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Low vision care for the elderly

Report of a workshop

Madrid, 4-6 July 1996

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to the Programme for the Prevention of Blindness**

specifically on this occasion:

**Asian Foundation for Prevention of Blindness
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The Lighthouse, Inc. (USA)
Sight Savers International (UK)**

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INTRODUCTION

A workshop on "Low vision care for the elderly" was convened from 4 to 6 July 1996 in Madrid, hosted by the Organizacion Nacional de Ciegos de España (ONCE) and with support from the Task Force of the Partnership Committee to the WHO Programme for the Prevention of Blindness and from the World Blind Union (WBU). The participants included experts and representatives of seven nongovernmental organizations and seven countries working in the field of low vision care; the list of participants is included in Annex 1. The draft agenda was adopted with no modification (Annex 2).

Dr B. Thylefors, Director of the WHO Programme for the Prevention of Blindness and Deafness, gave an outline of the establishment of the workshop and Mr R. Mondaco welcomed the participants on behalf of ONCE.

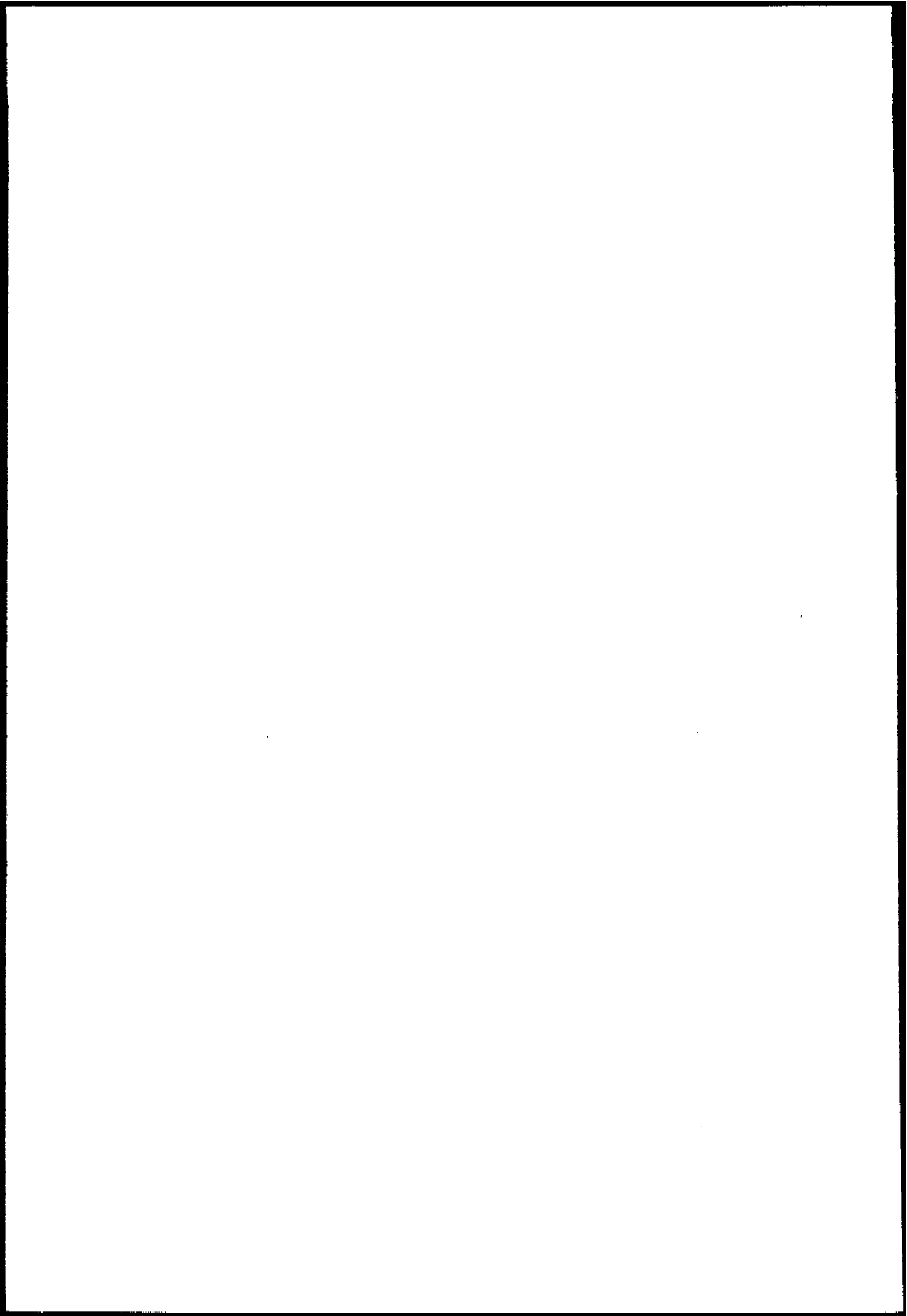
Sir Duncan Watson, Immediate Past President of WBU, stated that its objectives included the prevention and cure of blindness and the improvement of eye function, or the enhancement of residual vision, in visually impaired elderly people. Sir Duncan drew attention to the 1989 Royal National Institute for the Blind (RNIB) survey that estimated that one person in 60 in the United Kingdom was visually impaired and that 90% were over the age of 60 years. Most of the people who were visually impaired had some residual vision and two-thirds suffered from a second age-related illness or disability. At its General Assembly in Toronto, in August 1996, WBU would consider recommendations that:

- ▶ WBU, its member countries and affiliates, and WHO, at global, national and regional levels, develop strategies and policies to reduce low vision in the elderly by the prevention and treatment of eye disease and the provision of low vision devices;
- ▶ as the majority of elderly people with impaired vision had other health problems, WBU seek to enlist the support of WHO to ensure that effective general medical care was provided.

Early identification, assessment of needs and treatment were required with the aim to improve the quality of life of visually impaired elderly people, who were amongst the most disadvantaged in society.

Mr W. Brohier, President of the International Council for Education of People with Visual Impairment (ICEVI) and Education and Rehabilitation Consultant for Asia for Christoffel Blindenmission (CBM), expressed the interest of both organizations that he represented. ICEVI saw low vision as an essential and integral part of its mandate - the promotion of the equalization of educational opportunity for people with visual impairment throughout the world. ICEVI collaborated with WHO in the organization of the consultation in Bangkok in 1992, the outcomes of which were presented in the WHO document "Management of low vision in children", and played a supportive role in the development of the "Low vision kit". Low vision was one of the themes of the Focus Day at the ICEVI Conference in Brazil, in August 1997.

Mr William Brohier was unanimously elected Chairperson and Dr Mary Ann Lang Vice-Chairperson. Ms Janet Silver and Dr Jill Keeffe were appointed Rapporteurs.



1. REVIEW OF AVAILABLE DATA ON THE MAGNITUDE OF THE PROBLEM OF LOW VISION

1.1 Definitions of low vision

The ICD-10 definition is to be used for reporting data on blindness and low vision, to enable comparison of data and to provide an overview of the problem. Low vision thus refers to persons with vision $<6/18$ but $\geq 3/60$.

Countries are encouraged to use ICD-10 in surveys and reporting, but this definition does not define the population in need of low vision services. The WHO (1992) "Bangkok" definition, which is a functional definition of low vision, is considered to be appropriate for use with elderly people with low vision.

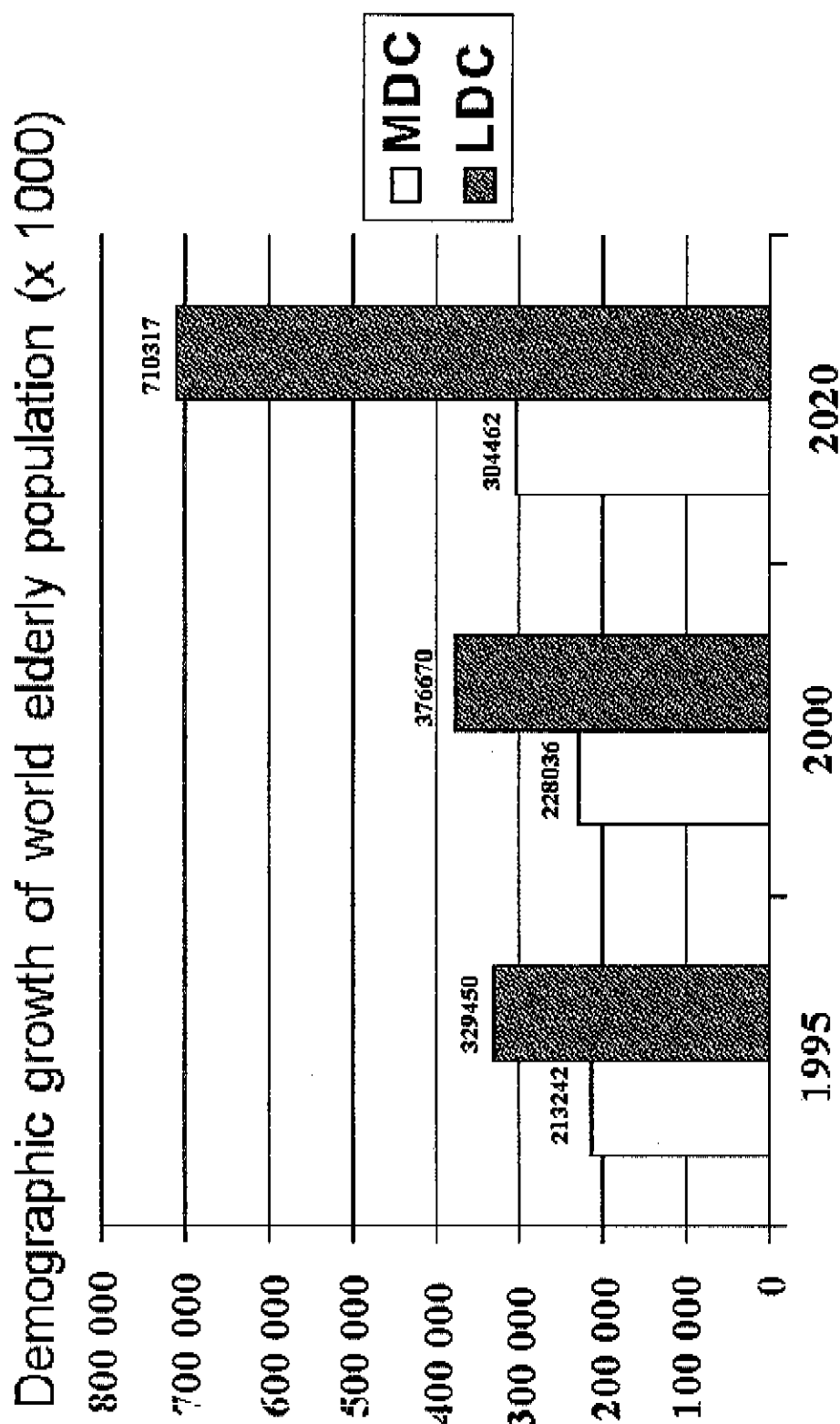
1.2 Magnitude of the problem

Data from the 1994 update of "Available data on blindness" reveal that the prevalence of blindness generally ranges from 0.3 to 1.7% and low vision from 2.0 to 7.0%. On average, the percentage of low vision is three times (more accurately, 2.9 times) the prevalence of blindness. However, estimates of low vision have been based on the number of registered "blind" or "partially sighted" or on the number of people attending for services. Both these methods underestimate the prevalence of low vision.

WHO estimates that there are 38 million persons blind (visual acuity $<3/60$) and 110 million with low vision (visual acuity $<6/18$). The total number of visually impaired people is thus 148 million.

These figures are likely to grow very rapidly and could effectively double by the year 2020 unless preventive action is expanded. Most of this expected growth of visual disability is due to the ageing of the global population (Fig. 1) - hence the strong rationale for low vision care for the elderly, which would become a field of great demand in the future.

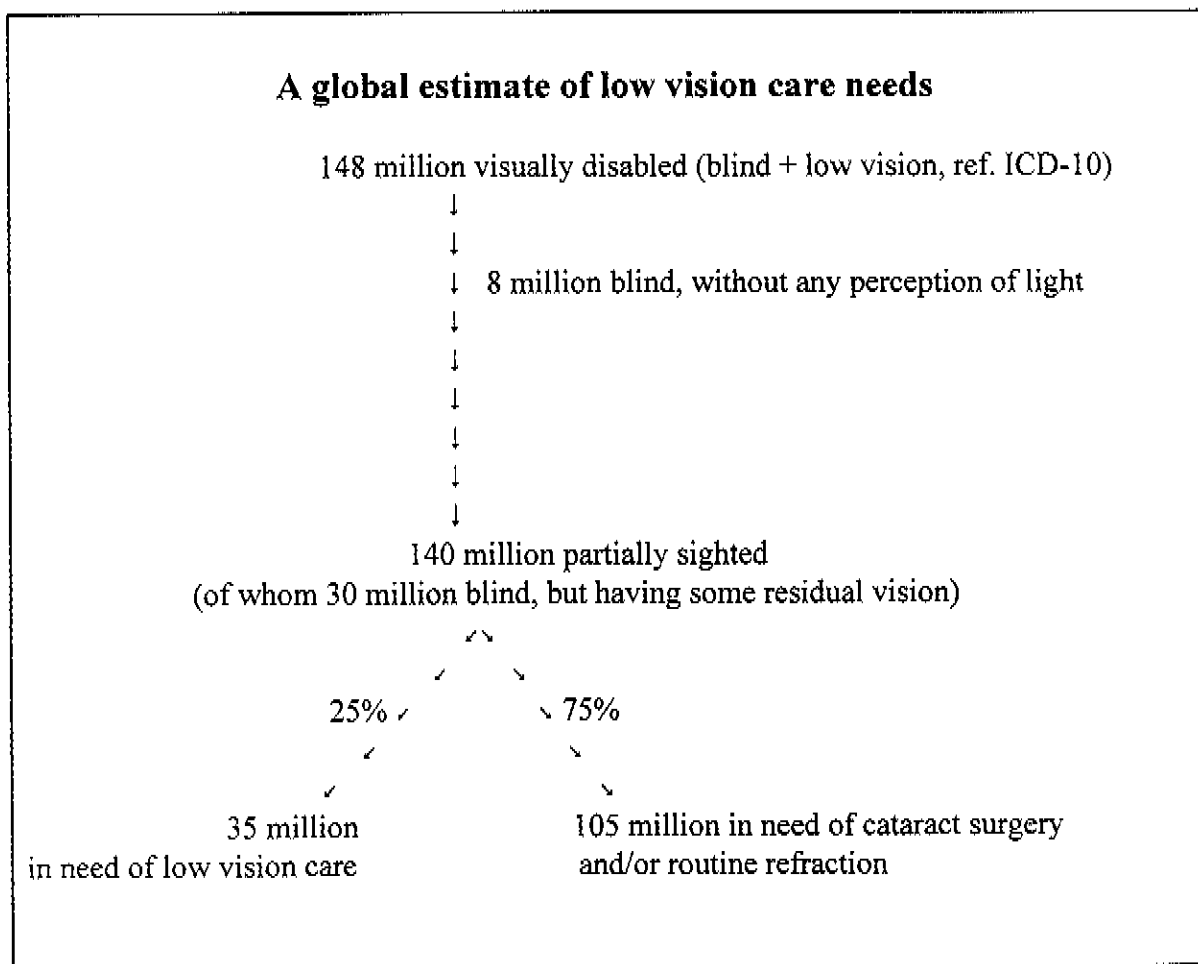
Fig. 1



MDC = More Developed Countries
 LDC = Less Developed Countries

The WHO (1992) "Bangkok" definition of low vision includes the statement "A person with low vision is one who has impairment of visual functioning even after treatment and/or refractive correction ...". Thus, by definition, people with unoperated cataract and refractive errors are excluded (but are included in surveys using the ICD-10 definition). Therefore, using the "Bangkok" definition, the low vision population in need of low vision services is 35 million (see below). Emphasis needs to be on the provision of surgery to reduce the cataract backlog and on refractive resources. With the problems of access to and utilization of services, more than this number could require low vision services. The use of the ICD-10 definition alerts countries to eye care and rehabilitation needs, but low public awareness of this issue is a constraint to be addressed.

Of the 38 million people classified as blind, some 8 million are estimated to have no perception of light:



Thus, using the "Bangkok" definition, 140 million are functioning as people with low vision. Seventy-five per cent. of this number could be eliminated with cataract surgery or correction of refractive errors, according to data from a great number of developing countries. This results in the global estimate of 35 million people in **true** need of low vision care, for example the provision of low vision devices, appropriate refraction and rehabilitation related to their visual disability.

1.3 Causes of low vision

There are no global data available on the causes of low vision; these could only be based on data from population-based blindness surveys. There is likely to be variation in the causes between countries, depending on the pattern of eye disease and care/services provided.

Treatable causes of low vision, such as **unoperated cataract** and under- or uncorrected **refractive errors**, constitute a large percentage of people with low vision. With the increase in the incidence of diabetes, a large rise in prevalence is predicted, especially in developing countries. The result is an increase of the number of people with **diabetic retinopathy**, already seen in many countries. The effectiveness of timely treatment of diabetic retinopathy has been demonstrated, but monitoring of diabetic eye disease and promotion of greater use of eye care services (and control of diabetes) needs to be incorporated into prevention of blindness activities.

Ageing-related macular degeneration (AMD) is most common in people over the age of 80 years and is more often seen in certain populations in industrialized countries. There is no generally effective means of prevention, but effective low vision care could improve significantly the quality of life for people with AMD.

Amblyopia, from its varied causes, is difficult to prevent unless detected and dealt with at an early (preschool) age. However, cases of unilateral (most common) amblyopia could become a priority for low vision care if an accident/injury destroyed the better eye.

Globally, there is a decrease in the incidence of **eye injuries** in industrialized countries, but an increase in developing countries: this is due to an increase in work-related injuries, in settings where eye protection is not common, and to road accidents.

Corneal disorders caused, for example, by trachoma are a significant cause of vision impairment in developing countries. Unfortunately the usual treatment, such as corneal transplants, is often very difficult in such cases because of scarring and neovascularization. However, trichiasis surgery and optical iridectomy can be useful in individuals with remaining clear parts of the cornea.

Recommendations

Definition

A comprehensive definition of low vision was proposed at the WHO/ICEVI joint meeting in 1992. It is recommended that that definition be adopted for use with elderly people. The definition is intended to be applied in a flexible manner to provide a working definition in order to identify people who might need low vision services:

"A person with low vision is one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to light perception, or a visual field of less than 10° from the point of fixation, but who uses, or is potentially able to use, vision for the planning and/or execution of a task."

Magnitude of the problem

*Present global estimates point to some 38 million people being blind and 110 million having low vision (ICD-10). Available data indicate that commonly 75% of the visually disabled in developing countries could benefit from surgical or routine refractive services to improve vision. Thus the remaining need for low vision care, according to the 1992 WHO definition, should be in the order of 35 million cases, but there is a great need for more data on that matter. It is **therefore recommended** that all population-based assessments of visual loss include specifically low vision and its causes.*

2. THE PRESENT STATUS OF LOW VISION CARE FOR THE ELDERLY

2.1 Sub-Saharan Africa

(i) *Southern Africa*

Because of the overall tremendous eye disease burden, low vision has had a low priority, with shortages of personnel and funding. The emphasis has been on the needed provision of primary eye care. Several NGOs are concerned, but a negligible number of people presently have access to low vision services. Less than 10% of people estimated to be in need of care are utilizing available services.

(ii) *East and Central Africa*

In Kenya, there is only one low vision clinic, but outreach services exist in some areas. Optical devices are being produced in two centres in Kenya. The major issues are the very small numbers of ophthalmologists and few, if any, optometrists; the shortage of training; and access to services, almost impossible for most of the people. The situation in Kenya is representative of most East African countries. CBM has co-workers who specialize in establishing some low vision services both in East and in West Africa. Services provided focus on young people and especially on those already in special education. The services to adults are virtually non-existent, but Sight Savers International has conducted courses for training of trainers in low vision.

(iii) *West Africa*

Very few, if any, services exist in the French-speaking area of West Africa, nor is there any known regular low vision care being provided in those English-speaking countries concerned, except for Ghana, where low vision programmes have been initiated.

2.2 The Americas

(i) *North America*

There has been under-reporting of the number of people in USA with low vision, but there are now population-based studies for both urban and rural populations. From a study of the self-reporting of visual impairment, the prevalence of low vision is 15% in those aged 45-64 years, 17% in those aged 65-74 and 26% in the >75-year age group (see Table 1, page 11). Furthermore, the prevalence of low vision in people in institutions is four times that rate. The common attitude towards blindness is reflected in the statistic that 61% of people fear blindness more than other disabilities.

Only 1% of the respondents with self-reported vision loss reported that they utilize low vision services. Lack of familiarity was given as the main reason for not using the services. Moreover, many services exist but are not well understood, or are insufficiently publicized. In general terms, there is a lack of trained professional personnel in relation to the needed coverage of populations.

In Canada, vision care is linked to the eye care services, but low vision care is not provided on a routine basis. A network of 56 offices of the Canadian National Institute for the Blind provides services throughout the country. Coverage is essentially 100%, but access to service could be difficult due to long distances to travel. Identification of people with low vision is the key issue, especially for people in residential care. Even among those identified, only 50% have acquired services; thus, general awareness about low vision is the major issue. Some States of Canada cover part of the payment for low vision devices.

(ii) *South America*

Brazil is a country of great regional differentiation and could thus be representative of other South American countries. Brazil has a good ratio of ophthalmologists to population, but no optometrists in practice. Orthoptists now work as ophthalmic assistants. Low vision services are provided by ophthalmologists, but only 20 (out of 6000) are trained in low vision. Approximately 5% of the population receive low vision services; access to services is more difficult in rural areas. Prevention of blindness programmes and the low vision programmes are not linked. There is a general lack of awareness of existing services and also ignorance as to who should be referred. Availability of low vision devices is another problem. Brazil has still a young population, with only 20% of the population being over 50 years of age. However, the needs of the elderly with low vision are neither recognized nor understood.

(iii) *Other South American countries*

Teams from ONCE visited eight South American countries. The emphasis in the work of these teams was on the provision of support to children. Low vision services for adults are not yet recognized as a need in most of those countries concerned.

(iv) *Caribbean*

Short-term training programmes are provided in the Caribbean countries, but several of these have not continued on a long-term basis. There are no services in Cuba, where the situation has been made more critical by the epidemic of optic neuropathy in 1992-1993. Attempts to mobilize external support for low vision care in Cuba have so far not been successful, apart from training opportunities provided by ONCE.

2.3 Europe

(i) *Western Europe*

Awareness of the needs of people with low vision is a general problem. In the Nordic countries, services are well established and most, but not all, elderly people access services. The same is broadly true for Holland, Belgium, Germany and UK. In most of these countries, all low vision devices prescribed through the hospital services are loaned free of charge. In principle, everyone has access but, in practice, not all people do access low vision services.

In France, there are no optometrists, but ophthalmologists and orthoptists involved in low vision care. However, opticians do not have training in low vision. Legislation has been enacted for the provision of low vision services to children. Of the 1.27 million people who have macular

disease, only 50% are disabled and in need of low vision services. Two-thirds of the low vision population are over the age of 65 years, but less than 10% of the people with low vision access services.

In Spain, the provision of most low vision services is carried out by ONCE, the main NGO, which has 51 000 members of whom 70% have low vision (6/60 or less and a visual field of less than 10°). Forty-three per cent. are over 65 years of age. Some training is provided during initial qualification in optometry, including a low vision module which is being provided in six universities. Only 12 shops throughout Spain provide low vision devices, and ONCE also wishes to involve more ophthalmologists in services. Despite ONCE's efforts to create a high level of visibility of its work in Spain, many people with low vision do not use low vision services.

Programmes have commenced in Switzerland, much in parallel to other Western European countries; access to services for the elderly may still be limited in parts of the country.

(ii) Eastern Europe

There has been a recent awareness of the need for low vision programmes. Many small short-term, but unconnected, programmes are just commencing. CBM/ICEVI have fostered the "twinning" of organizations to assist in the development of programmes; low vision activities have been part of these programmes.

The former USSR States have not yet developed services, as far as is presently known.

2.4 Eastern Mediterranean

Programmes have been commenced in Libya, Morocco, Sudan and Tunisia. A low vision centre is being constructed in Egypt, and some ophthalmologists have been trained in low vision. In Iran, there is awareness of low vision but no services. CBM has conducted courses for teachers in Jordan. Courses are planned for Pakistan, in a centre in which programmes could be based. In Saudi Arabia, there is some interest in low vision, but resistance to the concepts of low vision services is also being encountered on cultural grounds.

2.5 South-East Asia

The South-East Asia Region includes an area with 1.4 billion people and some 10 developing countries.

(i) India

There are low vision programmes in a few centres which concentrate mainly on children. A course would be conducted in southern India later in 1996. A Disability Act which includes low vision has been introduced in India. The cost of low vision devices is a problem, but optical workshops which produce low-cost spectacles could also manufacture low vision devices.

(ii) *Other South-East Asian countries*

Some programmes have been introduced in Thailand and some small-scale projects have commenced in Nepal. As far as is known, low vision care needs are largely unmet in the other countries of the Region, i.e. Indonesia, Maldives, Myanmar and Sri Lanka.

2.6 Western Pacific

(i) *The People's Republic of China*

A national low vision care programme has been implemented for children, of whom 50% have access to the services. In rural areas, however, this rate is much lower, with approximately 10% having access. There is a target for all children to have low vision devices, including one 2x telescope and a 3x stand magnifier. Services for adults are being started, and it is estimated that 1.5 million people are in need of low vision care. Short training courses are conducted for ophthalmologists and courses are planned for teachers, who would assist in the community screening. There are no optometrists in China. There is not a perceived need for services for elderly people with low vision, as care of the elderly is seen as the responsibility of the family. Low vision devices are being produced in China and, if the need for devices were established, these could be provided by the Government; otherwise payment for devices has to be made by the family.

(ii) *Hong Kong*

Hong Kong has good manpower and other resources for low vision programmes. Training in low vision is available for optometrists. Awareness activities exist to encourage ophthalmologists to refer patients with low vision and to publicize services to elderly people. Most people in Hong Kong have poor knowledge of but easy access to services. Charges for consultations are minimal and can be waived if necessary; a waiver system exists for up to US\$ 120 for low vision devices.

(iii) *Australia*

A population-based survey has been conducted to determine the numbers of people with low vision in urban and rural areas and in nursing homes. The prevalence of visual impairment doubles for each decade over 60 years. Utilization of services ranges from nil in some populations and areas up to approximately 25% in others. Ophthalmologists are more likely to refer their patients to low vision clinics than to rehabilitation services. Some people referred to low vision clinics do not need either devices or services, and others are unable to be assisted; some criteria are thus needed to identify people who would benefit from services.

(iv) *Other Western Pacific countries*

A low vision clinic has been established in Malaysia for many years. Courses have been conducted and some services exist, but the access to services is variable across the country. The Philippines is just commencing low vision programmes but, so far, the emphasis is on children only. There are presumably largely unmet needs for low vision care in Cambodia, Laos and

Viet Nam, whereas services are developing in the People's Republic of Korea as part of a national blindness prevention programme.

In summary, the needs are for the following:

- ▶ Increased awareness of low vision services
- ▶ Counteraction of the perception of low vision as an inevitable penalty of age
- ▶ Information for professionals of the potential benefits of low vision services
- ▶ Investigations into costs and acceptability of services and devices
- ▶ Better data on eligibility criteria and benefits of services
- ▶ Information on the advantages of the social acceptability and improvements in quality of life stemming from low vision services
- ▶ Better utilization of services

Low vision services are generally seen as low priority, except for children.

Recommendation

Availability of low vision services

There is at present a marked imbalance between the developed and the developing countries in the availability of low vision services for the elderly population. In the developed countries, there is a need to increase the availability of services and to make them more accessible to persons in need. In the developing countries, it is recommended that low vision services be established and strengthened in a phased manner, starting with basic services using appropriate technology.

3. STRATEGIES FOR IDENTIFICATION AND ASSESSMENT OF LOW VISION IN THE ELDERLY

Low vision (visual acuity $<6/18$) is most common in the elderly population and increases in prevalence with age (Table 1). For some people, improvement in vision is possible or loss of vision is preventable with treatment. Strategies are required for identification of those people with treatable impairment of vision and referral of those who may benefit from rehabilitation. Strategies for identification can include vision screening of specified groups, assessment by eye or health practitioners and rehabilitation personnel. Knowledge of the need for and the range of services available for people with low vision can promote family or self-identification.

Table 1. Prevalence of low vision in the elderly

Study	Age group	Prevalence
Baltimore Eye Study [<i>Arch. Ophthalmol.</i> , 1990, 108, 286-290]	70-79	White 5% African American 9% Nursing homes 26%
	80+	White 20% African American 22% Nursing homes 35% (80-89 years)
	90+	Nursing homes 45%
Mud Creek [<i>J. Amer. Med. Ass.</i> , 1990, 264, 2400-2405]	70-79	5%
	80+	17%
Melbourne Visual Impairment Project [<i>Amer. J. Ophthalmol.</i> (In press)]	70-79	5%
	80-89	10%
	90+	40%

Prevalence of low vision using the WHO definition of low vision for elderly people. The Baltimore Eye Study (USA) and the Melbourne Visual Impairment Project (Australia) sampled urban populations; Mud Creek (USA) sampled a rural population.

The prevalence of eye disease on a population basis is higher in developing countries. The average for industrialized countries is 0.3%, whereas the developing and least developed countries range from 0.5% to 1.4%.

The age-standardized prevalences for developing countries will also be different due to:

- ▶ the possible earlier onset of eye diseases such as cataract;
- ▶ the lower visual acuity threshold at which cataract surgery is performed;
- ▶ the poor access to and utilization of eye care services, particularly in rural areas;
- ▶ the lower life expectancy.

National programmes should develop policies and strategies which aim to ensure that high-risk groups are identified and that vision testing of those groups is integrated into the health care of elderly people. Vision loss and its management are then more likely to be integrated into the total health care of the person. Vision screening could be carried out by gerontologists, medical or paramedical personnel, carers in institutions or primary health care workers in the community.

As the numbers of elderly people using low vision services are quite low in many countries, it is important to target awareness and screening strategies to groups in which vision impairment may be greatest. This would allow for reaching the underserved, for better utilization of existing or planned services.

In general, low vision care strategies should:

- ▶ focus on target groups
- ▶ be oriented towards activities of daily living (ADL)
- ▶ use appropriate technology
- ▶ be cost-effective
- ▶ work on case-finding
- ▶ utilize appropriate educational and vocational adaption
- ▶ be sustainable and not dependent on short-term funding

3.1 Target groups

Target groups could be identified from population-based surveys; experience in industrialized countries shows those groups which have high risk of vision impairment to be: (i) people with glaucoma; (ii) people with ageing-related macular degeneration; (iii) people with systemic diseases and other disabilities; and (iv) specific populations such as people living in residential care. People with poor access to eye care services would also have a higher risk of impaired vision.

Fig. 2
Low vision care for the elderly

High-risk groups:	Age: ≥ 70 years generally
	Family history of visual loss
	Sight-threatening systemic disease and/or other disabilities
	Poor access to eye care services

For people living in developing countries, access to and utilization of services are particularly important issues. The increasing prevalence of diabetes will require monitoring and fundus examination of people with diabetes, to prevent impaired vision.

3.2 Vision screening

Vision loss and its management should be integrated into the general health care of elderly people. Vision screening should be simple and appreciated as such by elderly people. Vision screening can be carried out by medical or paramedical personnel (including general practitioners), carers in institutions, or primary health care workers in the community.

Ideally, tests for vision should:

- ▶ contain the minimum number of sizes, yet still provide the essential information required for appropriate referral for treatment, refraction, low vision devices or vision-related rehabilitation
- ▶ be quick and easy to administer
- ▶ use a format such as a matching set to obtain a maximum rate of responses in people who might have disabilities in addition to impaired vision
- ▶ use content relevant to and understood by aged people
- ▶ be widely available
- ▶ be suitable for use by people with minimal training

Near vision tests should not require reading. Optotypes for the near test should be the same as those for the test of distance visual acuity.

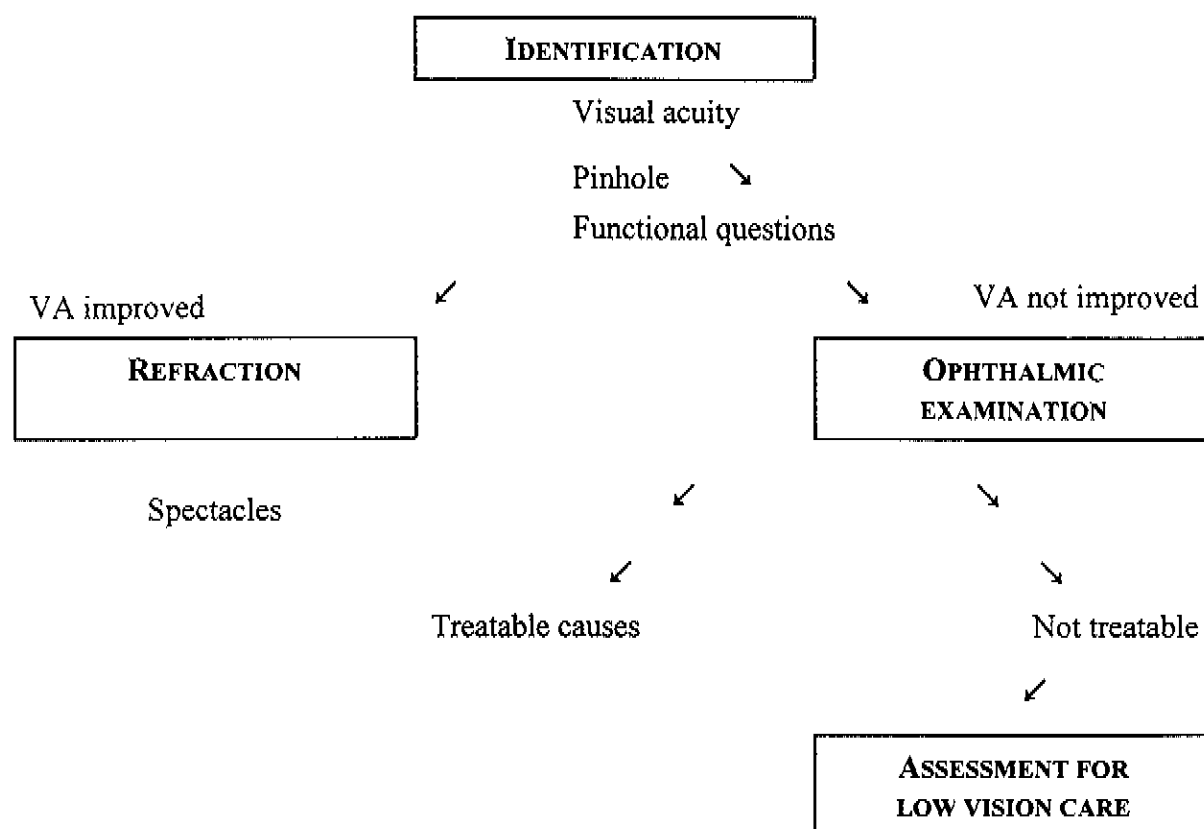
Population-based surveys of visual impairment have found that many people have un- or under-corrected vision. Results of refraction have shown that significant numbers of people could have best corrected visual acuity improved by one, two or three lines. A simple pinhole such as the one in the WHO "Low vision kit" should be used in conjunction with visual acuity testing.

Identification of people in need of low vision services should also include an assessment of functional vision similar to the WHO form for assessment of children, which includes four items that give an indication of the use of vision. Similar items relevant to the lifestyles of elderly people should form part of the identification of people with low vision and the determination of their needs. Such items should assess culturally relevant independence in activities of **daily living**, **social** and **communication skills**, and **mobility**. The items should be simple to administer and should require no specialized equipment.

Screening of particular groups of elderly persons to identify those with low vision satisfies the general requirements for health screening, which are that:

- ▶ effective tests be available
- ▶ suitable tests could indicate appropriate referral
- ▶ the prevalence of low vision be sufficiently high to warrant screening
- ▶ treatment and rehabilitation be generally available
- ▶ the screening be cost-effective if integrated into current health care programmes

Fig. 3



3.3 Awareness of low vision in the community

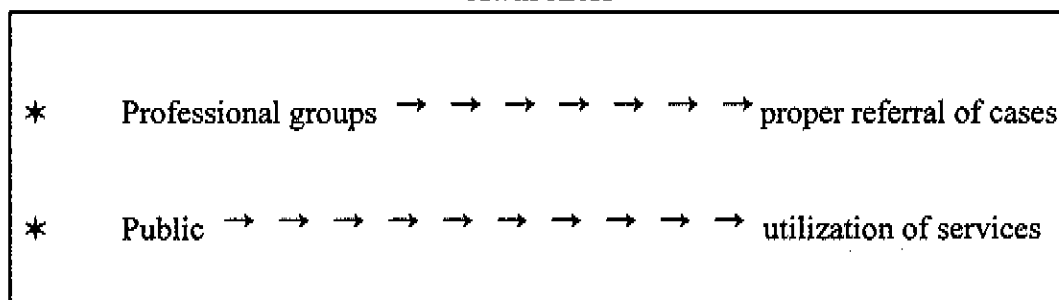
Awareness of the needs of people who have visual impairment should be tackled before, or in conjunction with, identification and assessment. People need to know what constitutes the difference between normal vision and impairment, the potential benefits of low vision care and where to go for services.

Organizations of and for the blind may traditionally have emphasized services for the education and employment of blind people, rather than for the elderly. A careful balance has to be struck between all the groups of visually impaired people. The use of the term "blind" in the name of organizations is felt by many people with low vision to exclude them from that organization. The importance of vision enhancement and low vision rehabilitation for the elderly needs to be accepted. Furthermore, the enhancement of residual vision should be a continuing process. Maintenance of independence is important, as visual loss in many elderly people is usually progressive.

The message needs to be conveyed that low vision care need not be difficult, and effective home adaptations can be simple and inexpensive. Some can be simply carried out by the family and carers, others by community-based workers in conjunction with them. The person with a need for low vision correction, or his/her family, should be prepared to contribute a small amount towards devices.

There are several possible mechanisms for increasing awareness at both professional and public levels:

Fig. 4
Awareness



General awareness campaigns could include special national, or international, days such as "White Cane Day" or "Disability Day". Radio is a useful medium for low vision people. Clubs and organizations, especially for elderly people, are another avenue for awareness and screening. Existing means of disseminating information should be investigated and low vision should be part of other public awareness campaigns, such as the need for medical check-ups.

Awareness of professionals must involve all disciplines, including geriatricians and general practitioners, in addition to personnel involved in eye care. Presentations on low vision to national and international professional meetings should be encouraged. An information page on Internet could disseminate information on low vision, on the need for a range of services, and on training available.

There are risks from creating too much awareness which could be counterproductive if services were not available to match demand. If expectations are raised, there will be a need for additional funding or services which are unlikely to be readily available. The provision of magnifiers and other aspects of low vision care usually need to make use of the public health system.

Recommendations

High-risk groups

Specific groups of elderly people have been identified as being at high risk of visual impairment. It is recommended that vision screening be carried out to identify people with low vision in these groups, for example people 70 years of age and over, elderly people with systemic disease and other disabilities and those living in underserved areas. Vision screening should take place as part of routine medical assessment or care of these people.

A screening test

To facilitate the identification of people with low vision, it is recommended that the E-card from the existing WHO "Low vision kit" be adapted by the addition of a "key card" and a short series of questions about functional vision.

Professional awareness

There is a lack of awareness of the special needs of elderly people with low vision by professionals responsible for their care. In order to facilitate referral, it is recommended that methods of simple assessment, awareness of the need for and benefit from low vision care and from locally available low vision services be included in the training of ophthalmologists, general practitioners and others concerned with the care of the elderly.

It is also recommended that professional eye care organizations be encouraged to support coordinated efforts to expand low vision care and to include low vision topics and issues on their meeting agendas.

It is further recommended that the existing WHO Prevention of Blindness page on Internet be extended to include information on low vision.

Public awareness

Low vision among the elderly is generally looked upon as an inevitable consequence of ageing. It is therefore recommended that awareness campaigns be undertaken, focusing on:

- (1) elderly persons, their families and carers in order to make them aware of the benefits of low vision care;*
- (2) members of the community with a view to sensitizing them to the needs and potential of elderly people with low vision.*

It is further recommended that, where appropriate, awareness campaigns take advantage of national and/or international days, such as that for the Disabled, to convey the message, bearing in mind that awareness campaigns should be in tandem with the provision of appropriate services.

4. THE LARGE-SCALE PROVISION OF LOW VISION CARE FOR THE ELDERLY

Even where there is little access to good medical management, many people retain useful vision but find some everyday tasks to be beyond their capacity. Their capability can be augmented with spectacles and low vision aids.

No country can claim that every individual who might benefit has no difficulty in obtaining suitable spectacles and low vision aids at reasonable cost. Even in countries where services are well developed, many people are unaware of the potential benefits of low vision aids and services, or are so overwhelmed with other problems that their visual handicap is perceived as relatively unimportant.

Low vision care includes **four principal components**, ranging from (i) the provision of optical services and devices to facilitate (ii) activities of daily living, (iii) orientation and mobility, and (iv) psychosocial adaptation. Low vision techniques and environmental modifications are applicable in relation to all these components.

Ideally, **spectacles** should be the result of a careful refraction followed by accurate dispensing, producing a comfortable frame and correctly centred lenses. In practice, many presbyopes find that they can manage print with simple off-the-shelf spheres which are self-selected. These are available in most countries, retailing at between US\$ 5 and US\$ 20. Powers available are up to +4.00 dioptres and may be in bifocal form. A common type is a moulded half-eye which may cost as little as US\$ 1 when purchased in bulk. These would only rarely meet the needs of people with low vision. Half-eye spectacle magnifiers have many advantages, usually incorporating base-in prism in UK and USA; powers of up to around +16.00 are available, costing in the region of US\$ 50.

Conventional **low vision aids** are available in wide variety. In developed countries, a sophisticated low vision clinic will hold a number of alternative aids of each type, including hand and stand magnifiers ranging from 3 to at least 76 dioptres, spectacle magnifiers to around 50 dioptres and telescopic lenses to perhaps 10x; others include electronic magnifiers, text enlargement systems for computers, image intensifiers, head-up displays using virtual reality technology, etc.

The cost of reasonable quality low vision appliances ranges from the equivalent of less than three dollars for a simple moulded plastic magnifier to several thousand dollars for the top-of-the-range CCTV (far more for devices now being developed).

In much of the developing world, basic spectacles with spherical glass lenses are widely available at low cost, but the range of power is limited to less than 20 dioptres and they are very heavy. Plastic lenses, bifocals and astigmatic corrections are usually beyond the means of most people - the cost of a pair of bifocals may be equivalent to the cost of a small cow.

Christoffel-Blindenmission has developed an ingenious range of stand and hand magnifiers and has published plans for these to be produced from readily available materials in local workshops, using appropriate technology. A completely untrained person using only the simplest tools can produce a stand magnifier in less than half-an-hour and three each hour after less than a week (the rate for hand magnifiers is six per hour). Presently, the maximum power

available is 28 dioptres in stand magnifier form: this is produced by using two +14.00 lenses mounted together in one stand. The lenses are either cheap glass imports or ground from ordinary window glass. Some 60% of the need for simple magnifiers can be met from the current CBM range.

Fig. 5
A low vision care model

* Optical devices/services	Low vision techniques and environmental modifications
* Activities of daily living	
* Orientation and mobility	
* Psychosocial support	
Functional assessment:	What are you doing now ? What do you want to do? What is stopping you?

The **functional assessment** is most important, before the question of services and/or devices is considered. The functional assessment must take into account the patient's present situation, with needs, desires and constraints in terms of daily life and occasional particular situations. The rationale for low vision care in the elderly is to improve social interaction, quality of life and self-esteem and, as a result, to reduce considerably the cost or burden of social care for the individual.

Fig. 6
Low vision care for the elderly

Rationale:	social interaction
	quality of life
	self-esteem
	cost of social care

Most elderly people could be helped with simple off-the-shelf magnifiers, and the provision of low vision care should take this into account. The issue of **appropriate** technology of devices used or prescribed should always be considered in the patient's context with regard to usefulness, easy use and sustainability, and costs.

The provision of low vision care on a large scale poses a particular problem in countries where there is a shortage of trained staff. In such circumstances, the services and devices applied would have to be kept simple and at a strict minimum. Furthermore, much as the screening for identification of persons with low vision should be part of PHC, low vision care should be integrated, or at least be compatible, with community-based or other rehabilitative activities. Thus, personnel working in community-based rehabilitation can be trained in techniques to enhance use of vision and in methods to adapt the environment for more effective use of vision.

Low vision care should be developed in a **phased** manner, as part of national blindness prevention programmes or rehabilitative services. The main focus in a three-stage scenario is shown in Fig. 7, which includes the four main components of low vision care and a progression of services/activities within each component.

Fig. 7
Low vision care components and phases

Optical	Activities of daily living	Orientation and mobility	Psychosocial
Refraction Magnifiers Illumination Glare control	Food and eating Safety Communication Personal care Personal organization Money Tactile markings	Familiar environment Orientation Safety Spatial concepts Sensory awareness	Family attitudes Self-esteem Depression
Simple telescopes Contrast enhancement	Child care Cultivation Business/employment	Wider environment Travel Public transport Simple support devices, e.g. cane	Interaction with groups
CCTV Electronic devices Complex telescopes Computers	Electronic devices: Money Measuring, etc.	Cane travel Guide dogs Electronic devices	Community involvement Social responsibility Leadership

The **priority** needs in the mounting of low vision care projects in most settings are usually:

- ▶ refraction
- ▶ provision of magnification
- ▶ training in effective use of vision
- ▶ support for mobility

The development of low vision care would also have to take into account the two aspects of **distance** vision as opposed to **near** vision, the purpose being the best possible visual rehabilitation in a broad context.

Recommendations

Low vision devices

More simple, high-quality, low-cost low vision devices are needed. It is therefore recommended that interested organizations address the development of such devices on a sound scientific basis.

As people with low vision require optimal optical devices, it is also recommended that the prescription of such devices be an integral part of optical assessment and include appropriate refractive correction and advice on illumination and light sensitivity.

Organizational commitment to low vision services

Organizations of and for blind people currently address issues pertaining particularly to education and employment of blind persons. It is urged that these organizations be encouraged also to become committed to and actively support low vision services.

5. HUMAN RESOURCES FOR INFRASTRUCTURAL NEEDS FOR LOW VISION CARE

In most countries, there is still a shortage of human resources and facilities for low vision care. In order to overcome this, it is very important that clear, **task-oriented** training of all personnel be undertaken for the provision of low vision services. In this way, it is possible to make use of a broad range of cadres of staff with specific tasks and delegation of responsibilities. The **team** approach to low vision care has already become firmly established in a number of countries, and this is a very useful basis for building new services in other countries.

Fig. 8

Human resources and infrastructure

- * Multidisciplinary effort
- * Team work
- * Task-oriented knowledge and skills
 - What are the "musts"?
 - What is "useful"?
 - What is "nice"?

With regard to **optical services**, the personnel most commonly involved include ophthalmologists, optometrists in some countries, orthoptists, opticians and, in a few developing countries, auxiliary staff trained in refraction ("refractionists"). General practitioners, ophthalmic assistants and nurses could also contribute usefully to refraction services, if properly trained and provided there were a referral possibility for more complex cases.

There is as yet no common format or standardized training for the provision of optical services in relation to low vision care. A number of different courses are being conducted (see Annex 3), but this is still largely insufficient at the global level.

Training in the effective use of vision and methods to adapt the environment are undertaken by a variety of professionals (teachers, paramedical personnel or rehabilitation workers). They should have access to courses in low vision care.

Another component of low vision care - training in **orientation** and **mobility** - is commonly handled by special teachers, by rehabilitation professionals or by assistants with rehabilitative or similar skills. In general, it seems that six- or twelve-month training courses for this cadre of personnel have been well established in many countries, with a positive experience. Such training could, in principle, very well be conducted on an intercountry basis and involving Technical Cooperation between Developing Countries (TCDC), but this has yet to be established.

The need for **infrastructure** for low vision care is still a major obstacle in many developing countries. Low vision care could be part of **ophthalmic** or **rehabilitative** services, and a **phased** development of services could be applied. In this context, it is useful to ask the following:

- ▶ What **must** be there?
- ▶ What is **useful** for services?
- ▶ What is **nice** for services?

Priority-setting for infrastructure should follow these basic principles, to be adapted to the local/national context of each project. Scientifically **sound** technology **appropriate** for the local setting should be applied. This implies technology and devices that are accessible, acceptable, affordable and sustainable.

Training in low vision care could be conveniently divided into **modules**, as has already been done in several countries. The training modules should be given in a specific sequence, to allow for dealing with increasingly complex cases and to provide for a logical chain of services.

An example of training modules could be as follows:

- (a) Refraction
- (b) Magnification assessment
- (c) Magnifier selection
- (d) Magnifier instruction
- (e) Illumination and advice
- (f) Light sensitivity
- (g) Mobility - assessment; training
- (h) Other functional components (ADL and psychosocial)

An overview of internationally available courses in low vision care is given in Annex 3.

Recommendation

Human resource development

The delivery of low vision services requires a multidisciplinary effort by appropriately trained personnel working as a team.

It is recommended that training of such personnel be task-oriented and that, wherever possible, existing personnel be given such training.

It is also recommended that consideration be given to identifying existing training institutions as "training of trainers" centres, perhaps on a regional basis.

6. OPPORTUNITIES FOR ACTION NEEDED

In view of the great need to develop low vision care in many countries, there is a need to identify opportunities for promotion and implementation of suitable model projects. Furthermore, the visibility of the issue and rationale for low vision care must be increased at the international level. As work for development of low vision care is being taken on by several institutions and nongovernmental organizations, the possibilities for coordination and joint projects with possible cost-sharing should be explored.

The following represents a suggested short-list of priority activities or issues:

- ▶ To establish a coordination office in the WHO Programme for the Prevention of Blindness and Deafness for development of low vision care; this could be supported, for instance, by the Partnership Committee of NGOs collaborating with the WHO Programme.
- ▶ To establish an Internet page on low vision care; this could form part of the WHO Programme page, with input from collaborating NGOs.
- ▶ To develop and harmonize standards for optical devices within the context of appropriate technology.
- ▶ To elaborate more uniform curricula for training of various cadres of personnel involved in low vision care.
- ▶ To sensitize ophthalmological professional groups and organizations to the issue of low vision care.
- ▶ To identify suitable opportunities for "twinning" of institutions between developed and developing countries, and also on the basis of TCDC.
- ▶ To evaluate low vision care provision in different settings, to strengthen the case for development of appropriate services.

Fig. 9
Evaluation of low vision care

* Coverage ("access")
* Utilization of services
* Outcome of provision: functional quality of life
* Cost-effectiveness
* Consumer satisfaction

Further work on the above items would be considered by the Partnership Committee of NGOs collaborating with the WHO Programme and by its Task Force for support to specific activities.

Recommendations

Evaluation of low vision services

There is a need to assess objectively the outcomes of low vision services provided to the elderly population.

It is recommended that a suitable reporting form, together with studies including functional outcome, quality of life and patient satisfaction measures, be used to evaluate outcomes in selected low vision service delivery situations.

Coordination

The need for low vision services, particularly among the elderly, is growing rapidly. Creative solutions and resources are being developed to address those needs using diverse health care and rehabilitation personnel. However, considerable duplication of effort is already becoming apparent. Also, valuable initiatives could languish because of a lack of personnel to coordinate and promote the implementation of low vision care globally. Courses in low vision care are being developed for use in developed and developing countries.

It is therefore recommended that:

- (a) a staff position be established at WHO/PBD to coordinate and promote the development of low vision services worldwide;*
- (b) information on courses in low vision care be available from a central clearing-house.*

ANNEX 1

LIST OF PARTICIPANTS

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ANNEX 2**AGENDA**

Opening of Workshop
Election of Officers
Adoption of Agenda

1. Review of available data on the magnitude of the problem of low vision
2. The present status of low vision care for the elderly
 - ▶ developed countries
 - ▶ developing countries
3. Strategies for identification and assessment of low vision in the elderly
4. The large-scale provision of low vision care for the elderly
 - ▶ priority needs
 - ▶ technical approaches
5. Human resources and infrastructural needs for low vision care
6. Opportunities for action needed at the global/regional/national levels
7. Any other matters

Conclusions and Recommendations

Closure of Workshop

ANNEX 3

SUMMARY OF INTERNATIONAL LOW VISION COURSES

Title:	Low Vision Therapists Degree Programme
Institute:	Stockholm Institute of Education, Department of Special Education, Box 47308, S-10074 Stockholm, Sweden
Description:	The course trains selected people to become low vision therapist pioneers in their home countries in order to establish and develop low vision services and training. This is an 18-month course with two semesters in Sweden and one semester in the home country. Suitable for paramedical personnel, special education teachers or those with equivalent qualifications.
Contact:	Örjan Bäckman. Fax +46-8 737 9621. E-mail orjan.backman@lhs.se

Title:	Enhancing Visual Functioning, Low Vision Assessment I and II, Postgraduate Courses
Institute:	Department of Graduate Studies in Visual Impairment, Pennsylvania College of Optometry, 1200 West Godfrey Avenue, Philadelphia 19141-3399, USA
Description:	(1) Enhancing Visual Functioning is a six-week course covering clinical and functional low vision assessment, low vision training, psychosocial aspects of visual impairment, accessing systems and funding and low vision populations with special needs. (2) Low Vision Assessment I and II are continuing education courses held in the autumn and winter semesters respectively. Course I focuses on clinical examination, assessment and evaluation of functional vision, and evaluation of distance and near low vision devices. Course II focuses on intervention strategies including vision stimulation, vision training, low vision devices and vision rehabilitation for individuals with head injuries. (3) Master of Science courses are available in Low Vision Rehabilitation and Rehabilitation Teaching and a Master of Education is available in Education for Children and Youth with Visual or Multiple Impairments. Courses are for optometrists, special education teachers, rehabilitation and paramedical personnel.
Fees	
Contact:	Kathleen M. Huebner, PhD. Fax +1-215 276 6082 E-mail 7397039@mcimail.com

Title: Courses for Professionals in Low Vision Care

Institute: The Lighthouse Inc., 111 East 59th Street, New York, N.Y. 10022-1202, USA

Description: Extensive range of half- to three-day courses in clinical and rehabilitation management of patients with low vision for ophthalmologists, optometrists or paramedical and rehabilitation personnel. A six- or 10-week course of supervised clinical practice and lectures for optometry graduates, final year students, or ophthalmologists who meet eligibility requirements.

Contact: Karen Seidman. Fax +1-212 821 9705. E-mail kseidman@lighthouse.org

Title: Low Vision Therapy Course

Institute: Birmingham Royal Institute for the Blind, 62 Woodville Road, Harborne, Birmingham B17 9AX, UK

Description: The course is spread over two to three months and includes awareness of vision disability, low vision therapy, multidisciplinary teams and 16 practical sessions working with a trained low vision therapist. Suitable for paramedical personnel.

Contact: Mary Moore. Fax +44-121 428 5079

Title: Low Vision Practicum Course

Institute: Western Blind Rehabilitation Centre, Department of Veterans Affairs, 3801 Miranda Avenue, Pao Alto, California 94304, USA

Description: A three-week full-time course covering perceptual and cognitive factors in visual impairment, low vision evaluation, examination of the visual system, low vision training, glare, optics and magnification. Observation of staff working with people with low vision is included. Mainly for rehabilitation and orientation and mobility personnel, but attendance is open to application.

Contact: Gregory Goodrich. Fax +1-415 852 3472. E-mail goodrich@roses.stanford.edu

Title:	Custom-designed Courses for Groups
Institute:	Resources for Rehabilitation, 33 Bedford Street, Suite 19A, Lexington, Massachusetts 02173, USA
Description:	Topics: low vision devices, self-help groups, psychological responses to vision loss, special needs of the elderly or youth, modifications of the home and workplace, low vision evaluation and coordinated care. Duration: half day, full day or longer. Suitable for paramedical personnel, optometrists and ophthalmologists.
Fees	
Contact:	Susan Greenblatt. Fax +1-617 861 7517

Title:	Coping with Blind and Visually Impaired Elderly
Institute:	Theofaan, St Elizabethstraat 4, 5361 HK Grave, The Netherlands
Description:	A choice of three modular courses taken over three to four afternoons which include anatomy and physiology of the ageing eye, visual perception, environmental modifications, magnification, devices for mobility, psychosocial consequences and residential care. Designed for staff of residential care homes and professionals working with elderly people.
Language:	Dutch
Contact:	Peter Verstraten. +31-486 472 441

Title:	Low Vision and Rehabilitation Training Course
Institute:	Hong Kong Society for the Blind and China Disabled Peoples Federation, 248 Nam Cheong Street, Shamshuipo, Kowloon, Hong Kong
Description:	Six-week seminars and workshops offered in various provinces and cities in the People's Republic of China. Topics: mobility and orientation, independent living skills, communication skills, clinical low vision examination and prescription of low vision devices. Suitable for administrators, rehabilitation personnel, special education teachers, nurses, optometrists and ophthalmologists.
Language:	Chinese
Contact:	Ms Maureen Tam. Fax +852-2788 0040

Title: Prescribing Low Vision Devices

Institute: Moorfields Eye Hospital/Institute of Ophthalmology, City Road, London EC1V 2PD, UK

Description: A three- to four-day course with academic elements and a strong practical, hands-on approach. Most associated professions contribute in the teaching and the course is suitable for optometrists or ophthalmologists.

Fees

Contact: Louise Culham or Janet Silver. Fax +44-171 253 5198. E-mail j.silver@ucl.ac.uk

Title: Low Vision Course

Institute: National Rehabilitation Centre for the Disabled, 4-1 Namiki Tokorozawa, Saitama 359, Japan

Description: A five-day course which covers the theory and practice of optics, clinically applied optics and social systems for the visually impaired. Suitable for ophthalmologists.

Language: Japanese

Fees

Contact: Dr Kenji Yanashima. Fax +81-429 962 034. E-mail yanasima@po.ijnet.or.jp

Title: Low Vision

Institute: School of Optometry, University of California, Berkeley, California 94720-2020, USA

Description: The course deals with low vision theory and practice with emphasis on optical treatments. Offered from January to May, there are two lectures and one two-hour laboratory session each week. Suitable for optometrists, ophthalmologists and low vision rehabilitation specialists.

Fees: Only if university credit is required.

Contact: Professor Ian L. Bailey. Fax +1-510 643 5109.
E-mail bailey@mindseye.berkeley.edu

Title:	Graduate Diploma in Optometry
Institute:	Department of Optometry, University of Melbourne, Parkville 3052, Melbourne, Australia
Description:	A four-module course of which two modules relate to low vision. Modules include diagnosis, assessment and optometric management of low vision, and clinical skills in the examination and management of patients with low vision. Duration is one year. Suitable for optometrists.
Fees	
Contact:	Associate Professor Alan Johnston. Fax +61-3 9349 7498 E-mail Alan_Johnston.optometry@muwayf.unimelb.edu.au

Title:	Continuing Professional Development Award - Low Vision Training
Institute:	Department of Optometry and Vision Sciences, UMIST, P.O. Box 88, Manchester M60 1QD, UK
Description:	A programme of four courses and self-study for those working with the visually impaired. The full course is suitable for social workers or special education teachers with some elements suitable for optometrists or paramedical personnel.
Fees	
Contact:	Dr C. M. Dickinson. Fax +44-161 200 3887. E-mail mjccmd@fsl.op.umist.ac.uk

Title:	Fellowship in Low Vision
Institute:	Department of Ophthalmology, University of Melbourne, 32 Gisborne Street, East Melbourne 3002, Australia
Description:	Short-term (six- to eight-week) fellowship in management of people with low vision and establishing a low vision clinic in developing countries.
Fees	
Contact:	Dr Jill Keefe. Fax +61-3 9662 3859. E-mail keefe@iris.medoph.unimelb.edu.au

Title:	Low Vision Therapist, Low Vision Specialist, Low Vision Basics
Institute:	Santa Casa de Misericordia de São Paulo Medical School Central Hospital, Department of Ophthalmology Children's Unit, Rua Cesario Motta Jr 112 6º andar, Pavilhao Conde Lara, São Paulo, SP, Brazil, CEP 01277-900
Description:	Three courses are offered. (1) The Low Vision Therapist course is for therapists of any background and is for a six-month period. Topics: management of infants, children and adults, training in the use of low vision devices and evaluation of visual function. (2) Low Vision Specialist is a one-year residency programme in ophthalmology. It is a theoretical and practical course on the evaluation and diagnosis of low vision in adults and children. Topics: new methodology, low vision devices - prescription and training, case discussion and scientific project development. (3) Low Vision Basics is a three-week practical and theoretical course for ophthalmologists enrolled in a three-year base project for starting low vision services in regions in Latin America.
Language:	Portuguese, Spanish, English
Fees	
Contact:	Dr Silvia Veitzman. Fax +55-11 221 5881. E-mail celscasa@macbbs.com.br

Title:	Postgraduate Courses
Institute:	Peabody College at Vanderbilt University, Box 328 Peabody, Nashville, Tennessee 37203, USA
Description:	Masters and Doctorate courses for special education teachers in low vision. The Masters course duration is 53 hours per semester for students without teaching certification and 30 hours for those who have certification. Doctoral students must have either teacher of the visually impaired certification or orientation and mobility certification and have a minimum of two years of experience.
Fees	
Contact:	Dr Anne L. Corn. Fax +1-615 322 8236. E-mail CORNAL@ctrvax.Vanderbilt.Edu

Title: Structure and Function of the Eye: Educational Implications

Institute: University of Minnesota, 178 Pillsbury Drive S.E., Minneapolis 55455, USA

Description: A two-week intensive course on ophthalmological and educational considerations of anatomy and physiology of the eye, visual screening and visual functioning. Offered in alternate years in the summer semester for graduate students.

Contact: Marie Knowlton. Fax +1-612 626 9627. E-mail KNOWLOO1@maroon.tc.umn.edu

Title: Low Vision and Visual Functioning, Advanced Low Vision

Institute: University of Arizona, College of Education, Department of Special Education, Box 210069, Tucson, Arizona 85721-0069, USA

Description: Two courses are offered.
(1) Basic: one semester which includes structure and function of the eye, functional vision assessment and interpretation of eye reports.
(2) Advanced: three hours per day for three weeks, which includes advanced functional vision assessments, optics, optical devices and intervention strategies for students with low vision. Designed for pre-service and in-service teacher training.

Fees

Contact: Dr Irene Topor. Fax +1-520 621 3821. E-mail ilt@u.arizona.edu

Title: Low Vision Training Manual

Institute: Department of Ophthalmology, University of Melbourne, 32 Gisborne Street, East Melbourne 3002, Australia

Description: A modular training manual designed for use in developing countries. The manual emphasizes a "low-tech" approach, utilizing local resources for training and intervention programmes. Topics include low vision awareness, vision testing and planning and implementation of national programmes. The modular format allows training to be adapted for groups of students according to their knowledge and experience. The course contains a module to "train the trainer".

Contact: Dr Jill Keefe. Fax +61-3 9662 3859. E-mail keeffe@iris.medoph.unimelb.edu.au

Title:	Training of Low Vision Teachers
Institute:	L'Union centrale suisse pour le bien des aveugles (UCBA), 51 avenue de Béthusy, 1012 Lausanne, Switzerland / 4 Schützengasse, 9000 St Gallen, Switzerland
Description:	Training in four modules (basic optics, assessment of low vision, training of low vision persons, including practice and research) for assessment and training in use of residual vision, including low vision devices, mobility and orientation. Training period includes practical courses of approximately three months. There are also courses in low vision of two days for ophthalmologists and of two weeks for opticians.
Languages:	German, French
Fees:	Swiss francs 600 per module
Contact:	Mr Norbert Schmuch. Fax: +41-21 320 7496

Title:	Vision Rehabilitation - Patient Management, Vision Rehabilitation - Practice Management
Institute:	University of Houston, College of Optometry, 4901 Calhoun, Houston, Texas 77017, USA
Description:	Two courses are offered. (1) A three-day refresher course for optometrists interested in getting involved in vision rehabilitation. (2) A two-week course for the optometrists requesting more indepth supervision and education.
Fees	
Language:	English, Spanish
Contact:	Kia Eldred or Ana Perez. Fax +1-713 743 2053

Title:	Low Vision
Institute:	Department of Special Education, University of Oslo, Granasen 4, N - 1347 Hosle, Norway
Description:	A one-year course in low vision and blindness for special education teachers.
Language:	Norwegian with some course materials in English.
Contact:	Associate Professor Rolf Lund. Fax +47 2285 8021 E-mail rolf.lund@isp.uio.no

Title:	Low Vision
Institute:	Department of Optometry, Rand Afrikaans University, P.O. Box 524, Auckland Park 2006, Johannesburg, South Africa
Description:	Continuing education courses of varied durations which are suitable for people with knowledge/experience in low vision.
Fees	
Contact:	Hazel Sacharowitz. Fax +27-11 489 2091 E-mail hss@raul.rau.ac.za

- ▶ *All courses are in English unless otherwise stated.*
- ▶ *The term "Paramedical personnel" has been used to describe the group including Ophthalmic Assistant, Ophthalmic Nurse, Ophthalmic Technician, Ophthalmic Technologist, Occupational Therapist, Orthoptist and Rehabilitation Personnel.*
- ▶ *Fees are required only when specified.*

* * *