infrastructure requirement plan for enabling learning
  - Training centre development plan

Fig. 6.2: Training programme for eye care managers

Impact of setting up the training centre

Setting up the training centre will have multiple impact when viewed from different perspectives:

Impact of the hospital

- Offering training will definitely add to the brand value and further build up their brand name
- Provide human resource for the hospital (both for within the hospital and for outreach) including development of second line of trained personnel
- Opportunity to learn best practices from others to improve patient care
- Make it easier to develop sub specialty clinics
- Availability of trainers can help in smooth flow of charitable OPD, run vision centres and other secondary eye care projects
- Building a stronger referral network among the eye care service providers
- Maintenance high quality

Impact of the training centre for the region

- Sub specialty training in eye care becomes available for the region
- Refresher training for eye care professionals available for the region especially for the non ophthalmology cadre
- Eye care service delivery for the region will improve
- Increase competency among the eye care workers
- Increase in numbers of eye care support staff both mid level ophthalmic personnel as well as those who can provide services in primary eye care facilities as well as eye care managerial cadre

As per Kirkpatrick training evaluation process there are four dimensions to evaluate the training:

Reaction or immediate feedback on the training: Did the participant have a chance to vocalise his / her feedback through different means whether oral or written.

Learning Outputs: Did training result in acquisition of new knowledge and skills relevant to the achievement of development objectives?
Workplace behaviour outcomes: Are trainees applying acquired skills in the workplace in a manner likely to contribute to the achievement of broader eye care goals?

Impact on development of capacity: Is there evidence of improved eye care work or enhanced organisational performance as a result of training?

Factors for Successful Training

- Adequate targeting of training to meet organisational needs
- Organisational Capacity Diagnosis: What capacity gaps exist? Is training an appropriate means of addressing these gaps?
- Training Needs Assessment: What is the present capacity of those to be trained? What level of training is needed to address existing capacity gaps?
- Strategic participant selection: Who should be trained to meet organisational goals? Whether
- the participants are of similar level?
- Good pedalogy
- Curriculum matched to training needs (includes course, content, delivery, supporting resource materials)
- Training methodology is varied and appropriate for participant level and training goals (methodology mix, appropriateness of the language used)
- Application of adult learning principles as participants all have working experience, hence participant input must be included as a key methodology
- The learning should not only be from the training centre and the resource faculty but the training must equally foster sharing of experience of the participants.
- Feedback must be taken regularly and there should be scope for participants to freely express their thoughts.
- Adequate support for transfer of learning to workplace to be provided
- Preparation while in class to facilitate implementation of learning in the workplace through action learning and practical exercises
- On the jon follow up support through distance mentoring by email or telephonic communication

Once the core staff receive training in Centres of excellence like Aravind, LV Prasad Eye Institute, Sankara Nethralaya for tertiary services, they can, in turn carryout internal capacity building for developing other staff

- Dr. Jain, Sadguru Netra Chikitsalya

The key elements of training design are

Training objectives: Are the performance objectives and indicators of the success of the training clearly articulated?

Training provider: Who are the resource persons used for delivery of the training? Are they people with practical exposure to the subject?

Diagnosis: This is diagnosis of capacity gaps which involves assessment of existing organisational, institutional, and human capacity gaps and of the appropriateness of training as a means to address these gaps.

Training Needs Assessment: This identifies the training design in an understanding of the present capacities of the individuals to be trained and the specific knowledge and skills that participants must acquire in order to meet development objectives.

Strategic Participant Selection: This is necessary to ensure that the participants trained are those whose capacities must be built up in order to meet development objectives. Was there a selection or all applied were provided a seat? Are the eligibility criteria clear? What is the mechanism to ensure the right candidate is being selected for the training?

Client Commitment: Are the people sponsoring the candidates committed to participant learning and undergoing the training programme? Is sending the participant for training, just to finish spending the allocated budget or just rewarding a good employee?

Pedagogical Design: What is the training methodology that is used? Is there a mix of methodology? Is there a professional curriculum design and is that matched to the training needs? Should training content be delivered all at one time or spread out over weeks or months? To what extent are participatory methods or practical exercises necessary in order to achieve sustainable learning? Can course content be covered using electronic or distance learning or is face to face classroom based training necessary? How training content should be sequenced to maximize understanding? How much time should be devoted to specific topics?

Attention to capacity context: Whether there is sufficient capacity for the institute to ensure implementation of what the participant has been trained in?

Follow up support to trainees: What is the assistance provided to the participant beyond the training period to ensure application of what they have learned? Is there adequate support? the two training design practices most commonly associated in the literature with supporting transfer of learning to the workplace are

- Use of practical learning techniques such as exercises, action plans, and projects where the trainee has the opportunity to explore how learned knowledge and skills relate to or could be implemented in his/her workplace environment. The use of practical learning techniques is recognised in the literature as fundamental to the sustainable acquisition of skills through training. Research on adult learning indicates that tasks learned through practice are more likely to be remembered, particularly where more complex skills are involved. The opportunity to practice skills must be sufficient and must replicate the actual skills gaining that one plans.
- Follow up support through on the job technical assistance or access to offsite expert coaching or advice. Follow up support for trainees are recognised as the second important method for assisting them in applying learning. Research also has shown that learning particularly of skills is far less likely to be retained and implemented if it is not reinforced by follow up support once trainees return to the work place.

Model of designing an effective training programme

The process of developing a course should cover the following factors:
- Course objectives and outcome
- Target audience
- Course curriculum
- Marketing of the course and selection of the right candidate
- Process of getting buy-in from the stakeholders
- Teaching materials including lectures and manual
- Teaching methodology
- Practical including Wet lab
- Evaluate the performance of the candidate at the end of the course using log book
- Evaluation of the overall course delivery

Fig. 6.3: Resource Centre

- Course management

Infrastructure Required for a Training Centre

- Classroom space (as per requirement)
- Practical training space for refraction, wet lab
- Library and e-source centre
- Auditorium
- Hostel (This could be outsourced but it is the hospital's responsibility to ensure that facility and transportation are available)
- Canteen: This could be outsourced but it needs to be available within the campus

Recommendation for developing library and resource centre

The opening day collection (the list of books and other resources required to start a good ophthalmic library) provided by the Association of Visual Science Library is a good list every eye care especially tertiary centre should consider.

Developing training centre team

Sharing from the experience of setting up a fully operational training centre, the following roles and responsibilities need to be evolved over time.

Charcteristics of a good training centre team are:
- The core group for training should learn about developing a good training programme
- There should be dedicated staff to oversee

training administration
- There should be a lead faculty for each of the courses
- Marketing plan for various courses are available

Roles and responsibilities of the training centre team

Training Director

- He /she shall be responsible in taking all crucial decisions regarding the training programme, and for the smooth running of the department
- He/she shall guide the faculty team to start new courses
- He/she will approve the course fee and take other financial decisions
- He/she shall determine whether outside support for the course is to be sought, and identify potential course sponsors.
- He/she shall check all the course reports at the end of the year/month

Lead Faculty

- The most important responsibility is developing the course curriculum, designing the teaching modules and preparing the teaching aids
- Fix the target audience for the course
- Teaching the trainees
- To identify and invite the guest faculty in coordination with the head of departments
- To be responsible for the smooth running of the course and finalizing the course schedule as well as course materials.

Training Coordinator

- Invite and make proper arrangements for inauguration, certificate distribution
- Maintains all email and other correspondence related to training.
- Receive, scrutinize, shortlist and select applications with the concerned course coordinator / marketing manager.
- Send selection letter to the candidate confirming his selection and invitation letter to overseas candidates to obtain VISA and related follow-up correspondences.
- Monitoring collection of course fee, accommodation fee and any other receipts relating to course for both direct and sponsored candidates.
- Coordinates with the accounts department or the reimbursements to guest faculty / candidates.
- Ensure availability of adequate course material, classroom, audiovisual equipment, and any other necessary arrangements for the smooth functioning of the course.
- Overall coordination with concerned course for fixing the guest faculty and ensure appropriate arrangements (such as transport, accommodation, travel arrangements etc.) to the guest faculty during their visit.
- Overall coordination with concerned course coordinator, candidates, and guest faculty.
- Prepare appropriate documentation and statements for the training program, collect feedback from the candidates. Prepare evaluation report.
- Record keeping – applications data, candidates profile, course details, statistical information.
- Marketing of various courses through proper strategies
- Updating information on the website

- Keep in touch with alumni by sending relevant reading material.
- Form a network of alumni among the trainees
- Keep in regular touch with the participants and get their feedback about the benefits derived/ difficulties faced after attending the course.

Logistics coordinator

- Accommodation inside and ourtside
- Transport arrangements
- Ticket confirmation
- Tour / shopping arrangements
- Catering arrangements
- Classroom and audio visual aids arrangements
- Coordination with housekeeping department

Office Secretary

- Filling and recording the documents
- Course-pack preparation
- Give full support to training coordinator and faculty

Accountant

- To maintain accounting statements of all the courses
- To send the invoice to the sponsoring organization
- Design a format / database to track and record fees paid by the participants at all training centres, in coordination with the training coordinator
- Develop the income and expenditure sheet for each course and coordinate with the training coordinator to maintain the accounts and submit to the accountant at the end of the course.

7
Research for Evidence

Introduction

India suffers from a large proportion of the blindness burden of the world, which has been estimated to be more than 16.8% share of the world's population. One of the vital elements to improve this situation is to develop a comprehensive and relevant evidence base that would equip India to take informed actions. Studies conducted in these areas suggest that the research output from India is not proportionate to the magnitude and distribution of disease burden.

Role of research

The most critical analysis in the recent years was putting together, with evidence, the fact that over 80% of the blindness is avoidable (curable and/ or preventable). The next analysis established that over 90% of the blindness was in the developing countries.

These global analyses give us the direction that it's high time to sharpen the focus on priority eye conditions as well as on underserved geographical areas.

The purpose of research has been widely defined as 'to add to the body of knowledge'. But the ultimate purpose ought to be (in the case of eye care) making more people see, preventing blindness/impairment and enhancing quality of life. As we focus on implementation of our plans to reach our goals, we will also need to develop best practices with evidence in support of them to achieve excellence.

Gaps in research

Even though research and publication of findings have been happening, there is massive mismatch in terms of the areas in need and the areas where the works are being

Table 7.1: The number of articles from the World regionsfor each journal (2008)

Journal	Total Articles	Developed Countries	Developing Countries	Joint contribution from both regions
IOVS	1,336	1,269	40	27
Ophthalmology	923	775	93	55
AJO	937	865	59	13
Archives	1,081	1,042	37	02
BJO	913	834	55	24
Total	5,190	4,785 (92.2%)	284 (5.4%)	121 (2.3%)

Where the blind are?		Publications
Developing Countries	90.8%	7.8%
Developed Countries	9.2%	92.2%

Source: The contribution to ophthalmic literature from different regions of the world, Kaveri Mandal, Sarah Benson & Scott G. Fraser, International Ophthalmology 25: 181–184, 2004.

Fig.7.1: Basic clinical research in progress

done. More than 90 percent of the research contributions are from the developed world that holds less than 10 percent of the blindness magnitude (Table -1).

Does this poor representation matter?

Any researcher will focus on issues relevant to them and hence most publications tend to be biased towards issues of the developed countries. Generating evidence also generates ownership and the desire to address the issues or implement the findings. So, it does matter since the developing countries have most of the blindness burden. With rising health costs, local literature is important for facilitating evidence based and cost-effective decisions and thereby improving clinical practice.

c. What type of research can bring direct value to organization?

Research activities in a tertiary level eye hospital can happen in various ways.

Clinical Trials: Clinical trial is a carefully designed experiment with the aim of answering some precisely framed question. Clinical trials are conducted to allow safety and efficacy data to be collected for health interventions (e.g., drugs, diagnostics, devices, therapy protocols). Depending on the type of product and the stage of its development, investigators enrol healthy volunteers and/or patients into small pilot studies initially, followed by larger scale studies in patients that often compare the new product to the currently prescribed treatment. Clinical trials can vary in size from a single centre in one country to multicentric trials in multiple countries. A tertiary eye hospital with good patient load can collaborate with pharmaceutical companies to run various phases of clinical trials.

Clinical Investigations: Clinical investigation projects involving humans may aim to translate knowledge gained in laboratory science using animal or cell systems as models of specific diseases. This transactional model of research is designed to develop new prevention, intervention, and treatment strategies to ultimately improve patient outcomes.

Epidemiological Studies: Epidemiology is the study of patterns of health and illness and associated factors at the population level. It is the cornerstone of public health research, and helps inform evidence-based medicine for identifying risk factors of disease and determining optimal treatment approaches to clinical practice and for preventive medicine. Carrying out epidemiological studies will not only add value to the care delivery by the hospital but also will contribute in a bigger way to the community at large.

Health Systems Research: Health systems research is the multidisciplinary field of scientific investigation that studies how social factors, financing systems, organizational structures and processes, health technologies, and personal behaviors affect access to health care, the quality and cost of health care, and quantity and quality of life. Health system's research in eye care, in general has been a neglected area and the need of the hour is to concentrate more on this as the challenges to universal health and coverage are mostly in this realm. We have a handle on the clinical solution for almost 80% of all the causes of blindness. In most cases, we have the required resources and infrastructure as well. But, eye care programmes everywhere are struggling to get adequate number of patients, to increase the acceptance rates to treatment and follow-up, to retain skilled human resources and have the staff give their best or deliver the services efficiently. This results in underutilization of the available resources on one hand and increasing blindness on the other. From the delivery perspective, most of the problems in eye care today are related to access, productivity, cost (affordability), quality assurance, equity and financial viability-the components of health systems. Health systems research as a discipline can help generate evidence to understand and act on the real issues and also to promote best practices for the benefit of the community.

Research – a way of career development for ophthalmologists

Today's rapidly evolving medical science necessitates that clinicians keep abreast with the latest developments. This requires the understanding and use of scientific principles and methods. Research activity of ophthalmologists is important as it promises better clinical care, critical reasoning and lifelong learning.

Although there may be an imbalance of motivating and frustrating factors on the road to productive research for the active clinician, research can be exciting, highly creative, and personally satisfying. Although it is rarely rewarding in a direct financial sense, it is usually fulfilling in many other ways. Those who commit their lives to research have been described as varied, brilliant, strong, and single minded.

It is unlikely that a clinician starting out on a research path, or one returning to research later on in an established clinical career, will arrive at a definitive topic with appropriate funding without assistance from a more established researcher. Becoming involved in local projects that are already established is one way of entering the research pool, although it provides very limited ownership or ability to direct a project. Another relatively straightforward entry into clinical research is the clinical report approach, wherein a rare, unusual, or particularly well-illustrated case (or cases) is written up as a brief letter or case report to a journal.

Human Resources

Biostatistician -1
Data Manager -1
Data Entry staff -4

Infrastructure

Necessary Software like SPSS or STATA for data analysis.

Computers

For carrying out research it is essential that the human resources provide the necessary support for research design, data collection, and analysis. The research team will support those involved in research like Ophthalmologists, Microbiologists, Hospital administrative staff and others in the hospital who have a keen interest to do research. There will need to be activities related to awareness creation as well as consultations between the team members so that the research progresses in the correct manner.

Conclusion

The utilization and production of research along with human and institutional development are two important components of health research. Ultimately, research is within the capabilities of all clinicians, but it requires liberal doses of inspiration, enthusiasm, collegial support, and hard work. Remember, research is typically a team effort and it requires measures of diplomacy and persuasion to embark on appropriate projects and decline those of limited potential.

8
Tertiary Eye Care Centre to Centre of Excellence

The VISION 2020: RIGHT TO SIGHT service delivery pyramid envisages a centre of excellence for every 20 million population. That is for India 5 centres of excellence in eye care is required. India also requires 200 tertiary eye care centres. The Centre of Excellence is expected to perform the entire gamut of eye health care functions, the emphasis being on providing a model of excellence in all respects, and active participation in formulating eye care policy. Essentially, the emphasis at this level besides service delivery, research and training is on innovation and policy.

Centre of Excellence

The term "centre of excellence" is not a term which is a part of the name given by the institution to itself. We often can find organisations named as "Centre of Excellence". For the purpose of this manual we are not talking about such institutions. Centre of excellence is a recognition that the institutions must receive from others. This recognition is based on the activities that the organization engages itself in. This concept of centre of excellence is not new, it is there in several

Fig.8.1: Mr. R.D. Thulasiraj addresses a VISION 2020 meeting

sectors especially in the academic sector. The most commonly known examples of the centres of excellence is Stanford University which produced Silicon Valley.

A centre of excellence is a structure where research, service delivery is performed of world standard, in terms of achieving measurable good health outcomes, scientific production (including training) and/or technological innovation". It can be a separate institute, or department or division or part of the hospital complex itself. However at the heart of it is a team of people that promotes collaboration and uses best practices around a specific focus area to deliver best patient outcomes.

Characteristics of the Centre of Excellence (CoE)

- Comprise and attract excellent researchers and developers,
- Earn reputation as a significant resource for the progress of eye care treatment, through the application of better science and technology,
- Spread innovation

Centre of Excellence should serve five basic needs

- Support: For their area of focus, CoEs should offer support to the main purpose of bettering patient care. This may be through provision of services needed, or providing subject matter experts.
- Guidance: Standards, protocols, standard operating protocols, methodologies, tools and knowledge repositories are typical approaches to filling this need.
- Shared Learning: Training and certifications,

skill assessments, team building and formalized roles are all ways to encourage shared learning.

- Measurements: CoEs should be able to demonstrate they are delivering the valued results that justified their creation through the use of output metrics.
- Governance: Allocating limited resources (money, people, etc.) across all their possible use is an important function of CoEs. They should ensure that organizations invest in the most valuable projects and create economies of scale for their service offering. In addition, coordination across different divisions and centres is needed to enable the CoE to deliver value.

A list of some key features of such centres includes

- A 'critical mass of high level ophthalmologists, scientists and/or technology developers;
- A well-defined structure having its own research agenda;
- Capable of integrating connecting fields and to associate complementary skills;
- Capable of maintaining a high rate of exchange of qualified human resources;
- A dynamic role in the surrounding innovation system;
- High levels of international visibility and scientific and/or industrial connectivity;
- A reasonable stability of funding and operating conditions over time
- Sources of finance which are not dependent over time on public funding

The hospital will become a centre of excellence when it gains recognition

- As one of the referral centres in the world
- As a premier centre of research
- Developing state-of-the-art training programmes coupled with international expertise to attract international candidates even from developed countries

While the centre of excellence will be established to serve primarily the regional level or national level it should be held by the eye care community as an international centre of excellence in research, training and develop changes in treatment patterns to prevent blindness. It aims to develop state-of-the art training programmes coupled with international

Fig.8.2: Publications of Communications Division

expertise to attract international candidates even from developed countries. It also aims to establish a premier centre for research and become one of the best referral centres in the world. Infrastructure of a Centre of Excellence is expected to have the following services besides having a sophisticated and well developed sub speciality clinics patient care:

1. Communications Division: A state of the art facility will be available to take care of all the inhouse publications. These could be in the form of brochures, manuals, reports, or any other health education material.
2. IT Division: With technology developing the way it is, this would be a fundamental requisite to ensure state of the art use of technology
3. Training centre: A well developed training complex complete with classroom, auditorium, hostel and canteen facilities
4. Project management office: This will act as an incubation centre for new innovative ideas and ensure resource availability as well as implementation of innovations on a project basis

How does one evaluate success of a centre of excellence?

- Number of patients referred for treatment for potential eye condition where no further treatment was available elsewhere
- Scientific publications
- Number of medical equipments or instruments developed
- Contribution to identification of newer diseases, diagnostic possibilities or treatment regimen
- Number of outsiders visiting the organisations
- Number of tertiary eye care facilities supported or developed.

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Annextures

Case Sheet Model

OT Layout Model

Aravind Eye Hospital

& Postgraduate Institute of Ophthalmology
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Cornea Case Record

M.R.No. : _____

Cor No. : _____

Date : _____

Name :_____ Age :_____ Sex : M/F

Address :_____

_____

Diagnosis:

Complaints :

History : Injury / Application of Irritants / Treatment

Examination : Details of corneal problem :
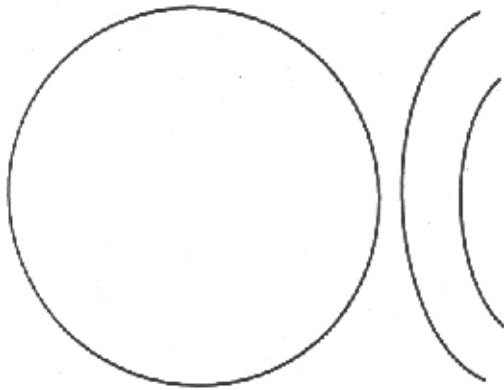
Staining :Rose Bengal
    Flourescein +ve-ve

Corneal Sensation :

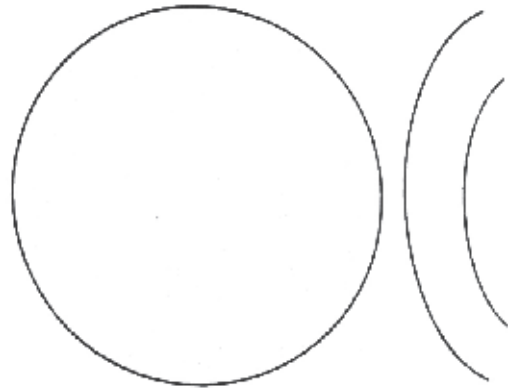| Vision		Without glasses with glasses	Duct :	
	RE			RE
	LE			LE

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Slip Lamp Examination : Cornea

Right Eye

Left Eye

Keratometry :

Pachymetry :

Specular Microscopy :

Scraping :KOH :
          Gram :

Culture & Sensitivity :

Treatment advised :

- ❖ Yellow - Active Infection
- ❖ Blue - Oedema
- ❖ Red - Vessels
- ❖ Green Hatching - Epithelial defect
- ❖ Black - Scarring
- ❖ Brown - Dystrophic Changes

Aravind Eye Hospital

& Postgraduate Institute of Opthalmology
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Glaucoma Case Record

M.R.No.: _____

Gla.No.: _____

Date : _____

Name : _____ Age: _____ Sex: M / F

Address : _____

_____

Occupation : _____

Diagnosis : RE

LE

1. History : Present Illness

Defective Vision		Injury
Night Blindness		Haloes
Frequent Change of glasses		Nausea
Pain in the eyes		Duration
Watering	Redness	Onset

Personal History :

Smoking/Alcoholic/Diabetes/Hypertension/Asthma/Urinary Tract/ G.I.T., / RS / Cardiac

Allergic to :

Family History

- of Glaucoma

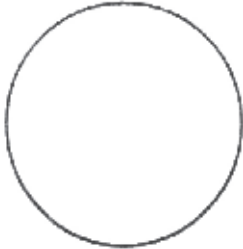- of Diabetes
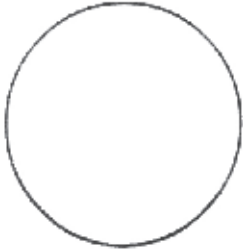
- of Ocular disease

Treatment taken :

Nature, Regularity
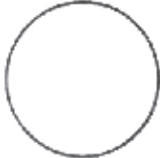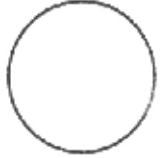
Drops :

Pills :

Surgery :

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2. EXAMINATION :

EXAMINATION OF THE EYE	RIGHT EYE	LEFT EYE
Conjunctiva : Bleb (type, Dilated episcleral vessels, others		
Cornea : EPI, Stroma, Endo., (edema) Pigment, kruckenberg Spindle, PXF, others		
Anterior Chamber : Depth, (central / Peri). Regularity, Reaction, others		
Iris : Colour / pattern (Nor/Alt) synechiae, (PS/PAS) NVI (G-1, II, III, IV) PI (sur / laser), PXF		
Pupil : Size shape, Transilluminations, PXF		
Lens : Clear, Cataract, Sublux / Disloc, PXF / Glaucomflecken, Others		
Other :		

3.VISION :   4. TENSION :

	Without glasses	With glasses	Schiotz	Applanation
Right Eye				
Left Eye				

5.FUNDUS :

Cup/Disc Ratio, Depth of **cup**, Notch, Vascular signs, Haemorrhage, NR Rim, Peripapillary atrophy, NFL defect

Right Eye

Background
Macula

Left Eye

Backround
Macula

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6. GONIOSCOPY

Pigmentataion, PXF PAS, Recession Neovascularization	✕	✕

7. Fields :	RE
<u>HFA</u> Tangent Screen	LE

8. DIAGNOSIS :	RE
	LE

9. TREATMENT Medical / Laser	RIGHT EYE	LEFT EYE

10. SURGICAL	RIGHT EYE	LEFT EYE

11. REVIEW ON / AFTER

12. FOLLOW UP : INV

Aravind Eye Care System   Glaucoma Review Record

Name : Mr. / Ms / Mrs. : _____   M.R. No. : _____

Age : ___ Yrs.   Sex : M ☐   F ☐   Date : _____   Review as per appointment : Yes ☐ No. ☐

GL. No. _____ MRD in time : _____ Glaucoma in time : _____ out time : _____

Previous Diagnosis :	Systemic Illness	
	DM ☐ _____	
	HTN ☐ _____	
	BA ☐ _____	
Complaints :	CARDIAC ☐ _____	
	Uninary Problem ☐ _____	
	OTHERS ———————	

Treatment taken	IOP	RE	Time	LE
	Perkins / NCT			
	Applanation			

Examination :

RE   ◯   *Model*   ◯   LE

RE	Gonioscopy	LE
✕		✕

Dilate : _____

Fundus :   RE   LE

◯   🟨 – Cup   ◯

🟥 – Blood Vessels

🟩 – RNFL

Treatment Plan:

Current Diagnosis:	Review After 3 / 4 / 6 / 12 Months

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Time :			Refraction Record			
PG Power		Spherical	Cylinder	Axis		V / A with PG
DV	RE					
	LE					
NV	RE : Add					
	LE : Add					

Retinoscopy (DYNAMIC)	RE	LE	Working distance
			Wants to change PG : Y / N Comfortable with PG : Y / N

Subjective Refraction :   Occupation :   Refractionist Signature :

VA / Unaided			SPH	CYL	Axis	V / A	With PH V / A
DV		RE					
		LE					
NV		RE : add+	Sph reads	at	cms		
		RE : add+	Sph reads	at	cms		

IPD :   OD   OS   NV   OD   OS   DBOC :

	RE	LE
HFA		
OCT		

COUNSELLING INFORMATION

UNDERSTANDING OF GLAUCOMA	MEDICATION COMPLIANCE	SUFFICIENT MEDICINE TILL NEXT FOLLOWUP
Good ☐ Average ☐ Poor ☐	Good ☐ Average ☐ Poor ☐	Yes ☐ No ☐

Follow up Investigations	
☐ HFA Last HFA done on _____ ☐ OCT ☐ Gonioscopy ☐ Others	Review Date : _____ Referred to : _____ Counsellor Signature _____ Physician Signature _____

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Aravind Eye Hospital
& Postgraduate Institute of Ophthalmology
(Run by Govel Trust)

M.R. No. _____

Date : _____

Glaucoma Surgery Record

Gl. No. : _____

Name   : _____ Age : _____ Sex : M/F

Address : _____
_____

Nature of Glaucoma :		
	Primary open-angle Glaucoma	
	Primary angle-closure Glaucoma	
	Congenital Glaucoma	
	Secondary Glaucoma due to	

Nature of surgery :
_____
_____

Surgeon :   Assisted by :

Anaesthesia :   Date :

Details of surgery :

Complications

Post Operative Notes :

Date	Lid	Conjunctiva / Bleb	Cornea	Ant. Chamber	Iris	Pupil	Lens

On Discharge :

Post operative Tension :

Post operative conditions of the eye :

Treatment after discharge :

Condition of the other eye :   Treatment (if any) :

Follow up :

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& POSTGRADUATE INSTITUTE OF OPHTHALMOLOGY
(Run by Govel Trust)

M.R. No. : —————

Laser No.: _____

Laser Procedure - Notes

Name : _____ Age : _____ Sex : M/F

Diagnosis :

Procedure :	Date :	Surgeon :

Anaesthesia - Topic/RB

LE / RE

Type of laser :

Power :

Spot Size :

Duration :

No. of Spots :

Area treated :

Complications :

Follow up :

Procedure :	Date :	Surgeon :

Anaesthesia - Topic/RB

LE / RE

Type of laser :
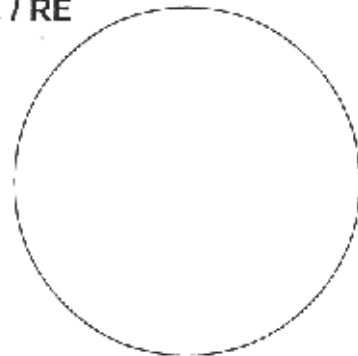
Power :

Spot Size :

Duration :

No. of Spots :

Area treated :

Complications :

Follow up :

Procedure	Date :	Surgeon :
Anaesthesia - Topic/RB	LE / RE	
Type of laser :		
Power :		
Spot Size :		
Duration :		
No. of Spots :		
Area treated :		
Complications :		
Follow up :		

Procedure	Date :	Surgeon :
Anaesthesia - Topic/RB	LE / RE	
Type of laser :		
Power :		
Spot Size :		
Duration :		
No. of Spots :		
Area treated :		
Complications :		
Follow up :		

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Vision Rehabilitation Centre
ARAVIND EYE HOSPITAL
& POSTGRADUATE INSTITUTE OF OPHTHALMOLOGY
LOW VISION CASE SHEET

First Visit : ☐

Follow up No. : ☐

Patient Name : _____ MR. No. : _____

Age : _____ Sex : _____ Date :

Education : _____ Time :

Occupation : _____

Medical History :

Refferal Diagnosis : _____ Department : _____

Does the patient use any Lowvision Aids : Yes / No

Type / Power of the Glass / Magnifiers : _____

Does the patient have Adaptation Problem : Yes / No

Does the patient Experience Photophobia : Yes / No

Type of tint used : _____

Paediatric Low Vision History :

Education : _____ Normal / Integrated Education / Special Education

Methods used : Braille / Print / Both

Childs performance in class : _____ Family History : _____

Parental History : _____

Any other disability : Mental Retardation / Hearing Impairment / Orthopaedically Handicapped

Others : _____

Functional History :

The patient face problems in,	yes	No
Class room activities :	☐	☐
Daily living activities :	☐	☐
Mobility :	☐	☐
Social participation :	☐	☐
Leisure time activities :	☐	☐

Details : _____

Patient's stated needs : _____

Recommendations :

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Optometry Workup :

Visual acuity :	RE	LE	PG Power
Unaided :			RE
Aided :			LE
Near Vision :			
Chart Used : ETDRS	1m / 2m / 3m / 4m		

Dynamic Refraction :   Working Distance :
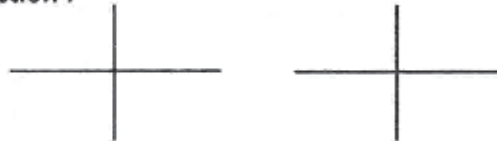
Subjective Refraction :	SPH	CYL	AXIS	VIA	VIA with PH
DV : RE					
LE					
NV : RE add +	Sph reads	at	cms		
LE add +	Sph reads	at	cms		

Central Fields : _____

Contrast sensitivity : ☐ Normal   ☐ Defective   ☐ Value BE

Colour Vision :   ☐ Normal   ☐ Defective

Trial with Low Vision Devices :

Distant vision with,

Telescope _____ Improvement _____

Binocular _____ Improvement _____

Near vision with,

Spectacle _____ Improvement _____ Working distance _____

Magnifier _____ Improvement _____ Working distance _____

CCTV _____ Improvement _____ Working distance _____

Photochr omic tint prefered   : _____

Illumination requirement   : _____

Low vision aids prescribed to better eye : _____

Non optical aids prescriped   : _____

Recommendations & Options :

Review :

ARAVIND EYE HOSPITAL

& POSTGRADUATE INSTITUTE OF OPHTHALMOLOGY
(Run By Govel Trust)

M.R.No.: _____
O.R & O.C. No.: _____
Date: _____

Orbit & Oculoplasty Case Record

Name :_____ Age :_____ Sex : M/F

Address : _____

_____

Occupation : _____

Presenting Complaint:

Model

History of Chief Complaint :

Previous Ocular History (Injury, Surgery) :

Ocular medications:	Non-ocular Surgical Procedures :
Allergies :	Family History :
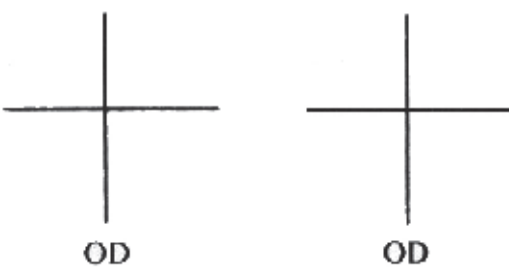
General Medical Health (Diabetics, Hypertension, Heart Disease, Respiratory, Thyroid, Bleeding. neoplasm, Arthritis)

General Ophthalmic Examination

V.A	Without Glass	With Glass	Pupil' size	Reaction	Afferent
OD					
OD					

Metility and Alignment

OD   OD

Fundus

Slit lamp Exam. OD OS			OD	OS
Eye lid margin		Iris		
Eye lashes		A/C		
Conjunctiva		Lens		
Cornea		Vitreous		
		IOP	Primary Gaze	30° Upgaze
Colour Vision	OD	OD		
	OS			
Central Fields	OD	OD		
	OS			

Orbital Evaluation

	OD	OS		OD	OS
Hertel (Base_____ _____mm)			Palpation		
			Retropulsion		
			Bruit		
Globe Displacement			Pulsation		
			Valsalva		
Vertical			Forced Duction		
Horizontal					

General Physical Examination

Head and Neck	ENT
Cranial Nerves	Skin and others

Investigations

Radiology
Laboratory

Socket Evaluation

Implant	Formix deapth
Superior sulcus deformity	Prosthesis Fit
Enophthalmos mm	Cornea - centeration / size
Lid position	Cornea - colour
Surface	Prosthesis surgface

Ocular Examination

Topography
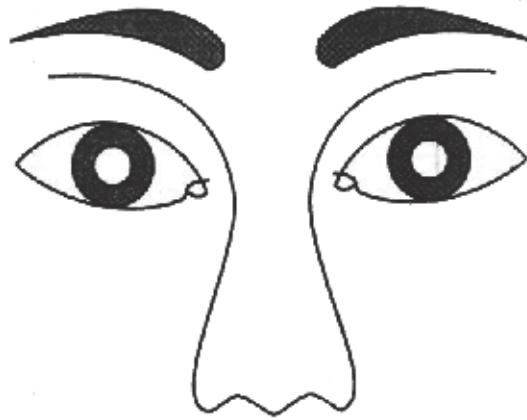
Lacrimal Evaluation	OD	OS		OD	OS
Eyelid position			Jones I		
Puncta			Jones II		
Tear Lake / Film			Probing		
Dye disappearance test			Irrigation		
Tear Break up time			Schirmer		

Eye Lid Evaluation

	OD	OS			
MRD			Jaw Wink	Present	Absent
Levator Function			Bell's Phenomena	Poor	Good
Palpebral Fissure			Hering's Law	Present	Absent
Lid Crease			Neostigmine test	Positive	Negative
Lagophthalmos			Fatigue	Present	Absent
Down Gaze Lid Position					

Aravind Eye Hospital
& Postgraduate Institute of Ophthalmology
(Run by Govel Trust)

M.R. No. : _____

Date : _____

Orbit & Oculoplasty Surgery Record

Age : _____ Sex : M / F

Name : _____

Place : _____

Diagnosis : RE _____ LE _____

Duct : _____

Surgeon _____ Assistant : _____

_____

Procedure : _____ Aneathesia : LA / GA

Operative Notes :

Complications (If any) :

Treatment :

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Aravind Eye Hospital
& Postgraduate Institute of Ophthalmology
(Run by Govel Trust)

Strabismus Case Record

M.R. No.   : ....

Strabismus No. : ....

Date   : ....

Orthoptic Report

Name : .... DOB / Age : ....

History : ....

....

....

....

AHP : ....

VA :   Test used : ....

      RE   LE   BEO

with glass

without glass

Cover Test :

sgs   6m ....

cgs   ....

sgs   (1/3m) ....

cgs   ....

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Binocular Status : Worth Lights   : ....

                       Bagolini Lenses : ....

Stereoacuity   : ....

Convergence   : ....

Accommodation :   RE   LE   BEO

Prism Fusion Range (Near / Dist.) :

Ocular Movements :

PCT

     6m ....

     1/3m ....

Synoptophore :

Diagnosis : ....

....

Management plan : ....

....

....

Aravind Eye Hospitals & PG Institute of Ophthalmology   **Retina New Case Record**

M.R. No.:_____   Date : _____

Name:_____   Age:_____ Sex: M / F

History / Complaints :

Past Ocular History : Trauma / Ocular Surgery / Laser / Ocular Inflammation

Systemic History :

- Diabetes Mellitus   - Type I / Type II / Uncertain   Duration :_____
- Treatment   - None / Diet / Oral / Insulin
- Other systemic conditions - Hypertension / Renal Disease / Asthma / Cardiac / Hyperlipidemia

Others:

BCVA : RE_____   LE_____   BP :_____ mmHg

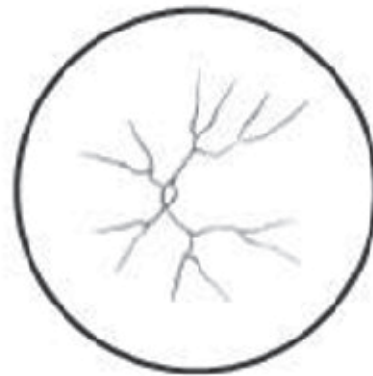IOP : RE_____   LE_____ mmHg   RBS / FBS / PPBS :_____

Anterior Segment :

Fundus :

	OD	OS

OD   **OS**
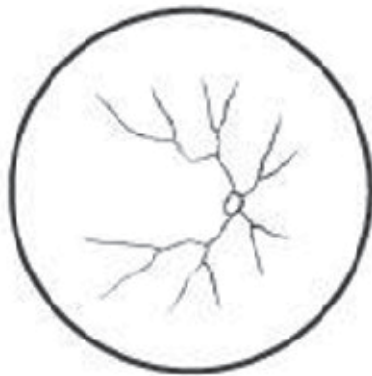
Diagnosis :

RE	
LE	

Investigations :

USG / OCT / FFA

Others :

Treatment / Advice :

Signature :

Date:

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Aravind Eye Hospitals & PG Institute of Ophthalmology	**Retina Review Case Record**

M.R. No.: _____   Date : _____

Name : _____   Age: _____ Sex: M / F

Complaints :

Past History :

Model

BCVA : RE _____   LE _____   BP : _____ mmHg
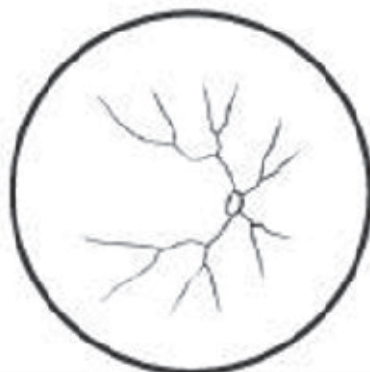
IOP : RE _____   LE _____ mmHg   RBS / FBS / PPBS : _____

Anterior Segment :

Fundus :   OD   OS
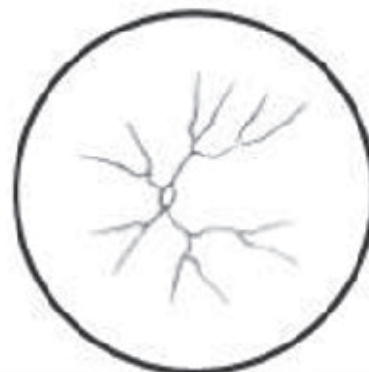
Diagnosis :

RE	
LE	

Investigation / Treatment :

Review After :

Signature :

Date :

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ARAVIND EYE HOSPITALS
& POSTGRADUATE INSTITUTE OF OPHTHALMOLOGY
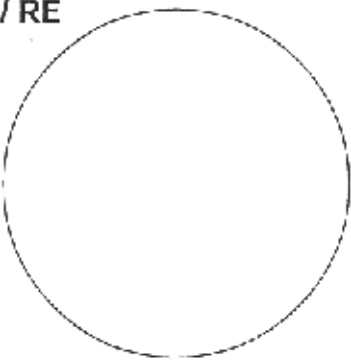(Run by Govel Trust)

M.R. No. : _____

Laser No.: _____

Laser Procedure - Notes
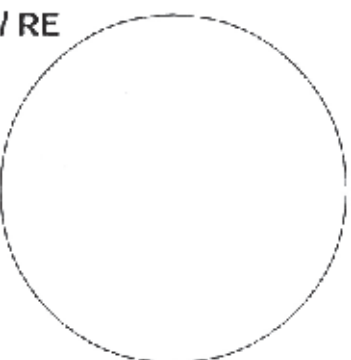
Name : _____ Age : _____ Sex : M/F

Diagnosis :

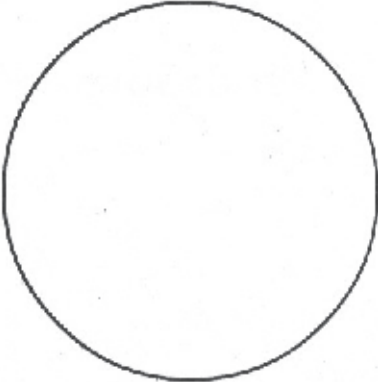| Procedure :	Date :	Surgeon :

Anaesthesia - Topic/RB

Type of laser   :

Power   :

Spot Size   :

Duration   :

No. of Spots   :

Area treated   :

Complications   :

LE / RE

Follow up   :

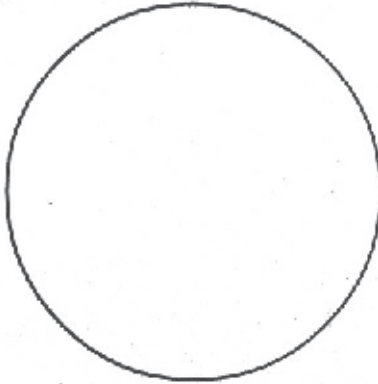| Procedure :	Date :	Surgeon :

Anaesthesia - Topic/RB

Type of laser   :

Power   :

Spot Size   :

Duration   :

No. of Spots   :

Area treated   :

Complications   :

LE / RE

Follow up   :

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Procedure	Date :	Surgeon :
Anaesthesia - Topic/RB	LE / RE	
Type of laser :		
Power :		
Spot Size :		
Duration :		
No. of Spots :		
Area treated :		
Complications :		
Follow up :		

Procedure	Date :	Surgeon :
Anaesthesia - Topic/RB	LE / RE	
Type of laser :		
Power :		
Spot Size :		
Duration :		
No. of Spots :		
Area treated :		
Complications :		
Follow up :		

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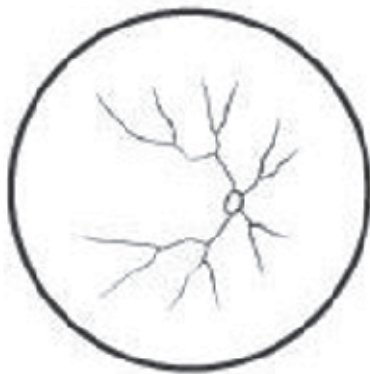
Fundus Fluorescein Angiography Report

Name : _____ Age : _____ MR.No. _____ Date : ___/___/_____

FFA Diagram :

RE :   LE :

OD   OS

AVT :

Description :

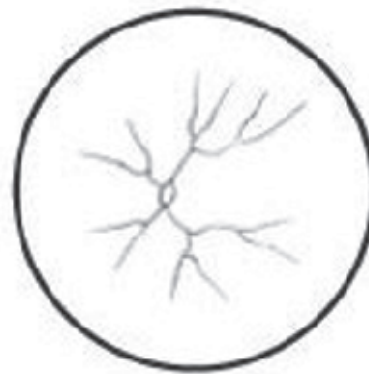Diagnosis :   Advice

RE

LE

                                                                     Signature

Aravind Eye Hospital
& Postgraduate Institute of Ophthalmology
(Run by Govel Trust)

Strabismus Surgery Record

M.R. No. :

Strabismus No. :

Date :

Birth Weight :

Name :   Age :   DOB____ /____ /____ Sex : M/F

Diagnosis

Surgeon :

Asst :   Model   **Date :**

Nurse :   **Theatre :**

Operation details

- **Anaesthesia :**   • GA   • LA   • Others
- **Approach**   • Limbal   • Fornix
- **Horizontal muscles**

  Medial rectus   • Recession/Resection _____mm

                    • Adjustable   • Hang back   • Conventional

  Lateral rectus   • Recession/Resection _____ mm

                    • Adjustable   • Hang back   • Conventional

- **Vertical muscles**

  Superior Rectus   • Recession_____ • Resection _____

  Inferior Rectus   • Recession_____ • Resection _____

  Superior oblique   • Tenotomy   • Tucking   • Others

  Inferior oblique   • Recession _____ • Myectomy   • Anteropositioning

---

- **Suture**   :

- **Complications**   :

- **Postoperative instructions :**

Post operative evaluation

Vision RE LE

Complaint (If any)

Orthoptic evaluation
- Head posture
- Corneal reflex test

- **Cover tests**

Near	Without PG	With PG	With PG & Acc. T
Distance	Without PG	With PG	With PG & Acc. T

- Ocular movements
- Pattern deviation
- **Prism Cover Test / Krimsky**

Near	Without PG	With PG	With PG & Acc. T
Distance	Without PG	With PG	With PG & Acc. T

Sensory examination

- B.S.V. (W4D / TNO / Others - Near Distance

- Stereopsis (TNO / Others)

Advice

ARAVIND EYE HOSPITAL
& POSTGRADUATE INSTITUTE OF OPHTHALMOLOGY

M.R. No. : _____

Uvea No. : _____

Date : _____

Uvea Case Record

Name : _____ Age : _____ Sex : M/F

Occupation : _____ Community : _____

History :	RE	LE		
Pain			Duration	:
Redness			Onset	: Acute / Insidious
Photophobia			Severity	: Mild / Moderate / Severe
Floaters			Course	: Acute / Subacute / Recurrent / Chronic
Defective vision			Previous attack : Treated / Not tr. / Stop / Tapering	

Treatment history	Steroids	Dilators	Others	Current medications
Topical				
Subconj.				
Subtenon				
Systemic				

Past ocular history : Trauma / Eye surgery / Eye inflammation / prior visual loss / Mis :

General medical history and review

Systemic illnesses : (TB, Sarcoid, Arthritis, Diabetes, Syphilis, Leprosy, Collagen - vascular disease, High blood pressure, Fever)

Skin : (Vitiligo, Alopecia, Poliosis, Rash, Nodules)

Joints : (Low back pain, Any joint pain. Swelling or redness)

GI : (Painful mouth ulcers, Inflammatory bowel disease, Dysentry)

CNS : (Ringing in ears, Hearing loss, Headache, Thick nerves)

Pulmonary : (Cough more than 3 months, Hemoptysis)

Genitourinary : (Genital ulcers, Urethral or Penile discharge, Urethritis)

History of allergies : _____

Family history : TB, Arthitis, Syphilis, Chronic infectious disease

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Summary of history					
Vision with correction : RE:		**LE :**	**Tension :**	**RE:**	**LE :**

S/L Examination	RE	LE		RE	LE
Conjunctiva			**Iris**		
Congestion			Colour		
Nodules			PS		
			PAS		
Cornea			**Nodules**		
Sensation			**Granulomas**		
Epithelium			**Vessels**		
Stroma			**Atrophic patch**		
Endothelium					
			Anterior vitreous		
AC					
Flare			**90D lens examn.**		
Cells					
Haemorrhage			Vitreous		
Hopopyon					
			Optic Nerve		
Lens			Macula		
Clear					
Senile cat.			Retina		
Comp. cat.					
			Choroid		

Gonioscopy	RE		LE	

AC cell grading			Flare			Vitreous opacities		
0	=	None	0	=	None	0	=	Nerve fibre layer
1+	=	5 to 10 / HPF	1+	=	Faint	1+	=	Disc vessels clear
2+	=	10 to 20	2+	=	Moderate Iris clear	2+	=	Moderate blurring
3+	=	20 to 50	3+	=	Marked, Iris hazy	3+	=	Marked blurring
4+	=	> 50	4+	=	Fixed Aq.with fibrin	4+	=	Disc not visible

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Fundus :

Ultrasound / FFA

Date ordered	Laboratory Tests	Result
Clinical diagnosis		

Clinical diagnosis

Differential diagnosis
1.
2.
3.

Treatment

Follow-up plan

To be reviewed on / Review after:

Aravind Eye Hospital & PG Institute of Ophthalmology UVEA REVIEW CASE RECORD

M. R. No. : ....   Date : ....

Name : .... Age .... Sex : M / F

Complaints :

Work up

BCVA ⟨ RE [ ]
         LE [ ]

Diagnosis :

Tension ⟨ RE [ ]
          LE [ ]

Clinical Conclusion	
Sp. Diagnosis	

BP ->
RBS ->

Past Treatment :

IMMUNO SUPPRESSIVES					
NAME :					
STARTED ON :					
DOSE :					
1	2	3	4	5	6
CBC					
SE					

Anterior Segment :

RE   LE

Posterior Segment :

RE   LE

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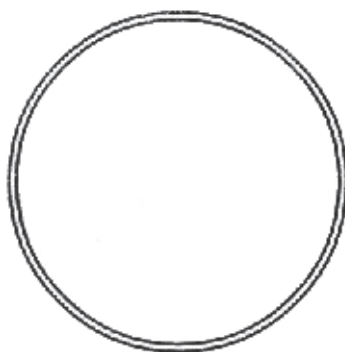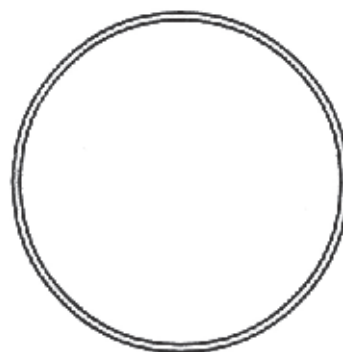
Investigation Needed :

Prescription :

Management Plan :

Review After :

Doctor Signature :

Follow Up :

OT Layout Model - 1

OT Layout Model - 1

SECOND FLOOR PLAN
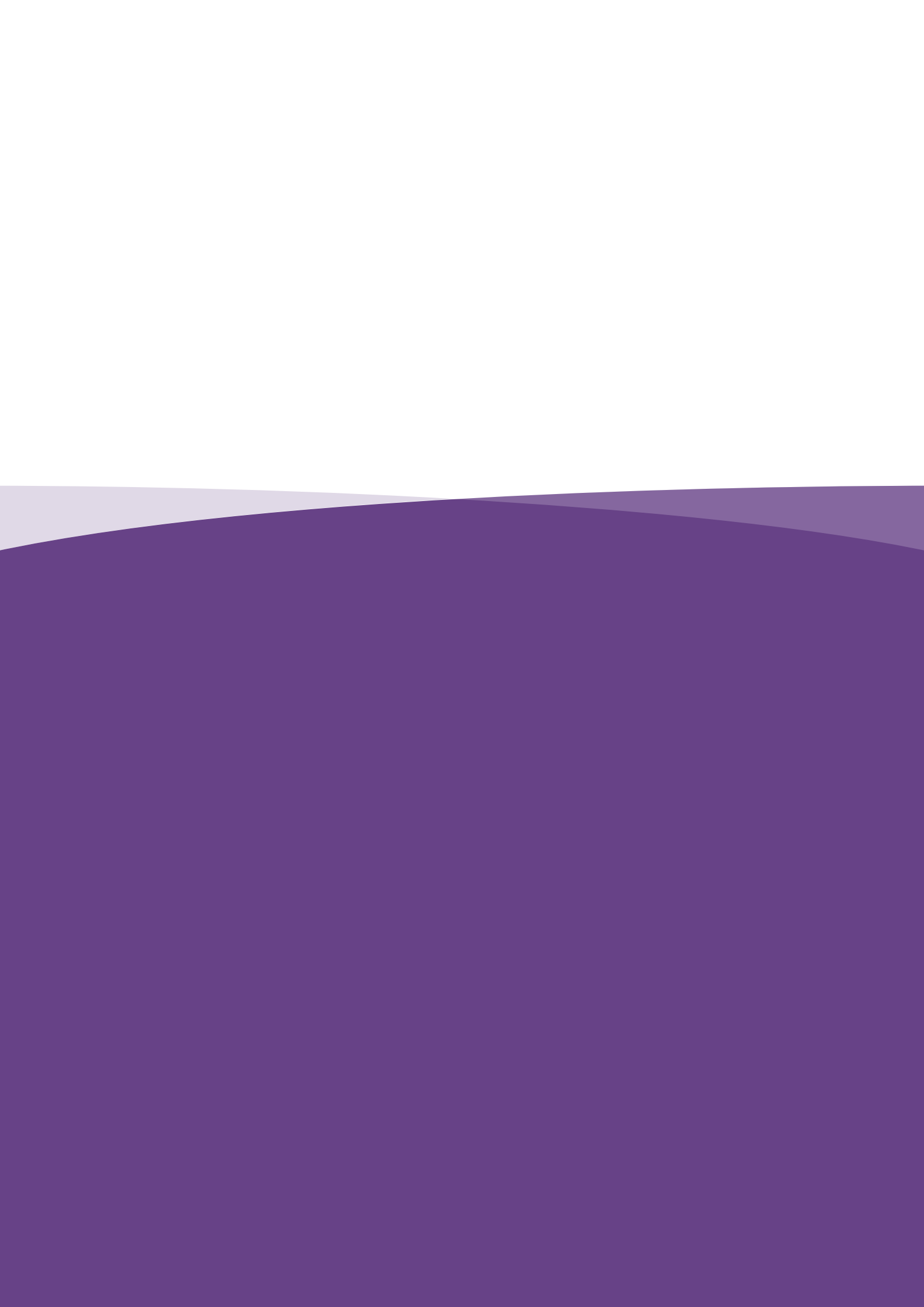
A VISION 2020: The Right to Sight - India Publication

VISION 2020: The Right to Sight is the global initiative for the elimination of avoidable blindness, a joint programme of the World Health Organization and the International Agency for the Prevention of Blindness with an international membership of NGOs, professional associations, eye care institutions and corporations. VISION 2020: The Right to Sight - India is a key driver of this initiative in India.

Vision
An India free of avoidable blindness, where every citizen enjoys the gift of sight and the visually challenged have enhanced quality of life as a right.

Mission
To work with eye care organizations in India for the elimination of avoidable blindness by provision of equitable and affordable services as well as rehabilitation of visually challenged persons through development of appropriate policies, quality standards, advocacy, training, and promotion of best practices with a special emphasis on the poor and marginalized sections of society and underserved areas.