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SUPPORTING VISION 2020: THE RIGHT TO SIGHT

VISION 2020: THE CATARACT CHALLENGE

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Cataract Blindness

The World Health Report published in 1998¹ estimated that there were 19.34 million people who are bilaterally blind (less than 3/60 in the better eye) from age-related cataract. This represented 43% of all blindness. The number of blind people in the world and the proportion due to cataract is increasing due to:

- **population growth:**
6,000 million people now in the world, will increase to around 8,000 million in 2020
- **increasing longevity:**
true for less economically developed countries as well as the industrialised world.

The result of these two factors means that the population aged over 60 years will double during the next 20 years from approximately 400 million now, to around 800

million in 2020. This increase in the elderly population will result in a greater number of people with visual loss and blindness from cataract who will need eye services.

The incidence of new cases of cataract blindness is unknown. Minassian and Mehra estimated that for India alone 3.8 million people become blind from cataract each year.² Globally the incidence figure is probably at least 5 million. A figure of 1000 new blind people from cataract per million population per year is used for planning purposes in developing countries.

'Operable' Cataract Eyes

The term 'operable' cataract is used to define a cataract where the patient and the surgeon agree to proceed with cataract surgery. The indication for cataract surgery depends on various factors, including the expectations of the patient and the likely



Bilateral cataract in a relatively young woman

Photo: Murray McGavin

visual result of the procedure. As the results of cataract surgery improve, the degree of visual loss at which surgery is indicated becomes less, and, therefore, the number of 'operable' cataract eyes increases.

It is estimated that globally there are approximately 100 million eyes with cataract causing a visual acuity less than 6/60, and this figure is likely to be 3-4 times more for cataract causing an acuity of less than 6/18. These estimates are projected to double in the next 20 years if service delivery does not improve (Fig. 1).

Cataract Surgical Rate

In order to reduce the backlog of cataract blindness and 'operable' cataract it is necessary to operate each year on at least as many eyes as develop cataract (Fig. 2). The number of cataract operations performed per year, per million population is called the Cataract Surgical Rate (CSR). The CSR for the six WHO/IAPB regions in 1997 are estimated in Table 1.

Economically well-developed countries

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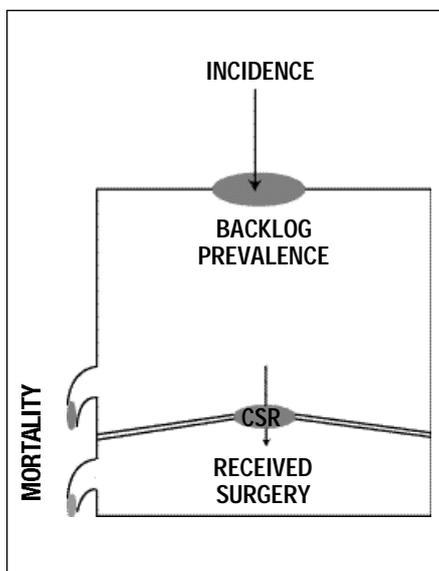


Fig. 2 : Schematic Representation of Cataract

Asia, in order to deal with cataract causing an acuity less than 6/60, it is necessary to do at least 3000 operations per million population per year and perhaps more. In Africa, and other parts of the world where there is a lower percentage of elderly people in the population, a realistic target for the next 5-10 years is around 2000 operations/million population /year.

It is possible to achieve these rates if good quality cataract surgery is performed at a reasonable cost, close to where people live. Models for this type of cataract service have now been developed in several developing countries, most notably in India.

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Hypermature cataract

Photo: David Yorston

Table 1: Cataract Surgery Statistics – Estimates for 1997*

WHO / IAPB Region	Population (millions)	Number of Cataract Ops. (millions)	C S R (ops./mill./yr)
Africa	600	0.2	300
range		(0.125–0.250)	(200–400)
Americas	800	2.15	2700
North	300	1.65	5500
Rest	500	0.5	1000
range	(0.25–0.75)	(500–1500)	
Eastern Med	475	0.5	1000
range		(0.25–0.75)	(500–1500)
Europe	870	2.1	2400
Western	385	1.5	4000
range		(1.2–1.9)	(3000–5000)
Russia	150	0.25	1500
range		(0.15–0.3)	(1000–2000)
Rest	335	0.35	1000
range		(0.17–0.5)	(500–1500)
S.E. Asia	1460	3.5	2400
India	960	3.0	3100
Rest	500	0.5	1000
range		(0.25–0.75)	(500–1500)
W. Pacific	1635	1.1	670
Australia & Japan	150	0.6	4000
range		(0.45–0.75)	(3000–5000)
China	1245	0.35	280
range		(0.125–0.6)	(100–400)
Rest	240	0.25	1000
range		(0.125–0.4)	(500–1500)
TOTAL	5840	9.55	1635

*author's estimates

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Recognising and Reducing Barriers to Cataract Surgery

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Reaching the goals for increased cataract surgical coverage set out in the Vision 2020 programme will require great effort. Cataract surgical coverage is inadequate in many places, for obvious reasons such as lack of trained manpower and supplies. Even when services are available, however, there are barriers which keep patients from utilising the services. In countries as diverse as India, Brazil, and Malawi it has been shown that 33-92% of cataract blind patients remain cataract blind, even when surgery is available. Understanding why people do not present for surgery and modifying our programmes to reduce these barriers is critical if we are going to increase cataract surgical coverage.

Cost of Surgery

The cost of cataract surgery varies widely and may be more than poor people, with little or no disposable income, can afford. It would be a mistake to assume, however, that providing free cataract surgery automatically leads to high cataract surgical coverage. In addition to the surgery itself, there are other costs such as transportation to the hospital, loss of work for the patient or the carer accompanying the patient, and living expenses for the carer while the patient is in the hospital. In Nepal, these non-surgical costs alone were estimated to

be one-fifth of the annual income of a rural patient.¹ In India, reducing the cost of surgery and providing transportation expenses for the patient has significantly increased the acceptance of cataract surgery.² Studies in India have demonstrated that most people are willing to pay approximately the average monthly income of their families for high quality cataract surgery. There have been innovative approaches to provide high quality services at a lower cost, and testing and implementing these in other settings should become a priority.

Cost, as a barrier, may be reduced by:

- decreasing the costs of surgery by reducing the cost of supplies and equipment and improving efficiency
- implementing different pricing mechanisms to make sure that the poor can receive surgery even if they cannot pay
- reducing the non surgical costs such as transportation and expenses for carers.

Distance to the Hospital

Most cataract blind live in rural areas while most ophthalmologists live in urban areas. Use of western medical services (including those for cataract) is related to proximity; people who live far from a hospital tend not to use its services. In Malawi, traditional healers who live far from the hospital provide more 'cataract treatment' than traditional healers living near hospitals.³ People will use what is most available to them first (see also M Jalaluddin Khan's article: Bangladesh Model of Eye Care: page 24).

Distance as a barrier may be reduced by:

- setting up outreach programmes in rural areas
- providing transportation (from villages direct to the hospital and return).

Cultural and Social Barriers

There is an increasing amount of data demonstrating that women are significantly less likely to receive cataract surgery than men,^{1,4-6} in spite of the fact that cataract surgical rates in women are slightly higher than those in men. There are many reasons for this: women are

less likely to be literate and have access to information about services; women may not have the necessary social support within the household or community to allow them to receive care; women often do not have adequate control over household financial resources, and women are generally less able to travel outside the village to seek services.

The concept of blindness is understood differently in different societies and differently among members of the same society.⁷ Generally, as societies become more developed, expectations of vision increase. In any society, a patient's visual function (a measurement of the important vision-dependent tasks that he or she can do) is a more important measure of the need for cataract surgery than visual acuity alone. In one developing country, being turned away because the cataract was not yet 'mature' was a major reason given by blind patients for not having had surgery.⁸

Cultural and social factors as barriers may be reduced by:

- targeting educational efforts in women's groups
- creating support mechanisms for elderly women
- teaching the public that blindness is not an inevitable part of ageing
- educating health care personnel about visual function and its importance in selecting patients for cataract surgery
- making eye care services 'user friendly' and so culturally acceptable.

Knowledge of Services

Community based education about cataract has not been undertaken in most areas; when it is, the demand for surgery will increase. Not only must patients be made aware of the existence of the service, but they need to know what to expect:

- how long surgery will take?
- what will it cost?
- will it be painful?

Health care workers at the village level must be made aware of existing services.

Lack of knowledge of services as a barrier may be reduced by:

- using health workers (including community based rehabilitation workers) and/or traditional healers to find, screen and educate patients about cataract surgery
- using successfully operated patients as educators and motivators
- educational campaigns using available media resources.



A rural clinic and provision of transport in Uganda
Photo: Murray McGavin

Trust in Outcome of Surgery

While satisfied cataract patients can serve as excellent motivators for others to have surgery, patients with poor results can have the opposite effect. Fear of a poor outcome may be a legitimate reason for patients to refuse cataract surgery. Programmes must provide consistently high quality cataract surgery with good outcomes if patients are to develop trust in the programme. It has been shown in India that the conversion from aphakic spectacles to IOLs led to a significant increase in cataract surgical coverage.⁸ In cultures (e.g., Egypt, Tibet) in which women do not like to wear glasses, the conversion to high quality IOLs may help decrease the gap between men and women.

Lack of trust in a good outcome as a barrier may be reduced by:

- additional training of surgeons to ensure that cataract surgery is high quality (monitoring of outcomes may assist this)

- transition to IOL surgery as soon as possible
- avoiding waiting lists which mean that patients have to return for surgery.

Barriers will vary according to local conditions and customs. Conversations with patients, village leaders, and women's groups may confirm the existence of barriers such as those listed above or reveal unexpected ones. Programmes planning to increase cataract surgical rates will need to determine the barriers in each area, whether relating to costs, distance, cultural/social factors, anxiety/fear or other barriers, and find creative ways to overcome them.

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Productivity: Getting Cataract Patients 'Through and Out'

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The increasing magnitude of blinding cataract means that the number of cataract operations is far below the level required to take care of the incidence and clear the backlog. As economic status and literacy levels improve the requirement for better vision will increase and people will demand cataract surgery earlier. The rapid growth in the older population, will further increase, by many times, the number of cataract operations that will need to be done. Even in India, which has a fairly high cataract surgical rate (CSR)¹ of about 3250/million/ population/year, the rate will need to increase by two to three times to address this problem effectively. In many countries the desired CSR should be ten times the current levels.

Getting Cataract Patients 'Through and Out'

Increasing the uptake of cataract services is by itself a major challenge and equally challenging will be maintaining high quality in service delivery. This requires a combination of increasing resources (increasing the capacity) and maximising the use of available resources (increasing efficiency).

This paper focuses on increasing the capacity and efficiency of the existing system of service delivery, which will be a genuine need in many situations.

Getting Cataract Patients 'Into the System'

The capacity of the existing infrastructure depends on the following factors:

Table 1: Resources and Factors Influencing Utilisation

Resource	Determinants of throughput & productivity
Human resource	Staff numbers, composition, skills, working hours and job descriptions
Building	Outpatient area, diagnostic facilities, number of beds and operation theatres available for ophthalmic work. The layout of these facilities and the balance between them
Instruments & Equipment	Diagnostic and surgical equipment. Instruments and their maintenance
Supplies	Availability of supplies matching the patient load

- **Working hours** during which the hospital is open to register both outpatients and inpatients. Many hospitals have a limited time to register outpatients, often too early in the morning, for patients who have to travel some distance to the facility.
- **Length of (inpatient) stay (LOS)** is another determinant of how many patients can be accommodated. If the average LOS is 5 days then at 80% occupancy, about 60 patients can be admitted per bed per year. If occupancy can be brought down to 3 days through better co-ordination and improved surgical techniques, then 100 patients can be admitted per bed. In a 50-bedded unit this increases capacity by 2000/year.

Getting Cataract Patients 'Through'

Once the patients are in the hospital and how well and how soon they receive care depends on internal efficiency. This can be thought of in terms of productivity, which is the relationship between input and output in a specified time period with a required quality. It is directly related to utilisation of resources (Table 1).

Systems and Procedures

Systems must be designed to optimise the balance between resources and patient load. Systems or practices that increase efficiency must be introduced. Similarly, systems or clinical procedures that do not contribute to clinical outcome, patient satisfaction or efficiency are wasteful and hence must be dropped or modified. Staff must be involved in decision making, encouraging motivation and good team practice. Planning for the next day, next month and the following year should be in place. Some of the strategies for greater productivity are as follows:



High volume cataract surgery at Aravind Eye Hospital

Photo: R D Thulasiraj & S Saravanan

- **Standardisation.** The hospital should follow a standard surgical procedure. This is particularly important when there is more than one ophthalmologist. Better instrumentation, training of paramedical staff and patient flow, all contribute to increasing efficiency and quality of care. Standard surgical procedures must be periodically reviewed against outcomes, new technologies and new instrumentation.
- **Division of labour.** In diagnosis or treatment there are a number of clinical tasks. In many settings an ophthalmologist does the entire range of clinical tasks including routine ones which are often the most time consuming. With proper training, paramedical staff can perform many of the routine and also 'specialised' tasks - from the simple task of measuring visual acuity to the use of A-Scan or computerised field analysis. Similarly, in surgery, there are many preparatory steps that a nurse can do very well which can significantly increase the volume of work that an ophthalmologist can do.

Care must be taken to match the tasks to be performed with the skills of the person, to ensure the desired quality standards and it must also be recognised that quality evolves continually, based on technological innovations and patient expectations.

- **Balancing resources.** In a surgical session, for example, a surgeon may have the capacity to carry out 6 cataract operations an hour while one set of instruments can be used only once in an hour,

Table 2: Surgical Output (ECCE + PC - IOL) and the Surgical Team

Tables	Assisting nurses	Circulating nurses	Instrument sets	Surgeries per hour
1	1	1	1	1
1	1	1	3	3
2	2	1	6	6

as it will need to be cleaned and sterilised between operations. Table 2 provides examples of the surgical (ECCE with PC-IOL) output per hour under different scenarios for a well-trained surgeon.²

- **Micro-level planning.** In addition to long range or annual planning it is essential to plan for the next day and ensure that all resources are organised and all concerned staff are informed. The form below (Illustration 1) with suitable modifications and more rows as required, could help in such planning.
- **Operating room layout and work-flow.** The OR layout, and workflow within it, has a maximum bearing on efficiency in terms of how many operations are done. The OR layout, for example, could have two tables with a floor model operating microscope between them (see Illustration 2). While the surgeon is operating on one table, the second assisting nurse can prepare the patient on the next table. Variations of this model are in practice elsewhere. For example, in a surgical practice in Germany, there is only one table on wheels with three other such

tables, with patients on them, in an adjoining preparation room. When the surgery is completed, the patient is wheeled out and another patient wheeled in. The basic underlying principle is the same – cutting down on the surgeon’s waiting time between operations.

- **Adapting newer technologies.** The high volume of cataract surgical procedures world-wide has led to newer surgical methods, together with related instrumentation developed by the industry. The general direction is towards smaller surgical incisions requiring no sutures. Of the several options available, Manual Small Incision Cataract Surgery (MSICS) promises much in promoting higher productivity, reducing costs and improving the quality of outcome. Once mastered, with good organisation as described above, a surgeon using this technique can easily complete six cataract operations in an hour.
- **Information and review systems: having a well-motivated team.** A formal quality assurance system should be in place to monitor intra-operative complications, clinical outcomes, patient satisfaction

and utilisation of resources. This should be discussed periodically with all the hospital staff - to get their inputs for improvement, resulting in a well functioning and motivated team which is essential for operating at high volume and quality.

- **Attitude and patient care.** Even with the best infrastructure and perfect systems in place it requires a certain attitude to get the best results. It is not possible to predict every single activity and specify every procedure.³ Since the major resource in a hospital is the staff, there will also be some variability in the understanding and interpretation of procedures and guidelines. A positive work culture and attitude towards patient care is also essential and such attitudes should stem from the leadership. Some of the specific strategies that promote a positive work culture are:
 - Creating an attitude of willingness to learn and aim towards perfection
 - Promoting ‘patient centred’ behaviour; that is, doing the best for each individual patient
 - Involving the hospital staff in policies and decision making, especially in areas where they will be responsible for implementation.

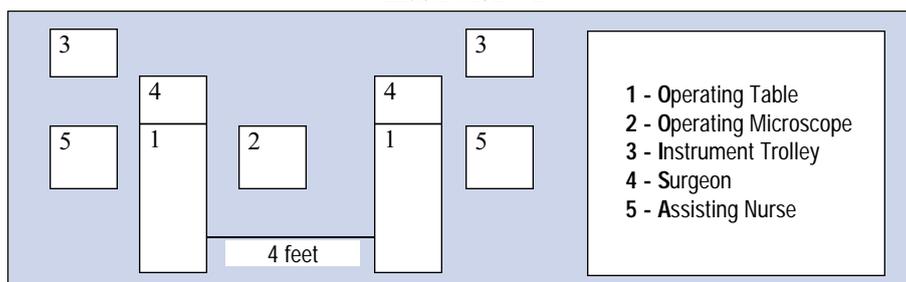
Conclusion

There is an urgent need to move beyond the debate as to whether high quality can be achieved with high volume cataract surgery and actually develop and implement ways of meeting the need. Bad service will not attract patients. At the Aravind Eye Hospital in Tamilnadu, the strategies and methods described above have made it possible for 70 ophthalmologists in the Hospital to do more than 150,000 cataract operations a year, in addition to other surgery. In other high volume settings, such as in Lahanor Lumbini in Nepal, these principles can be seen translated into applied working systems suitable to the practice required. With proper systems and the right attitude in patient care it is possible to achieve these aims in all situations.

Illustration – 1

O.R. Human Resource & Supplies Planner					
Date: _____		Total patients posted for surgery: _____			
Prepared by: _____		Cataract surgery: _____		Other surgeries: _____	
Activity	Person posted	Signature	Activity	Person posted	Signature
Local Anaesthesia			Surgeon		
O.R. Assistant			Assisting Nurses	1.	
				2.	
Sterilisation			Circulating Nurse		
Supplies:					
Item Description		Qty.	Item Description		Qty.
IOLs			Sutures		

Illustration – 2



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Bangladesh Model of Eye Care (Modular Eye Care, MEC)

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In Bangladesh cataract is probably responsible for over 60% of blindness, but more precise data will shortly be available as a result of a national survey. A cataract surgical rate of at least 2000 cataract operations¹ / year / million population is needed to control cataract blindness effectively. However, the present performance is estimated to be less than 500 per annum.² With a population of 130 million (which is growing at the rate of 2.1%/year), a minimum of 260,000 cataract operations / year are needed in Bangladesh.

In Bangladesh eye care services are provided as follows:

- Hospital based clinical services, which are usually in urban areas, usually without outreach activities
- Surgical eye camps
- Comprehensive eye care, which links activities in the community with primary eye care and tertiary services (Modular Eye Care).

Most eye care services, which are concentrated in urban areas, are clinically orientated and provide curative services. The majority do not have regular outreach

activities, nor do they undertake any preventive work. There are approximately 400 qualified ophthalmologists in the country, and a further 700 who have been trained in ophthalmology, but the level of service provision is inadequate to meet the need, mainly due to maldistribution of resources. Comprehensive eye care services, which encompasses prevention, health promotion, rehabilitation as well as curative, clinical services are mostly unavailable.

Surgical eye camps are very popular with Bangladeshi people, because the services are usually provided free. However, eye camps are undertaken less frequently now, due to advances in surgical techniques, and awareness of the need for high quality surgery and good post operative follow up. In addition, there are questions of social equity and justice to be considered.

Modular Eye Care: 1994–1999

Between 1994 and the end of 1999 the model of Modular Eye Care (MEC) was developed in several districts in Bangladesh. These programmes were supported by Sight Savers International, and they provided a comprehensive range of services.³ Recently the model has been modified (see below).

The seven base hospitals of the MEC projects provided a range of diagnostic, clinical and surgical services, being equipped to perform high volume ECCE/IOL cataract surgery. Each base hospital, some of which also provided non-ocular medical services, had a network of 4 Primary Eye Care centres (PEC centres). General doctors trained in PEC and refraction worked in the PEC centres with nurses and 'Organisers'—they treated simple eye conditions, counselled patients, referred those needing treatment for more complex conditions, and followed up patients discharged from the base hospital. The

Organisers worked with local community groups, or with ophthalmologists from the base hospital. They identified patients needing surgery at screening camps; they motivated patients for surgery; health education was provided through community groups (such as women attending literacy classes, or attending meetings of micro-credit schemes); and school vision screening and health education was provided in primary schools. For those people who were incurably blind in the catchment area, Community Based Rehabilitation and integrated education, were often provided, by networking with other local agencies.

The major features of the MEC model were as follows:

- **District focus** – the project has a defined area of work. The assessment of performance is focused on the need for the catchment area
- **Comprehensive Eye Service** – successfully provides curative, preventive, and promotive eye care services, as well as rehabilitation and education services directly or through networking with other agencies
- **Modular approach** – for effective and efficient delivery, service components are clustered into various modules which work together, and which support each other
- **Sustainability** – the projects are designed to address the issue of sustainability in terms of concept, technology and process, by encouraging organisational leadership and financial sustainability through cost recovery.

MEC projects introduced user charges a few years ago for those who could afford it, while poor patients received free or subsidised care. Internal income generation and external funds from Sight Savers International and other agencies financed the subsidised services. Sight Savers supported activities to enhance partners' capacity through a range of training initiatives, and by up-grading facilities. By the year 2002, the projects expect to meet 80% of the running costs through the generation of funds internally (i.e. cost sharing).

New Developments in Eye Care Delivery: 2000 Onwards

The MEC model evolved over time, and continues to change in the light of experience. The model has recently been revised, as it was found that the PEC centres were difficult to run efficiently and effectively and were not financially sustainable. Another constraint which limited further



Eye care in a rural setting in Bangladesh

Photo: Murray McGavin

implementation of the model was that all the base hospitals were in the non-government sector, and there are a limited number of potential partners in the non-government sector in the country.

The model described above has now changed, and there are no longer designated PEC centres, as primary eye care is being integrated into the primary health care system of the country. Another change is that the base hospitals are now also within the government sector. This important step developed through participatory planning workshops, emphasising the need to maximise the use of Primary Health Care (PHC) workers in rural health clinics to provide Primary Eye Care. Central to the concept is that Primary Eye Care is an integral part of PHC, which is already being provided in the community. The government can make Primary Eye Care services available throughout the country with only a small additional investment in training and equipment. In this revised model, base hospitals in the government sector will be strengthened so that they can provide clinical services, and they will run outreach programmes for identifying patients needing eye care and surgery, school vision testing

and increasing community awareness. Special education and rehabilitation will continue to be provided, by networking with local groups. Primary Eye Care will be provided by personnel in the catchment areas, after training, and the new model will not have established PEC centres as such. The recent national workshop organised by the National Institute of Ophthalmology has endorsed the concept and strongly recommended the inclusion of PEC in the government's PHC training programme.

The different components of comprehensive eye care will be introduced into the government sector as follows:

1. **Resourcing government hospital services** to be able to provide diagnostic, clinical and surgical eye services.
2. **Human Resource Development** (training of healthcare staff).



Eye care for all ages . . .

Photo: Murray McGavin

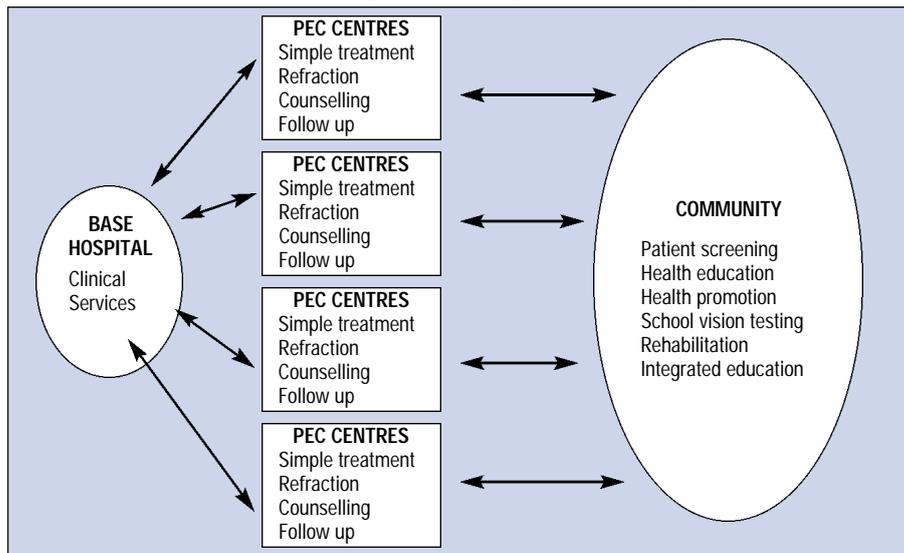
3. **Training Primary Health Care staff** in rural clinics in Primary Eye Care.
4. **Community Based Rehabilitation.**
5. **Integrated Education.**

It is anticipated that working with the government sector will result in the following:

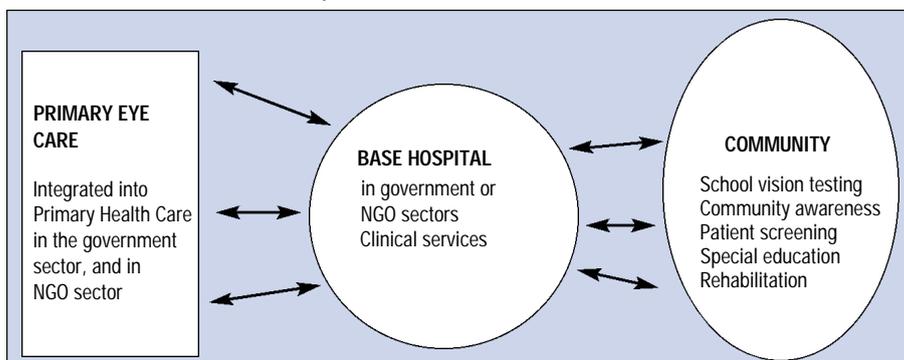
- Increase in the volume and quality of cataract surgery, with an increased proportion of surgery being ECCE / IOL
- Improvement in post operative follow up and care of patients
- Removal of barriers for patients who live in rural areas, by taking the services nearer to the patients, and by providing transport
- Improvement in the quality of non-clinical services e.g., by providing meals of good quality for in-patients
- Improvement in the supply and ensuring the quality of eye medication
- Integration of primary eye care into primary health care, which will lead to the prevention of eye diseases and blindness in the community.

Consideration has been given to most of the components needed for an eye care programme of high quality, in terms of both medical and programme management. Social equity and justice, which require free or subsidised services for the poor, are sometimes in conflict with financial sustainability objectives of projects, but this model has taken a balanced approach, considering both elements to be essential.

The Model of Comprehensive Eye Care in Bangladesh



New Model of Modular Eye Care Within The Government or NGO Sectors



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Developing Eye Care in Papua New Guinea

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Introduction

Papua New Guinea (PNG) is a land of high mountains, dense forest, lowland swamps, coral islands, torrential rainfall, many rivers and beautiful flora and fauna. There are over 1,000 people groups with more than 860 languages. Over 80% of the 4 million people live in a rural subsistence environment.

Increasing literacy (approaching 50%) is the result of half a century of widespread missionary sponsored education that is now becoming nationalised. The loss of near vision by the age of 40 and the onset of cataract by the age of 50, indicates an enormous need, not only for eye care and the recognition and treatment of common eye disease and frequent ocular trauma, but also the accessibility and availability of low cost spectacles.

The major causes of visual impairment and blindness in Papua New Guinea are cataract, pterygium, untreated eye infections and refractive error. PNG is very fortunate that ocular onchocerciasis is not found, trachoma is not a blinding disease, xerophthalmia is rarely seen, and then only in marasmic children with multiple vitamin deficiencies, and glaucoma is more often secondary to other ocular pathology, although open angle glaucoma is reported in the southern mainland.^{1,2}

centres, or 1 private ophthalmologist and 2 private optometrists who catered mainly for the few expatriates and the small number of wealthy national people.

A strategy for the development of a sustainable eye care programme, offering accessible and affordable eye care and spectacles to the people of Papua New Guinea, was initiated in 1994.

The strategy was simple:

- train existing salaried nurses to become basic eye care nurses
- provide them with equipment to be able to use their training
- ensure a stable supply of low cost eyeglasses for these trained nurses
- train selected nurses to take over the support and eventually the teaching of future eye care courses.

A Certificate course was developed. The course aimed to train nurses in basic understanding of the eye and eye problems (both refractive and disease), with skill in the diagnosis and prescription of appropriate spectacles (emphasis on low cost, ready-made spectacles), and in recognition of eye disease and basic treatment.

The course was of 10 weeks' duration, after which the nurses returned to their own hospital positions. The teaching programme was a mix of lectures and practical sessions with emphases on 'hands-on' experience, visual models and practical illustrations. A number of work sheets or 'assessments' were used to assist in monitoring progress of the trainees and highlighting areas requiring revision.

The teaching curriculum outline was as follows:

Teaching Curriculum

Week 1	How the eye works
Week 2,3a	Examination of the eye
Week 3b, 4, 5	Refractive errors, refraction and optical correction
Week 6	Eye diseases, injury, and ageing of the eye
Week 7	Running an eye clinic
Week 8, 9, 10	Supervised clinical experience

Nurse Training

Prior to the first nurse training course conducted in late 1994, eye care in PNG had been available only from a few Government eye surgeons (3), who were overworked and located in the major

The trainees were supplied with a set of eye examination equipment (including an ophthalmoscope, retinoscope, trial lens set and trial frame, letter charts, loupe, text books, etc.), and an initial stock of low cost



Teaching nurses basic eye care in Papua New Guinea

Photo: John Farmer

eyeglasses (total value about US\$1,500 per trainee), which was donated to the supporting hospital or health centre.

After graduation, these nurses returned to their hospital/health centre. As well as continuing their normal nursing duties, they conduct regular eye clinics to provide eye care to their communities. The patients pay the usual, nominal, outpatient fees. Spectacles, when required, are supplied at 10K (US\$3), for basic plastic frames from stock held by the nurse. Metal framed spectacles are available at higher costs. Replacement stock is ordered as needed from a nationally staffed Optical Workshop established by CBM International.

The nurses are effectively able to handle 80% of the eye cases that present for assistance. They also identify those patients requiring surgery, enabling maximum effectiveness from the eye surgeons' visits.

Thus, the nurses are providing accessible and affordable eye care in a sustainable system that is cost neutral to the national health budget.

Nurses in Action

So far, two Certificate courses have been conducted, one in 1994 and a second course in 1997. These courses have been funded by AusAid, Lions International, CBM International and other donations. Of the 25 nurses who graduated from the 2 courses, 20 are still active in eye care. (Some of the others are only temporarily inactive in eye care work due to changes in work situations). Collectively, by the middle of 1999, they have been able to provide accessible and affordable eye care to more than 45,000 people throughout PNG.

Supporting the Nurses

As a vital part of the programme the trainees are visited in their home hospital or health centre about six months after graduation. Rody Ukin, a nurse from the first course is being trained to take a leadership role as the National Eye Care Nurse

Co-ordinator. Rody was involved as a tutor during the second training course and competently undertook the follow-up visits to the second group of nurses. He is respected and will have a significant role in the teaching of future nurse training programmes. It is hoped to train another of the nurses as a second tutor/co-ordinator.

The nurses provide monthly reports, summarising the various eye conditions that presented and the numbers of patients requiring specialist attention. These monitor each nurse's progress as well as indicating those areas in need of an 'eye surgery' visit.

Annual Eye Care Conferences

In-service training or conferences for nurses have taken place each year. These gatherings are a very valuable time of reviewing knowledge and skills and also teaching some new aspects of care. The nurses can also share their experiences and encourage one another.

National Eye Care by National People: Becoming Self-Sufficient

The 5th Annual Eye Care Nurses' Conference/Refresher course, held in April 1999, marked a significant stage in the development of eye care in PNG. In 1998, the PNG Health Department appointed Dr Bage Yominao to the role of National Co-ordinator of eye care in PNG. Dr Yominao, together with Rody Ukin, organised the 5th Eye Care Nurse gathering. Most of the teaching at the 5th Conference was given by national ophthalmologists. Of the 20 active nurses, 19 attended the conference. Three ophthalmic nurses also attended the conference. Further, we had 7 (all but one) of the active Government ophthalmologists join with the nurses for the last day.

Diploma of Eye Care Nursing

Another important development in eye care in PNG is the establishment of a Diploma of Eye Care Nursing. This will be a one year course combining theory and practical components based on the experience of the existing Certificate course. It is anticipated that the main hospitals in PNG will have a specific full time position, at an appropriate salary level, for a nurse who is a graduate of the Diploma programme.

The Problems

While there have been some difficulties with the eye care work, the overall strategy of training nurses has proved to be remarkably effective. Most of the problems

experienced by the nurses relate to 4 areas which will need to be addressed.

- **Acceptance and recognition.** Whilst the nurses are taking on significant additional responsibility and workload (including extra hours and on call work for some of them) they are still receiving only basic nursing pay. In some areas they have been recognised as competent eye care workers and are appreciated. In other places the hospital management has been less supportive. The excellent work of the eye care nurses and improving cooperation between them and the ophthalmologists will encourage recognition of the nurses as a vital part of an integrated eye care programme. The establishment of the Diploma of Eye Care Nursing will further add to the acceptance of the eye care nurses.
- **Funding.** Financial difficulties have been a part of life in the health system in PNG. This has meant that very few of the centres are able to fund regular eye care visits into the surrounding rural areas
- **Surgical visits.** Funding difficulties have also limited the number of surgical visits that are being conducted, as well as the volume of eye surgery being performed at the main hospitals
- **Supply of spectacles.** We are continuing to work with the Mt Sion Optical Workshop to help improve the supply of low cost spectacles. There is also another nationally run optical workshop being established.

A Papua New Guinea Department of Health Programme

This successful eye care programme has been adopted by the PNG Government as an official programme of the PNG Health Department.

Eye Care Nurses: Different to Ophthalmic Nurses

The training and function of these nurses in eye care is different in approach and content to that of ophthalmic nurses. An ophthalmic nurse is trained to support and assist an ophthalmologist in the hospital clinic and operating theatre setting. She or he also has a general nursing background. In contrast, the eye care nurses are trained to work independently, often without direct access to an ophthalmologist, and most are the only trained eye care worker in their



Training in refraction

Photo: John Farmer

area; some, the only eye care worker in their province! There are now a number of hospitals with an eye care nurse as well as ophthalmic nurse and this more efficient teamwork is already making a significant impact in PNG.

Ongoing Work

Much of Papua New Guinea is still without access to eye care. Many more nurses trained in eye care are needed to ensure that all the people of Papua New Guinea have access to basic eye care.

The immediate focus for the future is on:

- Continuing the personal encouragement and support of the current nurses trained in eye care - involving annual conferences and occasional visits by the eye care nurse co-ordinator(s)
- Development of the Diploma of Eye Care Nursing
- Establishment of a second optical workshop to improve the supply of spectacles
- Better co-ordination of rural eye surgery visits
- Another Certificate of Eye Care Nursing course in the near future
- Training and further development of capable leaders and teachers for the eye care nurses so that they can eventually teach the Certificate and Diploma courses themselves.

This approach, which has been so successful in Papua New Guinea, could be used as a model for the rest of the Pacific region and where appropriate in the rural areas of other developing countries of the world.

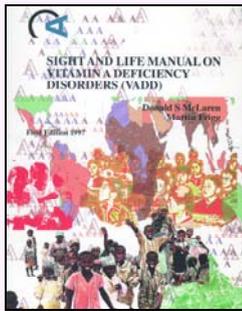
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SIGHT AND LIFE MANUAL ON VITAMIN A DEFICIENCY DISORDERS (VADD)

Donald S McLaren MD PhD FRCP
Martin Frigg PhD



Published by:
Task Force SIGHT AND LIFE
ISBN 3-906412-00-8

This invaluable 138 page manual on vitamin A deficiency disorders (VADD) has been compiled by two internationally recognised authorities in the field. The

achievements and backgrounds of Dr McLaren and Dr Frigg are complementary, bringing the extensive practical and research knowledge of Dr McLaren together with Dr Frigg's experience of programming to combat VADD as Secretary of Task Force SIGHT AND LIFE (founded by Roche in 1986).

This is much more than an introduction to the subject of VADD although it is also described by the authors as a 'companion to study'. The Manual is designed for those health and nutrition workers involved with real needs, particularly the protection and preservation of eyesight and child survival.

While there is an appropriate strong emphasis on xerophthalmia, and its clinical features – there is also reference to the effects of vitamin A deficiency on growth, the immune response, haemopoiesis, and skin and reproductive systems.

After describing vitamin A in nature, in food sources, in health, and assessment of vitamin A status, the section on vitamin A deficiency affecting the eyes is followed by a discussion of morbidity and mortality. A review of the worldwide situation with relevant data and the epidemiology of VADD leads on to a chapter on treatment, prevention, dietary modification and disaster relief.

The Manual concludes with a section on further reading and a glossary.

The text is liberally interspersed with illustrations: tables, diagrams, graphs, maps and (black and white) photomicrographs and clinical pictures.

This Manual has immediately become a standard work, very important as a resource and reference text for all those concerned with vitamin A deficiency disorders.

A teaching slide pack to accompany the Manual is also available:

- 57 colour transparencies
- Illustrated handbook

D D Murray McGavin

For further information contact:

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Task Force SIGHT AND LIFE Support for New Regional Resource Centres Project

Task Force SIGHT AND LIFE is supporting the training of eye health workers at six key training centres in Africa, Asia and Latin America through distributing teaching and educational materials on **Childhood Blindness** and **Xerophthalmia**. The support of Task Force SIGHT AND LIFE for the new Regional Resource Centres project means that more than 1,100 materials will be made available to support eye health workers involved in training others.

"This is an important partnership" said **Dr Martin Frigg of Task Force SIGHT AND LIFE**, "and we believe that our contribution will have a far-reaching impact on the education of health workers in the prevention of childhood blindness and, particularly, vitamin A deficiency".

The project will be co-ordinated by the **International Resource Centre for the Prevention of Blindness, ICEH, London** and involves six training centres in **Colombia, Nigeria, Tanzania, South Africa, India and Pakistan**.

FOUNDATION DARK & LIGHT

The Foundation supports organisations (not individuals) that work with the blind, including those with multiple disabilities. It also supports low vision, integrated education, vocational training and CBR projects as well as early intervention and improved medical treatment of eye diseases. Based on Christian principles, the Foundation supports organisations regardless of religion, nationality, race or age. For more information, please write a short letter introducing yourself and requesting an application questionnaire. For those with internet access, the questionnaire is also available on the website.

Foundation Dark & Light, PO Box 672, 3900 AR Veendaal, The Netherlands.

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Ophthalmic Epidemiology Issue on Trachoma

Through the generous support for **Pfizer Inc.** and the collaboration of **ISGEO (The International Society of Geographical & Epidemiological Ophthalmology)** and the Editor of **Ophthalmic Epidemiology**, a special issue of **Ophthalmic Epidemiology** will be issued on the topic of trachoma. We are alerting members of the 'trachoma' community, as well as persons who presented at the ISGEO meeting in Bamako.

The same high standards of research currently published in **Ophthalmic Epidemiology** will be in evidence for the trachoma issue. Therefore, submission is not a guarantee of acceptance, as space will be limited. The instruction for authors can be obtained from the Email addresses given below.

There are a few important points:

- The deadline for submissions is August 31, 2000. No submissions can be accepted after this date.

Submissions received after this date will be routed to a regular issue.

- As per regular submissions to **Ophthalmic Epidemiology**, all trachoma submissions will be sent out for peer review.
- Submissions should be sent to either **Dr Sheila West** or **Dr Paul Courtright**, who will serve as Editors for this special issue. Email (and regular) addresses are given in the instructions for authors. If possible, manuscripts should be submitted via Email (as an attachment) rather than regular mail. Dr West's Email address is: **shwest@jhmi.edu** and Dr Courtright's Email address is: **pcourtright@providencehealth.bc.ca**
- All questions regarding the trachoma issue should be addressed to either Dr West or Dr Courtright.

We look forward to your submission.

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Epidemiology Research Awards Scheme

The **International Society of Geographical & Epidemiological Ophthalmology (ISGEO)** has been pleased to announce that, in 1999 **Dr Taffessework Girma (Ethiopia)** received the ISGEO Start-up Research grants. These grants (up to US\$1,000) are to help people living and working in developing countries initiate small/pilot ophthalmology research projects.

Special note: With a generous donation from **Pfizer Inc.** and the **International Trachoma Initiative – ISGEO** will be providing a new **Start-up Research grant on trachoma.**

Applications for the regular (year 2000) Start-up Research grant and the Trachoma Start-up Research grant are now being accepted and a copy of the research application form can be obtained from:

Dr Paul Courtright, ISGEO Secretary
BC Centre for Epidemiologic & International Ophthalmology
St. Paul's Hospital
1081 Burrard Street, Vancouver, BC,
V6Z 1Y6 CANADA

Fax: 001-604-806 – 8058, E-mail:
pcourtright@providencehealth.bc.ca
or on the ISGEO website:
www.interchange.ubc.ca/bceo/isgeo/

Glaucoma Associations

First Meeting of the World's Patient Based Glaucoma Associations

The **International Glaucoma Association** is planning a meeting of the world's patient based glaucoma associations in February 2001. The purpose of the meeting is to decide whether an international organisation should be established to represent the associations of the world at governmental and intergovernmental level. The meeting will provide an international forum for the discussion of subjects relating to glaucoma and provide a resource available to all, based on the materials produced by the member associations.

In order for the meeting to be a success it is necessary to identify those individuals and associations not already affiliated to the **International Glaucoma Association**. If you are involved with a glaucoma patient organisation or know of such an organisation in your country, which may be interested in this proposal, please contact David Wright at IGA.



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Travel grants may be available.

Further information will be available in the next edition of this journal.

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Teaching and Learning

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This article is the second in a series of eight, dealing with 'Teaching Eye Health'. Almost everybody who is involved in community eye health is also a teacher - but many have never had any training on how to teach effectively. The aim of the series is to stimulate readers to teach and learn more effectively, and we will be working through important topics related to teaching and learning in a systematic and practical way. This article sets the scene by examining some important concepts related to 'teaching' and 'learning'.

Words we use to Talk About Teaching and Learning

People use different words when talking about teaching and learning. Sometimes the same word will mean different things to different people, and sometimes different words will carry the same meaning. For example, Americans tend to use the word 'evaluate' to describe testing students to see if they have learnt, while the British often use the word 'assess'. Here are some other examples of words with related meanings:

- 'educator', 'teacher', 'trainer', 'tutor', 'lecturer', 'facilitator'
 - 'student', 'pupil', 'learner', 'scholar'.
- What do these words mean to you? There will never be full agreement about the 'real' meaning of each of them. If people appear to misunderstand us, we have to explain what we intend them to mean.*

* Please also see the glossary compiled by Sue Stevens (page 31)

'Learning'

All of us understand things in the light of our past experience. This is also true of 'learning' - we get our ideas of what 'learning' means from what happened to us in the past. So, for example, we may think of 'learning' as something which takes place in a school or college, in a classroom. We may think of it as a person sitting alone at night, trying to memorise a lot of facts so that s/he can pass an exami-

nation. However, a bit of reflection will show us that 'learning' is much wider than that. After all, children learn a great deal before they even get to school - they learn to speak, to walk. Educational psychologists tell us that any activity which leads to a change in our behaviour is 'learning'.¹

Here are some more ideas about 'learning':

- Learning can be **formal** or **informal**. We learn informally from what we experience day by day: things which happen to us make us change the way we think and act. We may not even be aware that we are learning, which may cause problems - for example, health workers may learn bad attitudes from the example of others. Of course, learning may also be formal: we attend a course which is planned in a structured way, in a school or college.
- We don't just learn **knowledge and facts** - we also learn **skills and attitudes**. This is especially important for health workers, since it is in our practical work that we have an effect on the health of the people we serve. Interestingly, we learn knowledge, skills and attitudes in different ways - for example, we may learn a new idea from a discussion, but we learn skills by practising them and getting feedback.
- **People learn in different ways**. Researchers have identified different 'learning styles'.² Some people are 'receivers': they like to memorise what is given to them. This is a very common style, and it is reinforced by teachers who expect students to memorise, and reward them for it. Other people are 'detectives': they like to investigate what they are learning themselves, to get to understand it. Yet others are 'generators': they like to decide themselves what they want to learn, and then look for opportunities to learn those things.
- Learning can be **superficial** or **deep**.³ If knowledge is only memorised (*superficial* learning) it is soon forgotten, and may never affect the way that person does her/his work. If the learner is made to use the new knowledge actively, the learning becomes *deep*. The learner connects the new knowledge to the concepts that s/he already has, and understands how it can be used practically. It is, therefore, much more likely to be remembered and used.
- **Motivation is important for learning**.⁴ What is it that makes people want to learn? Some learn because they want to

do a better job - they get satisfaction from the feeling that they are competent. People are also very strongly motivated by the hope that they will be rewarded - for instance, by gaining a qualification, leading to a promotion and better pay. The need to pass exams is therefore a very strong motivator.

- Learning continues **throughout a person's lifetime** - at least informally. We all know that health workers should continue to learn throughout their careers, because new information about health is constantly becoming available. However, many workers do not have access to formal in-service training. This means they themselves have to take the responsibility for staying up-to-date - they have to become 'life-long learners'.

'Teaching'

Once again, our understanding of what 'teaching' is, is based on our past experience. Our earliest experience was in school, where the teacher was also a 'master' or 'mistress', standing in front of the class, telling us what to do and what to learn. Some of us experienced the same kind of 'teaching' at college. Others may have experienced teaching where the 'teacher' is more of an equal, who takes account of the learner's experience and even learns from the learner. That is why Abbatt and McMahon say: 'Teaching is helping other people to learn'.⁵ They go on to say that the job of 'teaching' health care workers has four elements:

1. The teacher has to **decide what students should learn**. The students may take part in this decision, but all are guided by the same principle: **it is the job that people have to do, that determines what they should learn**. They have to learn all the knowledge, skills and attitudes that they need to perform a specific job. They learn what they 'must know' and 'should know', not what is 'nice to know'.
2. The teacher has to **help the learners to learn**. This does *not* mean that the teacher 'spoonfeeds' the students, as if they were babies. It *does* mean that the teacher's first concern should be that the students should learn as well as possible. Teaching sessions or classes have to be planned carefully, taking into account the learning styles, the language, the background of the students. In short, the teachers must be **student centred, not teacher centred**.
3. The teacher has to **make sure that the students have learnt** - s/he has to assess

them. Assessment helps teachers and students to see how well the students are progressing, so that they can attend to any weaknesses. It sets a standard, so that society is given people who are competent to practice. **Assessment must be carefully planned so that it supports the learning we want to see** - we know that students learn what they believe they need to pass the exams, and leave out the rest . . .

4. The teacher has to **look after the welfare of her/ his students**. Students who

are stressed and unhappy do not learn well. Good teachers try to ensure that the general living conditions and environment of their students are adequate. They also provide opportunities for personal counselling for them. **Teachers need to cultivate an open and trusting relationship with their students.**

In the next article in this series we will start applying these ideas and principles, by considering 'Communication and Effective Teaching'. Stay with us!

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GLOSSARY OF TERMS USED IN TEACHING		Sue Stevens Nurse Consultant
TERM USED	DEFINITION	
Aims	A general statement of what is intended in a particular lesson or course of study	
Assessment	A means of comparing students' actual achievement with a desired standard of achievement as outlined in the syllabus	
Brainstorming	A collection of ideas shared in a group encouraging free expression	
Buzz group	Discussion in groups of 2-4 people	
Case study****	Text description to facilitate imagination and discussion of a possible situation	
Course design	The systematic planning of a period of study for a particular group of students	
Curriculum planning	A plan worked out in advance fixing the order or the timetable of a group of educational activities for a particular course - aims, content, methods, evaluation	
Demonstration	Teacher activity - e.g., to teach a practical skill or why certain outcomes occur	
Directed private study	Time set aside by the teacher for students to study a particular subject	
Evaluation	The process of reviewing particular areas of study to estimate their effectiveness according to student needs and any changing factors	
Exposition	An interrupted lecture where the teacher will stop to answer a question or explain further	
Feedback	Information received by the teacher about the success of, or problems experienced with, a session or course as it is progressing	
Learning objectives/outcomes	Specific statements of behaviour by a student after a period of learning - proving they have learned	
Learning strategies/ teaching methods	Activities chosen by the teacher to help students learn	
Lecture	Subject introduced and delivered by the teacher in a specific time which transmits information	
Lesson plan	A 'sketch map' of a particular session for a particular group of students, based on objectives and teaching methods with intended timing of activities	
Practical	Student activity - e.g., learning a skill or group work	
Programmed learning	A planned exercise to enable individual learning, e.g., in a manual or a computer programme	
Project	A task based on investigation with a specific time-table. The teacher will advise the student on resources and materials. The student reports back with findings, usually in written format	
Resources	(a) Any source of information from which students are able to learn, e.g., library, teaching materials, human resources (other students, teachers, etc.). All these are referred to as 'learning resources' (b) Funding, staffing, equipment - anything required to run a course	
Role play ****	Similar to case study (see above). A situation is acted out to create insight into students own behaviour	
Scheme of work	A session by session plan addressing a specific topic for a particular group of students which includes objectives, methods, content, resources, and assessment procedures. Based on a syllabus	
Seminar	A group of about 8 -12 people following up something that has already been introduced on the course. Involves reading of an essay or paper by one group member followed by discussion	
Simulation****	Similar to a case study and role play (see above)	
Syllabus	A statement of aims and content for subject areas	
Syndicate work	A task given by the teacher to a group of students to complete in a period of time. The students are required to report back to the teacher	
Tutorial	One-to-one teaching (student and teacher) usually for counselling purposes based on the student's work	
Weighting	The emphasis, in terms of time and the allocation of marks in assessment, placed on an area of study in comparison with other areas of study	

Grain Found Growing in the Eye

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Irritable, discharging left eye. Grain was found under the upper eyelid

Photo: A Kumar Sil

A child was brought to the Vivekananda Mission Hospital with a history of paddy grain entering the left eye. The ophthalmologist could not find any grain inside the eye and the child was given an ordinary antibiotic drop. The symptoms became aggravated and the child was brought to the hospital again after four or five days. After double eversion of

the upper lid, the grain was found with a shoot growing inside the eye. Fortunately there was no corneal ulcer and the eye could be saved. This led us to organise campaigns for the use of protective glasses while threshing paddy with electrically operated machines. With the use of electrically operated machines, the grains enter the eyes with greater force and cause much more injury to the cornea. The fine hairs of the paddy grain have a notorious tendency to push the grain up into the upper fornix and hide there. Double eversion is the technique to detect it.



Workers wearing protective glasses while using an electric thresher

Photo: A Kumar Sil

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THE ROYAL COLLEGE OF OPHTHALMOLOGISTS DIPLOMA IN OPHTHALMOLOGY EXAMINATION

The Royal College of Ophthalmologists has introduced an examination leading to the award of the Diploma in Ophthalmology (DRCOphth). The examination will be held twice a year, in June and November.

This Diploma is aimed at those not wishing to pursue a career as a consultant ophthalmologist in the United Kingdom. It should, therefore, be of interest to all doctors with an interest in ophthalmology working outside the European Union.

Details are available from:

Examinations Office, The Royal College of Ophthalmologists
17 Cornwall Terrace, London NW1 4QW, UK
Telephone: 00 44 (0) 207 935 0702 (extensions 24, 25, 26)
E-mail: rco.exams@btinternet.com

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