Prevention of Blindness in Myanmar: Situation Analysis and Strategy for Change

(Supported by International Agency for Prevention of Blindness and Standard Chartered Bank)

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Content

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B. LIST OF ACRONYMS

ACD	-	Anterior Chamber Depth
AEH	-	Aravind Eye Hospital
AL	-	Axial Length
AFBP	-	Asian Foundation for Prevention of Blindness
AusAID	-	Australian Government Overseas Aid Program
BCVA	-	Best Corrected Visual Acuity
BHS	-	Basic Health Staff
BL	-	Blindness
CBM	-	Christoffel Blindenmission
CBO	-	Community Based Organization
CSC	-	Cataract Surgical Coverage
CSR	-	Cataract Surgical Rate
DR	-	Diabetic retinopathy
ENT	-	Ear Nose Throat
GDP	-	Gross Domestic Product
GH	-	General Hospital
HA	-	Health Assistants
HR	-	Human Resource
HIV	-	Human Immuno deficiency Virus
HKI	-	Helen Keller International
IAPB	-	International Agency for Prevention of Blindness
ICARE	-	International Centre for Advancement of Rural Eye Care
INGO -	-	International Non Governmental Organization
IOL	-	Intra Ocular Lens
ISGEO		International Society Geographical and Epidemiological Ophthalmology
LHV	-	Lady Health Visitors
LOCS	-	Lens Opacification and Classification System
LVPEI	-	L V Prasad Eye Institute, Hyderabad
MD	-	Doctor of Medicine
MEENTH	-	Mandalay Eye and ENT hospital
MECP	-	Myanmar Eye Care Project
MES	-	Meiktila Eye Study
MoH	-	Ministry of Health
MLOP	-	Mid Level Ophthalmic Personnel
MPH	-	Masters of Public Health
MSICS	-	Manual Small Incision Cataract Surgery
MW	-	Mid-wives
NGO	-	Non-Governmental Organizations
OPD	-	Outpatient Department
OR	-	Operating Room
OT	-	Operation Theatre
PACG	-	Primary Angle Closure Glaucoma
PBL	-	Prevention for Blindness

PhD	-	Doctor of Philosophy
PHS	-	Public Health Supervisors
POAG	-	Primary Open Angle Glaucoma
RANZCO	-	Royal Australian and New Zealand College of Ophthalmologist
RHC	-	Rural Health Centres
ROP	-	Retinopathy of Prematurity
SEC	-	Secondary Eye Centre
Sq Km	-	Square Kilometers
SVI	-	Severe Visual Impairment
SVI/BL	-	Severe Visual Impairment/Blindness
U5MR	-	Under-5 mortality rates
UK	-	United Kingdom
URE	-	Uncorrected Refractive Error
USD	-	United States Dollar
VI	-	Visual Impairment
V-R	-	Vitreo-retina
WHO	-	World Health Organisation
YEH	-	Yangon Eye Hospital

C) EXECUTIVE SUMMARY

An evaluation of the current eye care status in Myanmar was carried out between 3rd June and 11th Jun 2013 to look at the existing situation pertaining to infrastructure, human resources, service delivery, training facilities and role of other service providers (including non-governmental organizations) for eye care in Myanmar with the purpose of recommending future directions in Myanmar.

Health care and eye care in Myanmar is provided and financed mainly by the government and there is an existing infrastructure from the regional/state level to district level. The secondary eye care centres at the district level are nodal point for carrying out the activities. The existing infrastructure has a basic facility for the delivery of cataract, trachoma, glaucoma and refractive error services; however, they are limited in terms of providing a comprehensive eye care. Below the district level, it is mainly primary health care with a little integration with primary eye care.

In terms of overall human resource deployment in Myanmar, there are 309 ophthalmologists, 32 optometrists, 3 orthoptists, 4 biomedical engineer and 150 nurses (73 specially trained). Apart from that there are a couple of fellowship trained ophthalmologists, mainly in Yangon Eye Hospital. 60-70% of the ophthalmologists are located in two cities i.e. Yangon (6 million population) and Mandalay (3 million population). Though a structured training program is available for ophthalmologists and other paramedical staff (refractionists, ophthalmic assistant and ophthalmic nurses), training of the refractionists does not happen each year. Apart from this, there is no structured training for primary health care staff in primary eye care. It would be ideal for an eye care team to be implemented with a mix of ophthalmologist, paramedical staff, management and support staff.

Annually, approximately 80,000-100,000 cataract surgeries are performed and the annual cataract surgical rate (CSR) is around 1400-1600. The output is quite variable and depends on the motivation and skill of the existing ophthalmologists, available support staff, supply of equipment and consumables, and outreach activities. Apart from this, there are patient related factors such as fear of surgery, out-of-pocket expenditure and access to services. All these factors need to be addressed if the set goals for VISION 2020 are to be achieved.
Specialty services are developed and offered mainly at the Yangon Eye Hospital only and there is a need to expand it to other tertiary care centres.
At the primary level, though there are multiple activities, such as Village Eye Health Examination, Model Eye Health Examination, School Vision Screening Program etc, there are no set annual targets or planned activities. Those children identified as having refractive error are also not always provided with free/affordable spectacles. A structured school eye health program needs to be implemented so that each and every child gets an annual eye examination, provision of affordable spectacles and replacement of the same as and when necessary
Low vision and rehabilitation services hardly exist and there is a need to integrate these at all levels of service.

Though International Non-Governmental Organization (INGO) service has been in existence in Myanmar since 1990, none of them are registered. Major INGOs worked/working in Myanmar are Hellen Keller International (HKI), Royal Australian and New Zealand College of Ophthalmologist (RANZCO) Eye Foundation, Sight For All (SFA), Christoffel Blindenmission

(CBM) etc. Apart from this, there are a couple of local donors. The private sector has just started emerging in Myanmar and it is usually an initiative by a government doctor who has his/her private practice.

For the supply of consumables, currently, most of them are imported. However, if there is an expansion of the program, there may be a need to start indigenous production of essential drugs and supplies from within the country.

In terms of monitoring and evaluation, including the audit of ongoing cataract surgeries, there is limited information available. Similarly for research, there is limited local capacity available.

Moving ahead, if Myanmar needs to achieve the set goals for VISION 2020, it needs to strengthen the existing infrastructure to provide comprehensive eye care, have structured and ongoing training of different cadres of human resources for eye care, strengthen its primary eye care and outreach activities, and at the same time it also needs to make changes in policy for increasing the external support for eye care programs. All the activities also need to have regular and ongoing monitoring and evaluation to assess the progress of its activities and if required, take appropriate corrective measures.

D) BACKGROUND

Myanmar

Myanmar is the largest country in mainland South-East Asia with a total area of 676,578 sq.km. It stretches 2,200 km from North to South and 925 km from East to West at its widest point. It is bound on the North and North-East by the People's Republic of China, on the East and South-East by the Lao People's Democratic Republic, the Kingdom of Thailand on the West, the Bay of Bengal and Andaman Sea on the South, and by the People Republic of Bangladesh and Republic of India on the West.

It falls into three well marked natural divisions, the western hills, the central belt and the Shan plateau on the East, with continuation of this high land in the Tanintharyi. Three mountain ranges from North to South divide the country into three river systems, the Ayeyarwady, Sittaung and Thanlwin. Great diversity exists between the regions due to the rugged terrain in the hilly North which makes communication extremely difficult. In the Southern plains and swampy marshlands there are numerous rivers and tributaries of these rivers crisscross the land in many places.

Population

The estimated population in Myanmar in 2010-11 was 60 million with a growth rate of 1.1%. Nearly 70% of the population resides in rural areas. Population density ranges from 666 person / sq.km in Yangon to 15 person / sq.km in Chin state. About 29.5% of the country's population is < or = 14 years, 61.8% is between 15-59 years and 8.8% is equal or above the age of 60.

Education

According to UNESCO, the literacy rates in Myanmar is 89.7% (males:93.7% and females: 86.2%)

Socio-economic environment

Myanmar is emerging from 5 decades of isolation - both economically and politically. It has abundant natural resources including land, water, forest, coal, mineral and marine resources and natural gas and petroleum. It could become one of the emerging stars in Asia if it can successfully leverage its rich endowments such as natural resources, labor force and geographic advantage for economic growth and development. It is opening up to trade, encouraging foreign investment and deepening its financial sector. Its GDP has increased from 20.2 billion USD in 2007 to 51.9 billion USD in 2011 and GDP per capita in 2011 was 824.19 USD. It has the potential to grow at the rate of 7-8% per year for a decade or more and raise its per capita income to $ 2,000 to $3,000 by 2030.

Administrative structure

The country is divided administratively into 14 Divisions and Regions (7 divisions and 7 states). It consists of 69 districts, 330 townships, 82 sub-townships, 396 towns, 3045 wards, 13267 village tracts and 67285 villages.

Health Care System

Health care is a pluralistic mix of public and private systems, both in financing and provision. The private, for-profit sector is mainly providing ambulatory care except for some providing

institutional care in Yangon, Mandalay and some larger cities. They are regulated in conformity with the provision of law relating to Private Health Care Services. Apart from this, there are private, non-profit, Community Based Organization (CBOs) and Faith Based Organizations providing ambulatory care, though some provide institutional care. Apart from this, there is an existing system of traditional medicine too. Major sources of finance for health care services are the government, private, households, social security system, community contribution and external aid. Almost 70% of health care finance is from government and 15-20% is private financing.

Health system organization

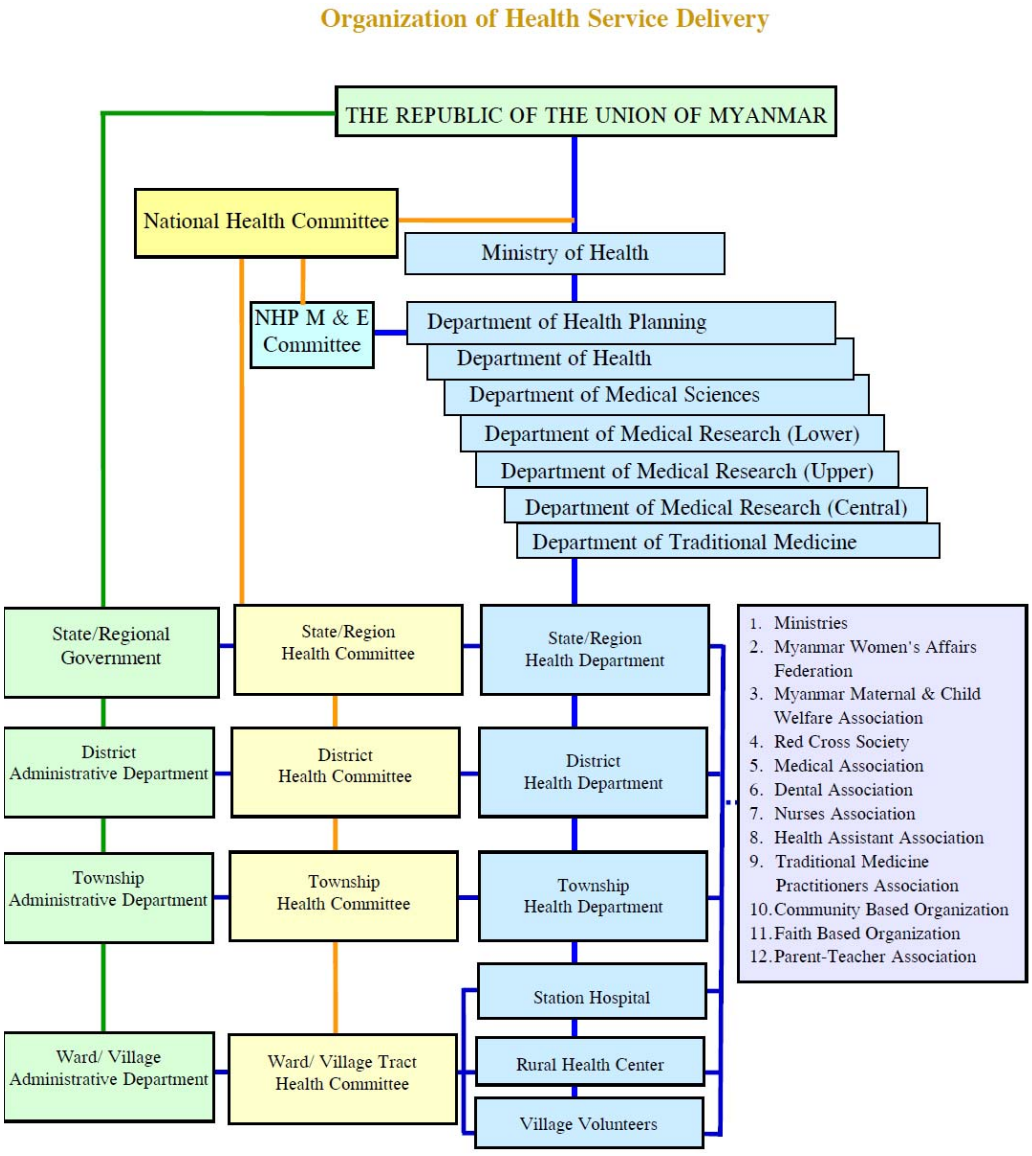

Figure 1[1]

[1] http://www.moh.gov.mm/file/Myanmar%20Health%20Care%20System.pdf

The Ministry of Health is the major organization responsible for the health status of the people of Myanmar. Health care is provided in both rural and urban areas through a tiered system. In the rural area, the first point of contact are the basic health staff (BHS) (Midwives, Lady Health Visitors and Health Assistants) who provide promotive, preventive, curative and rehabilitative services at **sub-rural and rural level** for a population of 20,000-30,000. The next level is the **Township Health Department** that forms the backbone of primary and secondary health care covering 100,000-200,000 population and is headed by a Township Medical Officer. Each Township hospital is 16/25-50 bedded (depending upon the size of the population of the township). Each township hospital has one to two station hospitals and 4-7 rural health centres (RHC) to provide health services to rural population. Each RHC has 4 sub-centres covered by mid-wife and a public health supervisor grade 2 at the village level. In addition, there are voluntary health workers (community health workers and auxillary midwives) in outreach providing Primary Health Care (PHC) to the community. The next level is the **district hospital** for a population of 0.5-1 million. It is at this level that a specialist is posted (including an ophthalmologist) and at the top level is the **regional/state health department** for the entire region.

Health Care Resources

There are 14 medical colleges and health universities under the management of the department of medical science. It also has 46 nursing and midwives training schools across the country. Apart from this, there are 31 doctorate courses, 7 PhD courses, 29 Master courses and 6 Diploma courses conducted under the Department of Medical Science.

Distribution of Government Medical Doctors

It varies from 6 (Mon state) to 59 (Chin State) per 100,000 population. Yangon and Mandalay divisions, where major teaching hospitals are located, have a very high concentration of medical doctors. Chin state has a higher number of sanctioned doctors due to the nature of its terrain and difficulty in travel.

Table 1: Health Facilities Development[2]

Health Facilities	**Year: 2011-12**
Hospitals (Pubic Sector)	987
Primary and Secondary Health Centrs	87
No of Maternal and Child Health Centres	348
No of Rural Health Centres	1565
No of School Health Teams	80
No of Traditional Medicine Hospitals	14
No of Traditional Medicine Clinics	237

Table 2: Health Care Manpower[3]

Health Manpower	**Year: 2011-12**

[2] http://www.moh.gov.mm/file/HEALTH%20STATISTICS.pdf
[3] http://www.moh.gov.mm/file/HEALTH%20STATISTICS.pdf

Doctors Public Co-operative and Private	28077 11460 16617
Nurses	26928
Health Assistants	1536
Lady Health Visitors	3371
Midwives	20044
Health Supervisor (1)	612
Health Supervisor (2)	1718
Traditional Medicine Practioners Public Private	 885 5867

Table 3: Health Care Indicators[4]

Health Indicator	**Year: 2009**
Crude Birth Rate (per 1000 population) Urban Rural	 15.3 16.6
Crude Death Rate (per 1000 population) Urban Rural	 5.1 5.8
Infant Mortality Rate (per 1000 live birth) Urban Rural	 25.7 27.8
Under 5 Mortality Rates (per 1000 live birth) Urban Rural	 36.15 41.08
Maternal Mortality Rates (per 1000 live birth) Urban Rural	 1.13 1.52
Population Growth Rate	1.29
Average Life Expectancy	
Urban (Males) Urban (Females)	65.5 70.7
Rural (Males) Rural (Females)	64.1 67.5

Morbidity and Mortality

The leading cause of morbidity are injuries, pregnancy related complications, diarrhea and gastroenteritis, viral diseases, malaria, arthropod borne viral fevers and viral hemorrhagic fever, gastritis and duodenitis, cataract and lens related disorders, respiratory infections and other

[4] http://www.moh.gov.mm/file/HEALTH%20STATISTICS.pdf

respiratory diseases. Similarly, the leading cause of mortality are HIV, septicemia, injuries, malaria, respiratory diseases (including tuberculosis), fetal deaths, liver diseases, heart failure, stroke, intrauterine hypoxia and birth asphyxia, intracranial hemorrhage and pneumonia.

E) SITUATION ANALYSIS

The International Agency for the Prevention of Blindness (IAPB) at its South East Asia Regional meeting in January 2013 has prioritized support to three countries in the South Asian region, including Myanmar. Following this, IAPB has secured funding from Seeing is Believing (an eye health development programme of Standard Chartered Bank) for a comprehensive Situation Analysis of the present eye health needs and immediate plans around eye health services in Myanmar. Hence, a team consisting of Gopal P. Pokharel past consultant World Health Organization (WHO) from Nepal and Dr Rohit C Khanna from L V Prasad Eye Institute, India conducted this situation analysis between 3rd June and 11th Jun 2013. The analysis included a detailed evaluation of the existing situation pertaining to infrastructure, human resources, service delivery, training facilities and role of other service providers (including non-governmental organizations) for eye care in Myanmar and to recommend future directions in Myanmar.

1. Blindness and Visual Impairment (VI) in Myanmar

The data for the prevalence of blindness and VI for Myanmar is from the Meiktila Eye Study (MES) which was conducted in year 2005 in the Mandalay Division. This includes examination of 2076 individual 40 years and above (836 males and 1240 females). The below table 1 shows the data on the prevalence of blindness and VI, cataract, glaucoma and trachoma and risk factors for them.

Table 4

Ocular condition	Definition	Prevalence	Risk Factors
Presenting (BL and VI)[5]	WHO	8.1% (6.5-9.9%); 32.9% (27.7-38.1%)	Increasing age
Best corrected (Pin-hole) (BL and VI)[6]	WHO	5.3% (4.0-6.6%); 21.5% (18.3-24.7%)	Increasing age
Cataract[7]	LOCS III	40.39% (37.3-43.8%)	Increasing age, lower level of education and lower body mass index
Glaucoma[8]	ISGEO	4.9% (4.1-5.7).	Increasing age
PACS[9]	ISGEO	5.7% (4.7-6.6%)	Increasing age, decreasing

[5] Casson RJ, Newland HS, Muecke J, McGovern S, Durkin S, Sullivan T, Oo TZ, Aung TH, Shein WK, Selva D, Aung T. Prevalence and causes of visual impairment in rural myanmar: the Meiktila Eye Study. Ophthalmology. 2007 Dec;114(12):2302-8.

[6] Casson RJ, Newland HS, Muecke J, McGovern S, Durkin S, Sullivan T, Oo TZ, Aung TH, Shein WK, Selva D, Aung T. Prevalence and causes of visual impairment in rural myanmar: the Meiktila Eye Study. Ophthalmology. 2007 Dec;114(12):2302-8.

[7] Athanasiov PA, Casson RJ, Sullivan T, Newland HS, Shein WK, Muecke JS, Selva D, Aung T. Cataract in rural Myanmar: prevalence and risk factors from the Meiktila Eye Study. Br J Ophthalmol. 2008 Sep;92(9):1169-74.

[8] Casson RJ, Newland HS, Muecke J, McGovern S, Abraham L, Shein WK, Selva D, Aung T. Prevalence of glaucoma in rural Myanmar: the Meiktila Eye Study. Br J Ophthalmol. 2007 Jun;91(6):710-4.

			ACD and AL
PAC[10]	ISGEO	1.5% (1.47-1.53%)	Increasing age, decreasing ACD and AL
PACG[11]	ISGEO	2.5% (1.5%-3.5%)	Increasing age
POAG[12]	ISGEO	2% (0.9-3.1%).	Increasing age, axial myopia and IOP
Trachoma[13]	WHO	2.6% (1.67-3.42%).	Increasing age (For every one year increase in age, the odds of trachoma increased by 5.3%). Having <3 children in the house was protective.

ACD: Anterior Chamber Depth; AL: Axial Length; BL: Blindness; ISGEO: International Society Geographical and Epidemiological Ophthalmology; LOCS: Lens Opacification and Classification System; PACS: Primary Angle Closure Suspect; PAC: Primary Angle Closure; PACG: Primary Angle Closure Glaucoma; POAG: Primary Open Angle Glaucoma; VI: Visual Impairment; WHO: World Health Organization;

The major causes of blindness were cataract (53%), glaucoma (10.5%) and trachoma (4%) and major causes of VI were cataract (70%), uncorrected refractive error (URE) (19%) and glaucoma (4%). PACG accounted for 84% of all blindness due to glaucoma.

Similarly, the cataract Surgical Coverage (CSC) for visual acuity cut-offs of <6/18, <6/60 and <3/60 was 9.74%, 20.11% and 22.3% respectively for people and 4.18%, 9.39% and 13.47% respectively for eyes. It was higher for men than women. The major barrier reported were cost of surgery, fear of surgery and access to care.[14]

Meiktila is one of the high performing districts and despite this the data from MES shows a relatively higher prevalence of blindness and VI and lower coverage. It can be a true figure or could be due to sampling bias. This suggests that more data would be needed from other parts of the country to give the overall National data for the purpose of planning.

The data presented by Dr Lin had showed that the overall prevalence of blindness in all ages was 0.52 %. The major cause was cataract (63%), glaucoma (16%), posterior segment disease (7%), trachoma (4%), corneal opacity (3%), trauma (1%) and others (6%).

Blindness in Children[15]

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[9] Casson RJ, Marshall D, Newland HS, McGovern S, Muecke J, Tan EW, Selva D, Aung T. Risk factors for early angle-closure disease in a Burmese population: the Meiktila Eye Study. Eye (Lond). 2009 Apr;23(4):933-9.

[10] Casson RJ, Marshall D, Newland HS, McGovern S, Muecke J, Tan EW, Selva D, Aung T. Risk factors for early angle-closure disease in a Burmese population: the Meiktila Eye Study. Eye (Lond). 2009 Apr;23(4):933-9.

[11] Casson RJ, Newland HS, Muecke J, McGovern S, Abraham L, Shein WK, Selva D, Aung T. Prevalence of glaucoma in rural Myanmar: the Meiktila Eye Study. Br J Ophthalmol. 2007 Jun;91(6):710-4.

[12] Casson RJ, Gupta A, Newland HS, McGovern S, Muecke J, Selva D, Aung T. Risk factors for primary open-angle glaucoma in a Burmese population: the Meiktila Eye Study. Clin Experiment Ophthalmol. 2007 Nov;35(8):739-44.

[13] Durkin SR, Casson RJ, Newland HS, Aung TH, Shein WK, Muecke JS, Selva D, Aung T. Prevalence of trachoma-related trichiasis and corneal opacity in rural Myanmar: the Meiktila Eye Study. Ophthalmology. 2007 May;114(5):e7-11.

[14] Athanasiov PA, Casson RJ, Newland HS, Shein WK, Muecke JS, Selva D, Aung T. Cataract surgical coverage and self-reported barriers to cataract surgery in a rural Myanmar population. Clin Experiment Ophthalmol. 2008 Aug;36(6):521-5.

[15] Muecke J, Hammerton M, Aung YY, Warrier S, Kong A, Morse A, Holmes M, Yapp M, Hamilton C, Selva D. A survey of visual impairment and blindness in children attending seven schools for the blind in Myanmar. Ophthalmic Epidemiol. 2009 Nov-Dec;16(6):370-7.

Data from 208 children below 16 years of age from all 7 schools for the blind showed that corneal abnormalities were the major anatomical site of Severe Visual Impairment/blindness (SVI/BL) (49.5%) and measles keratitis was the commonest identifiable cause (17.4%). The next common cause was lens related disorder seen in 14.4% of the children. Overall avoidable blindness was 43.6%. Nearly 16% of children require an optical device and 24.2% require medical attention with potential for visual improvement through intervention in 15.6%.

The following graph shows the mortality rates (U5MR) under-5 in different division/state in Myanmar. Overall it ranges from 47.36 to 117.23 per 1,000 live births. Strategies for tacking causes of childhood blindness in different regions could be based on this information.

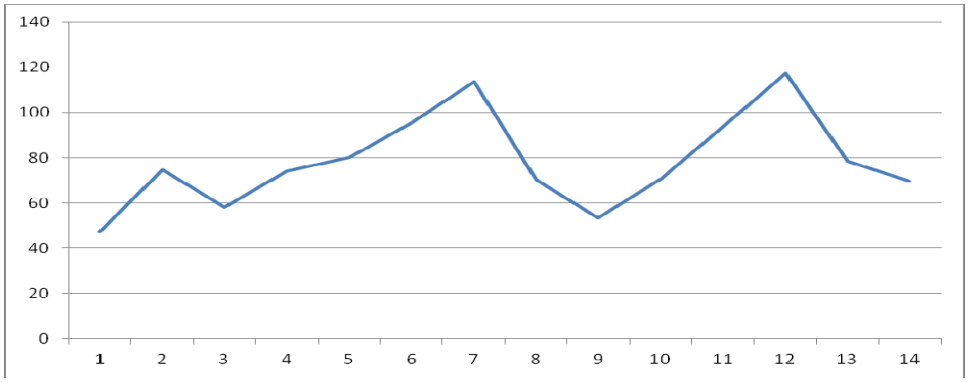


Figure 2[16]

2. Workload Estimate

Below table 2 shows the workload estimate at different level of care in different region/state providing eye care services

Table 5

Region/state	Population	*Blind	*Visually impaired	^Cataract blind	^Cataract VI	$Potential spectacle users	#Diabetics/DR requiring laser	@Childhood eye diseases	+Low vision
Mandalay	8216000	49296	164320	27112.8	115024	410800	14788.8	21361.6	82160
Ayeyerwady	7858000	47148	157160	25931.4	110012	392900	14144.4	20430.8	78580
Yangoon	6849000	41094	136980	22601.7	95886	342450	12328.2	17807.4	68490
Sagaing	6392000	38352	127840	21093.6	89488	319600	11505.6	16619.2	63920
Bago	5879000	35274	117580	19400.7	82306	293950	10582.2	15285.4	58790
Shan	5539000	33234	110780	18278.7	77546	276950	9970.2	14401.4	55390
Magway	5491000	32946	109820	18120.3	76874	274550	9883.8	14276.6	54910
Rakhine	3233000	19398	64660	10668.9	45262	161650	5819.4	8405.8	32330

[16] http://www.moh.gov.mm/file/Myanmar%20Health%20Statistics%202010.pdf

Mon	3060000	18360	61200	10098	42840	153000	5508	7956	30600
Kayin	1771000	10626	35420	5844.3	24794	88550	3187.8	4604.6	17710
Tanintharyi	1665000	9990	33300	5494.5	23310	83250	2997	4329	16650
Kachin	1539000	9234	30780	5078.7	21546	76950	2770.2	4001.4	15390
Chin	541000	3246	10820	1785.3	7574	27050	973.8	1406.6	5410
Kayah	344000	2064	6880	1135.2	4816	17200	619.2	894.4	3440
Total	58377000	350262	1167540	192644	817278	2918850	105079	151780	583770

Assumptions

*Prevalence of blindness: 0.6%; Prevalence of VI:2%

^Cataract blindness: 55%; cataract VI:70%

$Spectacle users: 10% use every 2 years (5% use per year)

#DR: 2% of the population has diabetes, 30% of them will have retinopathy and 30% of the retinopathy patients will require laser

@Childhood Eye Disease: 10% of adult eye diseases (BL/VI)

+Low vision: 1%

These estimates can provide a guide for setting targets for the country as well as region/state.

3. National Plan of action for VISION 2020

As per the presentation given by Dr Lin, the goal of VISION 2020 for Myanmar is to reduce the prevalence of blindness for all ages to less than 0.5% by the year 2020 and the objectives set are as follows

- To increase CSR to 3000 by the year 2020
- To improve quality of cataract surgery (IOL Rate --- 95% in 2020)
- To increase human resources for eye care services
- To increase coverage of Primary Eye Care (PEC) service to all states & divisions
- To enhance community awareness of avoidable blindness

Services provided for Prevention of Blindness (PBL) program are out-patient and in-patient services in hospitals, cataract out-reach programs, village and school eye health examination and primary eye care training to Basic Health Staff (BHS).

4. Eye Care Infrastructure

Our visit was to the two tertiary care centres, i.e. Yangon Eye Hospital (YEH) and Mandalay Eye and ENT hospital (MEENTH) and two PBL hospitals, i.e one in Bago Secondary Eye Centre and General Hospital and another in Sagaing Secondary Eye Centre.

Eye care infrastructure is divided into two broad categories i.e. 1) Hospital based Eye Care Services which concentrates on providing eye care services to patients at the base hospital and perform outreach cataract surgery. 2) Trachoma Control and Prevention of Blindness (TC/PBL) Program which performs mainly the public health components of the national eye care services. Apart from this, there are limited service providers in private practice.

The infrastructure consists of 4 tertiary care centres (also called as teaching hospitals) and 60 secondary eye care (SEC) centres. As trachoma was quite prevalent in past, the Government had started Trachoma Control and Prevention of Blindness Program (PBL) in 16 SEC centres. At

places, there is a General Hospital (GH) adjacent to PBL hospital and both have separate ophthalmology services.

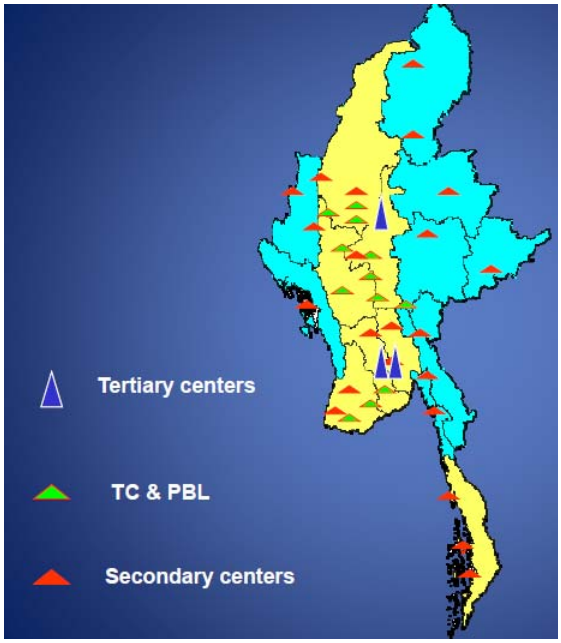


Figure 3[17]

Figure 3 shows the distribution of these teaching hospitals and SEC centres.

The following comprise the four teaching hospitals:

- University of Medicine 1 (Yangon)
- University of Medicine (2) (Yangon)
- University of Medicine (Mandalay)
- Defense Services Medical Academy

In 1964, Yangon Eye and ENT hospital was established in Signal Pagoda road, Yangon. This new YEH was completed in 1993 in a 3.312 acre of land. The land donation was from a local philanthropist and the building was constructed by the government. It has 3 blocks (A, B and C) and is a 4 storied structure with the ground floor utilized as outpatient clinic, optical and pharmacy and emergency room; the first floor being utilized as operating room complex and teaching space; second floor as female in-patient ward, paying rooms and wet lab and the third floor as male in-patient wards and eye bank.

Building (A): In the ground floor are located the out-patient department, refraction room, orthoptist & biometry room, minor operation theatre (OT) and emergency room. The first floor houses the major operation theatre; second floor an eye ward (Female) and third floor an eye ward (Male).

[17] From presentation of Dr Yee Yee Aung

Building (B): The ground floor houses the laboratory, medical store and 5 private double rooms. The first floor has the Buddhist religious room, 5 private single rooms and the matron's office. The second floor has 3 private double rooms, 2 private single rooms, a linen room and a lecture room. The third floor has 5 private double rooms and a lecture room.

Building (C): The ground floor houses the laser room, X-Ray room, glaucoma clinic, dark room, medical record room, telephone exchange room. The first floor has the guest room, laser room, lecture room, wet lab and library. The second floor has 4 consultant office rooms, fundus camera room and skills training lab., and the library. The third floor houses the International Eye Bank.

It has almost all the essential basic equipment for providing tertiary eye care services (including specialty like cornea, glaucoma, retina, pediatric and oculoplastics).

MEENTH: It was established in year 1971 and has a land area of 3.78 acres. The infrastructure comprises a two-floor facility. The ground floor houses the out-patient department (refraction room and room for undergraduate students), laboratory, X-ray room and administrative office. The first floor consists of male and female wards, septic ward, nurses' station, stores and operating room complex. It has 150 beds for ophthalmology.

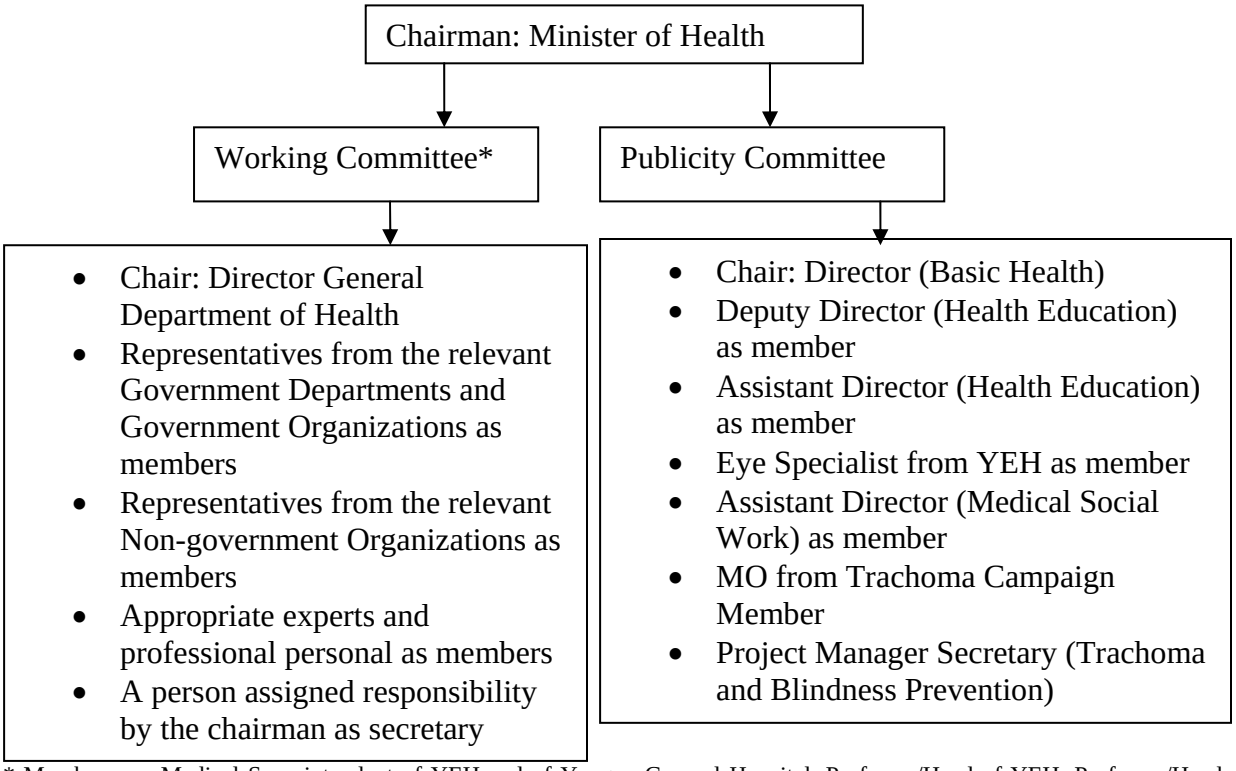
It has almost all the basic essential equipment for providing tertiary eye care services (including specialty like cornea services)

Bago Secondary Eye Centre and General Hospital
Bago SEC centre covers a population of 1.8 million and has 8 township hospitals, 24 station hospitals, 42 rural heath centres and 257 rural health sub-centres. The SEC centre has a patient waiting area, out-patient department, keratometry and A-scan room, doctor chamber, wards and operating room complex. Apart from this, there is a Divisional Hospital next to the SEC with a functioning eye department (including operating room complex).

Sagaing Secondary Eye Centre.
Sagaing SEC centre has coverage area from 3 township and covers a population of approximately 0.5 million. Like the Bago SEC centre, this also has a patient waiting area, out-patient department, keratometry and A-scan room, doctor chamber, wards and operating room complex.

Both the SEC centres have basic equipment for delivering cataract, glaucoma and refractive error services. However, they are limited in terms of providing comprehensive eye care. Apart from this, if these SEC need to scale up, they would a need lot of remodeling of their infrastructure to meet with the increase demand for services. The existing tier structure also can be used to develop a model for scaling up of services including primary eye care services.

Eye Bank: This was established in year 1993. The organogram of the National Eye Bank Committee is as below:



* Members are Medical Superintendent of YEH and of Yangon General Hospital, Professor/Head of YEH, Professor/Head of forensic medicine of Yangon General Hospital and a senior consultant ophthalmologist of YEH. Secretary is Deputy Director of TC/PBL.

5. Human Resources (HR)

Overall in Myanmar, there are 309 ophthalmologists, 32 optometrists, 3 orthoptists, 4 biomedical engineer and 150 nurses (73 specially trained). As per the information provided, all the ophthalmologists are well trained to performed cataract surgery. Apart from that there are the following fellowship trained specialists: One cornea (from L V Prasad Eye Institute, Hyderabad, India in 1995), two retina (trained in Royal Adelaide Hospital, Adelaide, Australia in 1996 and 2004), two pediatric ophthalmologists (one in L V Prasad Eye Institute in 2004 and one in Adelaide at Royal Adelaide Hospital, Australia in 2010). Apart from this, one ophthalmologist is trained in oculoplastics (from National University Hospital, Singapore). There is no fellowship trained glaucoma specialist. All the specialty trained ophthalmologists are in YEH and there are no specialty trained ophthalmologists in MEENTH. Apart from this, there are 5 people trained for short durations in community ophthalmology (2 from India and 3 from London). However 2 of them are not in service at present.

Like any other developing nation, there is an unequal distribution of ophthalmologists. 150 are in Yangon (6 million population) and 32 are in Mandalay (3 million population). Of the 309 ophthalmologists, 81 are in private practice and the remaining are in government service.

There are 32 optometrists/refractionists and 3 orthoptists. Training is only available in YEH. A pre-requisite for the training is that the candidate needs to be a high school graduate from a science background and should be working in the health department. However, the course is not conducted on a regular basis. The reason being that after 2 years of training, the staff needs to be promoted as Junior Officers and if the post is not available, no course is conducted. At present there are 24 optometrists/refractionists in service and the remaining are in private practice.

Apart from this there are 3 orthoptists (3 in YEH). One from YEH is trained in Christian Medical College, Vellore, and other two are trained locally.
There are 3 biomedical engineers (2 trained in Aravind Eye Hospital (AEH), Madurai, and one in Central Scientific Instrument Organization, New Delhi/Chandigarh)
Of the 150 ophthalmic nurses, however, only 73 are diploma trained ophthalmic nurses (9 months training after general nurse training).

Below table 3 shows the number of different ophthalmic personnel at different level of care in different region/state providing eye care services

Table 6[18]

Region/state	Population	Ophthalmologists	Optometrists/ refractionists	Ophthalmic technician	Ophthalmic nurses	Other MLOP	Primary Eye Care staff
Mandalay	8216000	37	4	2	17	71	680
Ayeyerwady	7858000	15	1	2	12	13	50
Yangoon	6849000	147	15	4		82	350
Sagaing	6392000	14	2	3	12	49	1650
Bago	5879000	16	1	1	5	24	150
Shan	5539000	8	1	NA	12	12	60
Magway	5491000	15	2	3	20	67	101
Rakhine	3233000	2	1	NA	4	4	40
Mon	3060000	2	1	NA	2	2	20
Kayin	1771000	4	1	NA	3	3	20
Tanintharyi	1665000	6	1	NA	6	6	30
Kachin	1539000	4	1	NA	4	4	30
Chin	541000	4	1	NA	2	2	40
Kayah	344000	2	1	NA	2	2	20

Pediatric Eye Care Team: There are two trained pediatric ophthalmologists (one in L V Prasad Eye Institute in 2004 and one in Adelaide at Royal Adelaide Hospital, Australia in 2010), one pediatric trained anesthetist (retired), one pediatric trained ophthalmic nurse and one trained low vision specialist.

6. Training

There is a structured training program for medical graduates, ophthalmologists, refractionists/optometrists, ophthalmic nurse. No formal sub-specialty training or cataract surgery training program is offered in the country.

[18] Information shared by Dr. Khin Nyein Lin

- **Training of medical graduates:** This is available in all the 4 teaching hospitals and the complete course extends for over 7 years. The ophthalmology module is for 2 weeks duration.
- **Training of ophthalmologists:** This training is available in all the 4 teaching hospitals. This was a 2 years course and has been recently revised to 3 years. Post-training, they need to work for 2 years in a tertiary care centre. Annual intake is about 10-20 candidates.
- **Doctorate in Ophthalmology (Dr.Med.Sc):** This is a 3 year course and is offered in the Institute of Medicine (1) and Institute of Medicine (2) (Yangon). It consists of 6 subspecialty modules. Till now, 12 candidates have obtained their Doctorate. Annual intake ranges from 1-4 candidates.
- **Training of refractionists/optometrists (curriculum available on request):** Details mentioned in HR section above.
- **Training in Ophthalmic Nursing (curriculum available on request):** This is a 9 month course and only available in YEH. Annual intake is 9 candidates.

The above table 6 shows gross deficiency of paramedical staff as compared to ophthalmologists. Hence, for effective and efficient scaling up of services, a team of paramedical staff, preferably a comprehensive eye care team, needs to be built. Also, the primary health care staff needs to be appropriately trained in primary eye care so that primary health care is fully integrated.

7. Service Delivery

Annually, approximately 80,000-100,000 cataract surgeries are performed and the annual cataract surgical rate (CSR) is 1400-1600. Some of the high performing centres were visited and their output is as follows

YEH: Annually 40-50,000 out-patients are seen and 9-10,000 (50% cataract) surgeries are performed (including major and minor)

MEENTH: In 2012, it has seen 16,236 out-patient and performed 1,338 surgical procedures

Bago Secondary Eye Centre: In 2012, 16,105 out-patient and performed 1,402 major surgeries (95% cataract) and 694 minor procedures. Below figure shows the surgeries performed in this SEC centre

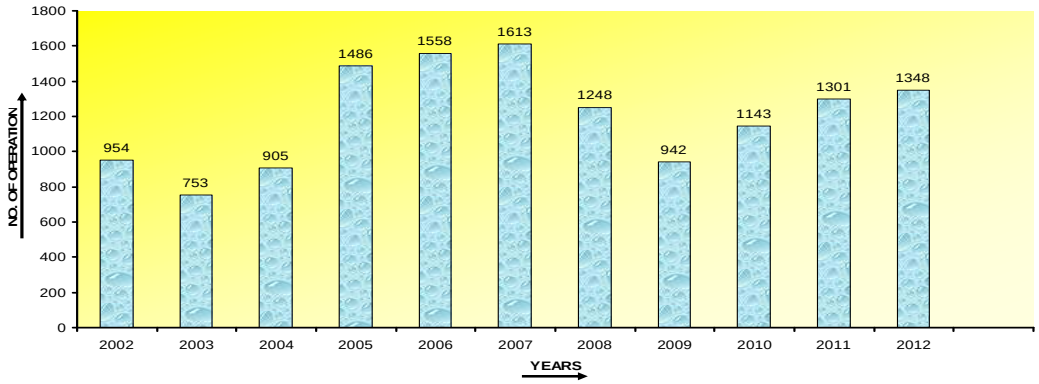


Figure 4[19]

Bago General Hospital: In 2012, approximately 3,500 out-patients were seen and 500 surgeries were performed. No out-reach activities are carried out in the GH.

Sagaing Secondary Eye Centre.
Like the Bago SEC centre, this also consists of patient waiting area, out-patient department, keratometry and A-scan room, doctor chamber, wards and operating room complex. In 2012, it has seen 3,290 out-patient volume and performed 776 surgeries (95% cataract).

Figure 5[20]

From the figure it is obvious that there is steady decline in the number, and the factors responsible were:

- Change of the ophthalmologist
- Inadequate supply of consumables

There are limited free services offered in tertiary or secondary eye care centres. The discretion to provide free services depends on the treating ophthalmologist. If he/she feels that the subject is poor, they can make the services available for free. It includes cost of intraocular lenses, viscoelastics and sutures. However, it does not include the cost of transportation and post-operative medicines. The funding for providing free services is usually from the government and sometimes it is through other donations. The cost of cataract surgery to a paying patient ranges from USD 20-150

[19] From presentation of Dr Saw Thwin Mon Thein, Bago.
[20] From Sagaing Secondary Eye Centre

Phacoemulsification is performed in Yangon, Mandalay, Mawlamyine and Mimbu. Elsewhere, it is mainly manual small incision cataract surgery (MSICS) (with 1-2 sutures).

Internal audit of the consumables is done by the Department of Health and also the Accountant General in all PBL supported hospitals. However there is no separate auditing of the amount paid for surgeries by the paying patients in these PBL hospitals.

It appears that there is gross variability in service coverage. The reasons for this are inadequate man-power, inadequate supply and equipment; out of pocket expenses of the patients, limited out-reach activities and school screening activities.

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Specialty services:

Cornea: Corneal services are provided only in YEH and MEENTH. In 2012, 5,000-6,000 corneal cases were seen, 101 keratoplasties (81 penetrating keratoplasties and 20 lamellar procedures) and 3 Boston keratoprosthesis Type I were performed. Apart from this, other surgeries performed were amniotic membrane for corneal perforations and stem cell transplantation. No LASIK is performed in the hospital.

Vitreo-Retina (V-R) services: These services are only offered in YEH. On an average 3000-3500 patients are seen annually, with the majority being diabetic cases, and 500-600 surgeries are performed. Apart from this, 1,000-1,500 lasers are performed per year for diabetic retinopathy.

Retinopathy of Prematurity (ROP) screening: This is available in Yangon and Mandalay. In Yangon it is carried out in co-ordination with Yangon Children Hospital, Yankin Children Hospital and Central Women Hospital. 4-5 lasers for ROP are performed annually.

Pediatric Ophthalmology services: This is also available only in YEH. On an average, they see 5,000-6,000 patients per year and perform 250-300 surgeries per year.

Oculoplasty services: This has begun recently in YEH. On an average, they see nearly 1,000 cases a year and perform 200-250 surgeries per year. Major procedures include eyelid and orbital tumors, ptosis and dacrocystorhinostomy surgeries.

Eye Banking: Eye banking activities are carried out through National Eye Bank in YEH and MEENTH. Annual cornea collection ranges from 110-120/year in YEH and 56/year in MEENTH.

As the majority of sub-specialty services are in YEH, there is a need to strengthen the sub-specialty services in other tertiary care centres too.

8. Primary Health Care and Primary Eye Care

Primary Eye Care is provided by Basic Health Staff (BHS) staff and school medical officers

- **Primary Health Care Staff:** These are BHS who play a vital role in providing comprehensive health care. At the rural level, there are Health Assistants (HA), Lady Health Visitors (LHV), Public Health Supervisors (PHS 1 ad PHS 2) and mid-wives (MW) providing primary health care. Though there are structured courses for this level of staff, there is no structured module for eye care training for the staff. Apart from other activities, they are also involved in trachoma surveillance and referral, supplementation of vitamin A treatment of red eye/injuries and referral. However, they are not trained to

identify cases of cataract and other eye diseases. Annually 200-400 BHS staffs are trained for primary eye care.

- **School Medical Officers:** These are people who look at the overall school health program which has the following components: health education, environmental sanitation, nutrition, prevention of communicable and non-communicable diseases, school health services, outreach, counseling and special support and training and research. For eye care, they are involved in health education, screening for refractive error and active trachoma and provision of vitamin A.
- **Activities at primary level include the following**
  - **Village Eye Health Examination:** This is conducted by 2 - 5 field teams led by HA. They visit to 1-3 villages in a month for eye health examination and treatment. This is done mainly in smaller townships.
  - **Model Eye Health Examination:** This includes a team led by an ophthalmologist who visits a village once a month for eye health examination and treatment. This is usually for larger townships.
  - **School Eye Health Examination:** This includes case finding and treatment of active trachoma at primary and middle schools. School teachers take care of the students with active trachoma by applying tetracycline eye ointment as prescribed. Primary eye care counseling is given to school teachers and students.
  - **School Vision Screening Program:** This is conducted for early diagnosis of refractive error in 6-15 years of age group. This is done in collaboration with school health team. However glasses are not provided free of cost unless the patient is poor.
  - **Mass Cataract Surgery:** This is an activity at the township level where no ophthalmologist is assigned.
  - **Mass out-reach refraction services:** This is part of mass out-reach cataract surgeries where glasses are provided free of cost. This activity is supported by MoH, local authorities, national NGO's, religious leaders and private sectors.

For centres below the level of the SEC centres, eye health professionals are not available in the country and the primary health care staff working in district, township and station health centres need to be appropriately trained in primary eye care so that primary health care is fully integrated.

9. INGO/NGO services in Myanmar

INGO service has been in existence in Myanmar since 1990, however they are not registered. Any activities are to be carried out through the MoH (including donations). Initially it was through ORBIS International followed by Christoffel Blindenmission (CBM), Lions Sightfirst, Australian Government Overseas Aid Program (AusAID), SEE Foundation, World Vision and WHO Collaboration Centre of Japan (Dr. Konyama), and later Hellen Keller International (HKI) started services and Royal Australian and New Zealand College of Ophthalmologist (RANZCO) Eye Foundation started the Myanmar Eye Care Project (MECP).

CBM: Initially, in the 1990s, CBM in collaboration with AusAID, provided microscopes to all SEC and presently CBM donates 50,000 USD per year for intraocular lenses (IOL's), viscoelastics and sutures.

Sight For All (SFA): Sight For All is involved in Myanmar since 1998. SFA activities is run by Royal Adelaide Hospital (Prof. Newland & Dr. James Mucke) fund from AusAID and other companies like Bayer. It was involved in Myanmar in the population based study, The Meiktila Eye Study in year 2005 which was successful in producing the first robust epidemiological data for Myanmar. Apart from this, they also conducted a study in all the 7 schools for the blind in Myanmar. They are also involved in conducting annual workshop for the trainee ophthalmologists at YEH as well as conducting sub-specialty workshops at YEH and MEENTH. They were involved in training two retinal surgeons and first oculoplastic surgeon from Myanmar at the Royal Adelaide Hospital. They were also involved in opening the first pediatric eye unit in YEH in July 2010. In 2008, and have commenced their AusAID funded cataract surgery project in Myanmar during which 8 SEC were upgraded. Till date, a total of 28 SEC have been established or upgraded.

Helen Keller International (HKI): HKI has been working in Myanmar since 2001. HKI activities are run by HKI Europe Paris, HKI New York head quarters and HKI Asia Pacific Regional Office, Phnom Penh. The main areas of activities HKI are involved in providing assistance in terms of equipment, teaching and training to teaching hospitals (YEH and MEENT hospitals) and to 16 SEC under the PBL program. Apart from this; they have also supported 4 General Hospitals (GH). They have also done skills enhancement of local ophthalmologists in 9 GH and trained two refractionists from MoH at Aravind Eye Hospital (AEH) for the maintenance of equipment. Apart from this, they have also trained two engineers from Concordia International ltd for maintenance of equipment. They have also organized meetings and conferences and were part of the annual meetings conducted locally. In terms of research, they have conducted outcome studies in 3 SEC-Shwebo, Sagaing and Minbu and a tertiary centre (YEH) and RAAB survey in Mektila and Sagaing. Apart from this, they continuously, monitor and evaluate their ongoing program (internal as well as external evaluation).

Other local donors are Total Exploration & Production Myanmar TEPM (main donor), Daewoo E&P Myanmar, Myanshwepyi Tractors Ltd. MSPTL- Caterpillar dealer, United Engineering Co. Ltd., Japanese Embassy, German Embassy & British Embassy and Asian Foundation for Prevention of Blindness (AFPB), Hong Kong.

The number of cataract surgeries performed by 16 SEC under the PBL program in 2001 was 8,806 while in 2009 was 17,018. Similarly, the number of cataract surgeries performed by all SEC's from 2001-09 was 152,803 and more than 125,000 cataract surgeries were performed by HKI supported hospitals. Presently HKI is supporting 6,500 cataract surgeries per year for 3 years and also replacing the microscopes for al the 16 PBL hospitals in phased manner in 3 years.

Myanmar Eye Care Project (MECP): It is located in Yangon (Jivitadana Sangha Hospital), Mandalay Monastery and Sagaing. It was started in the year 2002 by an Australian Ophthalmologist, Geoffrey Cohn. MECP is part of the Royal Australian and New Zealand College of Ophthalmologist (RANZCO) Eye Foundation.

He came as a volunteer to the monastery to do free cataract surgeries. Subsequently other specialty services (including retina services) were also added to it. Annually he and his team visit 5-6 times a year and in between visit the local ophthalmologist from Mandalay Eye and ENT (MEENT) hospital render free services over the weekend. Similarly, V-R surgeon from Australia and United Kingdom (UK) also render free services twice a year. In 2012, nearly 1,000 cataract surgeries and 200 V-R surgeries were performed. During their visit, some training is also provided to local ophthalmologists and technicians.

As INGOs had played a major role in increasing the output, the government policies need to encourage them. They could be of help regarding training, supplies, equipment and infrastructure development and thus increasing the output.

10. Private Sector in Myanmar

The private sector has just started emerging in Myanmar. Usually it is the government doctor who has his/her private practice and only 20-25% of the ophthalmologists are in full time private practice. One of the reason for doing private practice is low salaries (appx 150-200 USD) being given to the ophthalmologists.
In Yangon, there are two big private poly clinics and there is one in Mandalay. Others are mostly out-patient practice. Similarly in Bago, there were three ophthalmologists in private practice.

11. SWOT Analysis

STRENGTHS	WEAKNESSES
- Network of SEC centres with some designated to PBL activities - All ophthalmologists trained to perform good cataract surgeries - Structured training program for ophthalmologists, refractionists and ophthalmic nurses - Specialty services in YEH - INGO support - Enough local resources to support the PBL activities	- No comprehensive eye care services - Limited integration of PEC with PHC - Lack of concept of eye care team - Limited paramedical support staff - No structured training program for PEC staff - Low output - Variable supply of consumables - Limited specialty services in other tertiary care centres - Limited free services, including free glasses for school going children - No planned and structured out-reach program - No services for low vision and rehabilitation - Limited indigenous production of eye drops and consumables - Limited audit of ongoing cataract surgeries - Limited internal research capacity - Unstructured monitoring of activities and too much of central

	control
OPPORTUNITIES	**THREATS**
- To strengthen the existing infrastructure for expansion of PBL activities. - Developing all cadres of required HR for achieving goals of VISION 2020 - Development of sub-specialty services in other tertiary care centres - Strengthen PEC activities - Develop a structured school screening program - Development of a comprehensive eye care program for the entire country - To develop services for low vision and rehabilitation - Local production of eye drops and consumables - To strengthen internal research capacity. - Support from INGO's - Local fundraising	- Ophthalmologist also have private practice - Transparency in account for the amount paid by patients in PBL hospitals - Other competing health priorities can reduce the funding for eye care activities

F. RECOMMENDATIONS

VISION 2020: The Right To Sight Initiative has envisaged that South-East Asian countries reach at least a target of 3000 cataract surgeries per million population by the year 2020 for which the government of Myanmar has committed by adopting it in the year 2000. It is imperative that the surgical coverage be increased in the coming 7 years to meet the target. It means that the total number of cataract surgeries need to be more than doubled (180,000-200,000). Similarly, other blinding diseases such as glaucoma, trachoma, diabetic retinopathy, childhood blindness and VI caused by refractive error also need to be dealt with. The following may be some of the steps Myanmar Prevention of Blindness Program needs to look at and implement accordingly.

- **Evidence based national planning**: It was learnt that a new 5 year National Plan on Health care has been formulated and will be implemented. We were not able to get access to the document and so the details are not clear. Although recent National data on the prevalence of blindness and VI is not available, the recent studies could be a basis to formulate an evidence-based National Plan and set targets for the annual work distribution among different centres. Apart from this, more studies can be conducted in different geographic locations to have a better understanding of the regional burden of disease.

- **Infrastructure:** Infrastructure wise, Myanmar has strategically located SEC centres all over the country which could be the nodal point for carrying out the activities as per the strategy of the National Plan. There may be a need for refurbishment and increasing the space as per the requirement. The Burden of Disease table given on page number 13 may be a example to help to fix some of the targets of the activities.
  The co-existence of TC/PBL controlled SEC centres and eye department of GH may coordinate their activities so that the combined efforts will help in enhancing the activities.

- **Training / Human Resource:** At present, the ratio of ophthalmologists and paramedics (refractionists, ophthalmic assistant and ophthalmic nurses) is approximately 2:1 which is far from the ideal recommended (1:4). The present ratio of ophthalmologist for the population is 1:200,000. WHO has recommended that by the year 2020, the ratio be increased to the level of 1:50,000. In this regard, Myanmar should be prepared to increase the number of ophthalmologists produced in the country to reach the recommended level. The training of ophthalmic assistant and nurses needs to be standardized and all tertiary centres may conduct training regularly to meet the requirement.
  All tertiary hospitals should plan to develop sub-specialty department in their centres and the required man-power be trained for it.
  It is ideal that the concept of an eye care team be implemented with a mix of ophthalmologist, paramedical staff, management and support staff.
  Below the level of the SEC centres, eye health professionals are not available in the country and the primary health care staff working in district, township and station health centres need to be appropriately trained in primary eye care so that primary health care is fully integrated.
  A team of trainers could be trained who can work towards the development of above mentioned HR. Apart from this, a good career path for the paramedical staff can improve the uptake of these training programs too.

- **Service Coverage:** The objective of service coverage is to provide comprehensive eye care services to the entire population of Myanmar. At the same time, there is a need to develop a regional strategy. The present coverage, if continued at the same pace, will not achieve the targets set for the year 2020. The reasons for low coverage are inadequate man-power, inadequate supply and equipment. Many times, a patient has to resort to out of pocket expenditure. The other causes were found to be fear of surgery and transport cost. These reasons need to be addressed so that service coverage increases in future. At present the out-reach program is not structured and targets are not set for SEC centres. The population with low vision and those that are incurably blind need to be rehabilitated in the community so that every child could go to a regular school and visually disabled adults can be productive. With the National Plan being implemented it is assumed that these activities will be prioritized, including the out-reach programs.
  A structured school eye health program needs to be implemented so that each and every child gets an annual eye examination, provision of affordable glasses and replacement of glasses as and when necessary.

Strategies for increasing the uptake of specialty services need to be developed. This may also include integration with other specialties especially for diseases like DR, ROP etc.

- **Health Care Financing:** At present the government of Myanmar provides most of the finances to run eye care services in the country. There has been some help from INGOs regarding supplies and equipment in the past. The rapid expansion of services which is necessary to meet the VISION 2020 targets will need additional financing. Collaboration between INGOs and the Government will help the program. The INGOs could play a large role to generate finances and provide the necessary support to the government. Apart from that, the government needs to look for other sources for funds.

- **Monitoring and evaluation:** The monitoring of annual activities of each centre is essential to see the progress of its activities. Electronic data collection, analysis and dissemination is absolutely necessary. It helps in taking appropriate corrective measures so that the targets could be achieved in a timely fashion. An annual/bi-annual evaluation will help in formulating the next year's plan. The evaluation may include outcome auditing of some of the major activities such as cataract surgeries. Operational research needs to be carried out in selected state/division, if not for the entire country, so that the present scenario of blindness could be documented. This will help to increase effort in stage where the program may be lacking in achieving the targets.

- **INGOs role:** INGOs could play a part in the implementation of eye care program in Myanmar. The government administered program could be helped by INGOs regarding training, supplies, equipment and infrastructure development. It will depend on the policy of the government whether a mix of public-private institute initiative will be helpful in achieving the goals of VISION 2020.

- **Local production of eye drops and consumables:** At present most of the drugs and supplies are imported. As the program expands, there may be a need to start indigenous production of essential drugs and supplies from within the country.