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The provision of spectacles at low cost

By: Working Group on the Provision of Low-Cost Spectacles

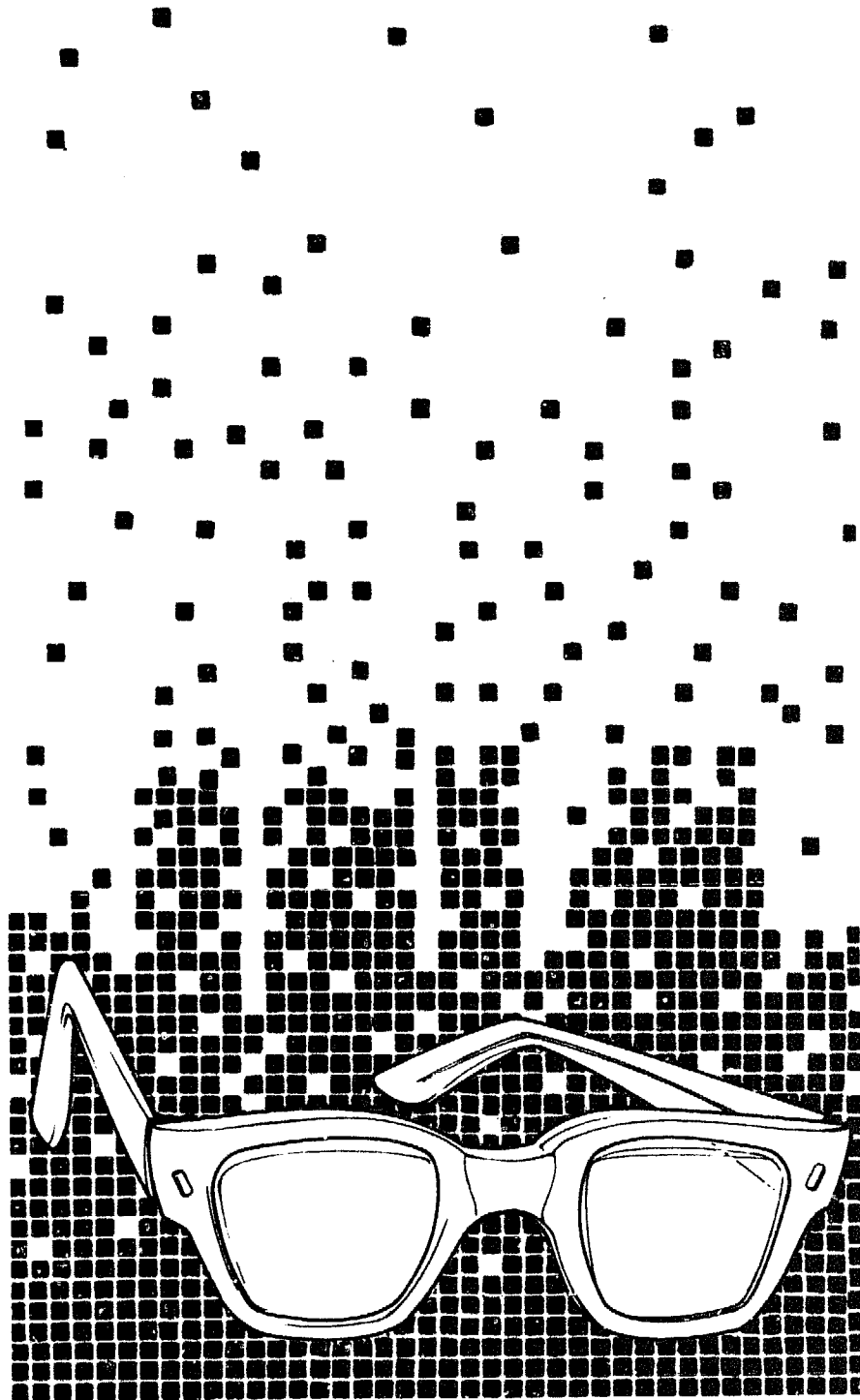
Published by: World Health Organization  
Geneva, Switzerland

Available from: WHO  
Distribution and Sales Service  
1211 Geneva 27  
Switzerland

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# The provision of spectacles at low cost



WORLD HEALTH ORGANIZATION GENEVA 1987

The World Health Organization is a specialized agency of the United Nations with primary responsibility for international health matters and public health. Through this organization, which was created in 1948, the health professions of some 165 countries exchange their knowledge and experience with the aim of making possible the attainment by all citizens of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life.

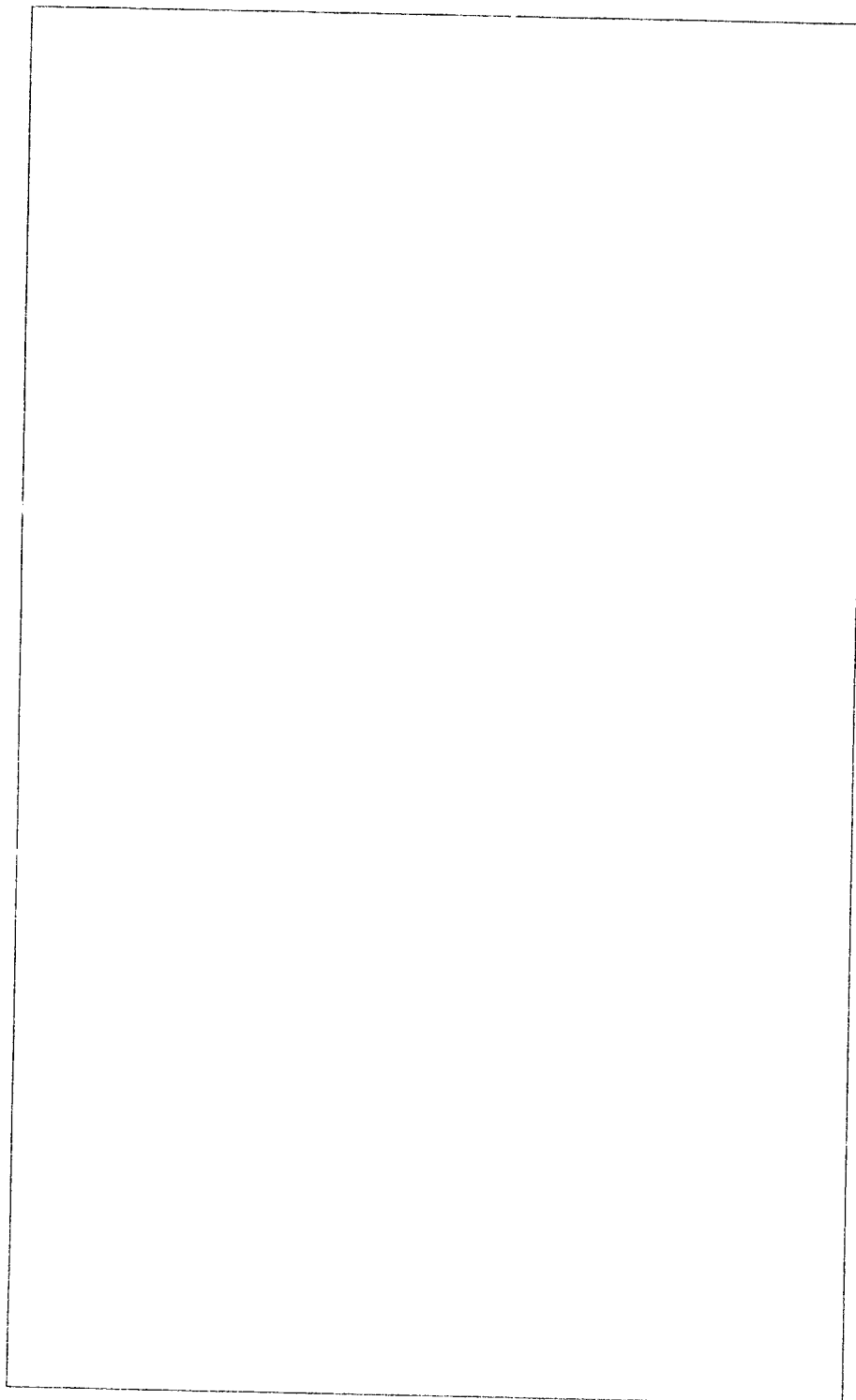
By means of direct technical cooperation with its Member States, and by stimulating such cooperation among them, WHO promotes the development of comprehensive health services, the prevention and control of diseases, the improvement of environmental conditions, the development of health manpower, the coordination and development of biomedical and health services research, and the planning and implementation of health programmes.

These broad fields of endeavour encompass a wide variety of activities, such as developing systems of primary health care that reach the whole population of Member countries; promoting the health of mothers and children; combating malnutrition; controlling malaria and other communicable diseases including tuberculosis and leprosy; having achieved the eradication of smallpox, promoting mass immunization against a number of other preventable diseases; improving mental health; providing safe water supplies; and training health personnel of all categories.

Progress towards better health throughout the world also demands international cooperation in such matters as establishing international standards for biological substances, pesticides, and pharmaceuticals; formulating environmental health criteria; recommending international nonproprietary names for drugs; administering the International Health Regulations; revising the International Classification of Diseases, Injuries, and Causes of Death; and collecting and disseminating health statistical information.

Further information on many aspects of WHO's work is presented in the Organization's publications.

# The provision of spectacles at low cost



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ISBN 92 4 156108 4

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## Preface

**T**he provision of spectacles is of great importance for the correction and improvement of many people's vision, since this will help to prevent unnecessary loss of sight.

Spectacles are widely used and easily available in developed countries, but the situation is different in many developing countries, where spectacles are sometimes difficult to obtain, and where they are often too expensive for the majority of the population.

The provision of spectacles at low cost is one of the activities included in the World Health Organization's Programme for the Prevention of Blindness. The objective of this endeavour is to make spectacles more easily available in developing countries, particularly for schoolchildren and people operated on for cataract. Relatively simple techniques exist for the production and assembly of spectacles and may be used in developing countries to improve the availability of simple spectacles at moderate cost.

A working group was convened in Geneva in 1985,<sup>1</sup> by the World Health Organization, to review the various issues involved in the provision of spectacles at low cost. This booklet is based on the group's discussions and is intended to provide general information in this field, including some of the experience gained in certain countries, which may be of interest to others.


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<sup>1</sup> A list of participants is given in Annex 1.

## **Glossary of terms used in this booklet**

<b>amblyopia</b>	— impairment of vision involving the nervous system; it is generally uni-ocular
<b>aphake</b>	— one who has aphakia
<b>aphakia</b>	— absence of the lens of the eye as after removal in cataract surgery
<b>cataract</b>	— opacity of the crystalline lens or its capsule
<b>dioptr</b>	— the unit of measurement for refractive power; a convergent lens with a focal power of one metre is said to have a power of +1 diopter
<b>hypermetropia</b>	— a refractive error in which rays of light entering the eye parallel to the optic axis are brought to a focus behind the retina
<b>myopia</b>	— short- or near-sightedness; a refractive error in which rays of light entering the eye parallel to the optic axis are brought to a focus in front of the retina
<b>presbyopia</b>	— impairment of near vision with advancing years; caused by a diminution in the power of accommodation of the crystalline lens
<b>presbyope</b>	— one who has presbyopia
<b>refraction</b>	— (1) the deviation of a ray of light in passing obliquely from one medium to another of different density — (2) the act of refracting; specifically the determination of the refractive errors of the eye and their correction with spectacles
<b>refractive error</b>	— when light passing through the lens of the eye is not brought to a focus on the retina
<b>refractive services</b>	— services to determine refractive errors and assess the need for correction with spectacles
<b>spherical correction</b>	— correction achieved by a spherical lens
<b>spherical lens</b>	— lens bounded by spherical surfaces





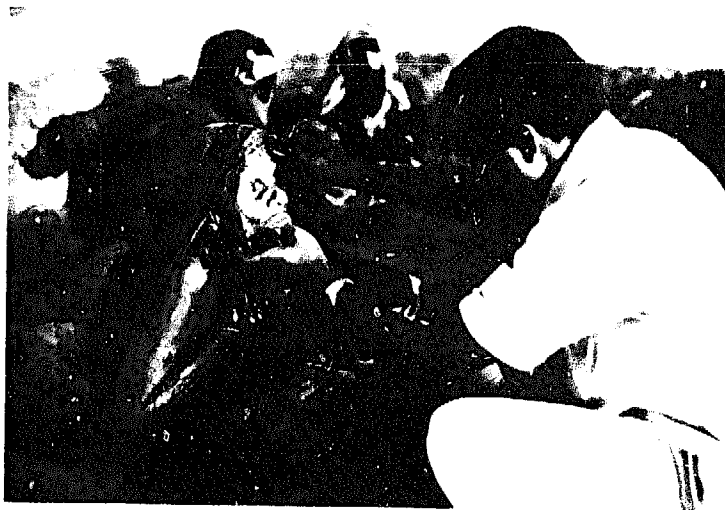
## Why are low-cost spectacles needed?

**G**ood eyesight is vital in most situations in daily life, particularly in education and at work. Defective vision is an obstacle to learning, both for schoolchildren and for adults — participating in adult literacy campaigns for example — and can lead to occupational and road accidents. It can also reduce a worker's productivity if the job requires good sight. Thus impaired vision may constitute an avoidable obstacle to social and economic development, quite apart from the obvious negative influence it has on the quality of life.

The potential demand for spectacles is considerable since it has been estimated that the sight of at least one-fifth of the population could be improved by their use.

Experience gained in several countries indicates that about 10% of schoolchildren would benefit from using spectacles,

because they are either hypermetropic or near-sighted (myopic). This is equivalent to saying that the investment made in one out of ten schools is not being utilized to the full. If these visual defects persist unremedied into adulthood, they will not only prevent children from realizing their full potential but also increase the risk of accidents. A child's mental development and psychosocial adjustment, both at home and



The provision of spectacles can dramatically improve vision

elsewhere, can be adversely affected by sensory impairment. Thus the early detection and correction of visual defects is an important measure, preventing the development of more serious and permanent problems (amblyopia and squint) and improving school performance.

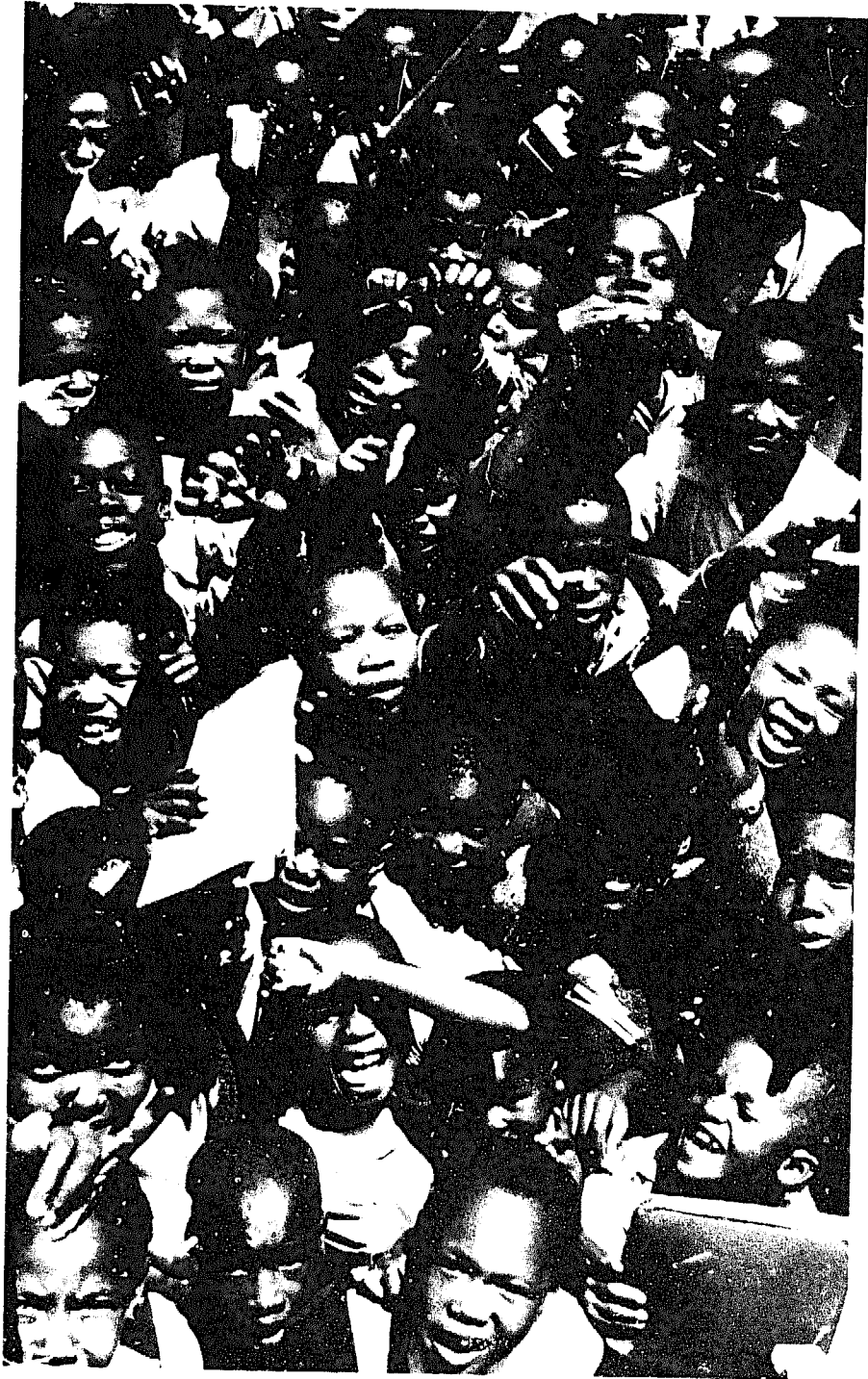
Because of loss of focusing power (presbyopia), most people over the age of forty require spectacles for reading or close work, such as sewing or operating machinery. Even in countries where the population is predominantly young, presbyopes will form at least 10% of the overall population.

Additionally, patients who have undergone cataract surgery with removal of the lens of the eye (aphakes) require appropriate spectacles to restore their useful vision and hence their independence. The provision of spectacles to such patients makes cataract surgery more acceptable.

Unfortunately, in many countries, particularly in the developing world, spectacles may not be available to the majority of those in need of them for several reasons:

- high cost — which may exceed the average annual per capita income in some developing countries
- inaccessibility of examination centres
- reluctance to wear spectacles in some cultures
- ignorance of many people about the existence or the nature of any sight defect and of the possibilities of correction.

It is clear that the availability of spectacles can be a critical factor in the promotion of education and development and is a problem requiring urgent attention. In most countries, some health service resources are already being made available for the provision of spectacles, and in order to ensure more efficient use of these resources the production and provision of spectacles at low cost might be an appropriate solution in many cases. Experience has shown that it is possible to produce spectacles at a cost of about US\$2.50–3.50 per pair, with a relatively small investment and using local labour and a minimum of imported material. This process can be adapted to a variety of local conditions in developing countries.



A significant proportion of these children may be in need of spectacles

## Who would benefit from low-cost spectacles?

The people who could benefit from spectacles can be divided into three groups:

- (1) those who can afford the spectacles and eye care services available within their countries;
- (2) those who might be able to purchase spectacles if they were available at low cost; and
- (3) those who could not purchase spectacles at any cost.

People in the first category can obviously take care of their own needs, while those in the third group will require particular social services. Those in the second group would benefit immediately from the provision of low-cost spectacles.

Ideally, everyone with any significant refractive error should receive appropriate spectacle correction. Until such time as this becomes possible, efforts should be directed to children, presbyopes, and aphakes, three groups that have special needs, as outlined above.

In children, refraction is often different in each eye, and therefore where refractive services are limited these should be reserved for children. Most presbyopes can manage to select spectacles that permit reading and other close work. However, more satisfactory results may be obtained if refractive services are used. Aphakes can often obtain significant improvement by choosing glasses from among a limited range of refractive strengths of +10.0 to +13.0 diopter (D).



The elderly often suffer from visual loss due to cataract, but spectacles can restore vision completely after appropriate surgery



As the first objective is to achieve useful improvement in vision in the above target groups, it is usually best initially to sacrifice refractive precision in order to achieve the widest possible coverage. With this in mind, it is recommended that the range of lenses made available should be in steps of only 0.5 D or 1.0 D. In the vast majority of patients, spherical correction alone will yield acceptable and useful improvement in vision.

In expanding the spectacle programme beyond the three initial target groups, particular consideration should be given to industrial workers and drivers with visual impairment. Correction of refractive errors in these groups will improve job safety and help prevent road accidents.

## Identification and motivation of those in need of spectacles

It is desirable to identify all children at risk at the earliest possible stage. In many cases, only those going to school can be examined adequately. Extra efforts will be required to reach other children — possibly through primary health care systems.



Many cases of squint in children can be easily and completely corrected if spectacles are provided at an early age



While most presbyopes and aphakes are aware of their need for spectacles, it may be necessary to identify some persons belonging to these groups. Identification, or screening for impaired vision, can be carried out through educational institutions, voluntary organizations or within health care systems.

In many societies there is reluctance to use spectacles, and in those places special attention should be paid to increasing motivation. Suitable methods of informing and educating the public — for example, through the mass media or through schools — will need to be developed. The benefits of improved vision, such as improved performance and safety at school or work, should be emphasized.



## Provision of services for refraction and for prescription of spectacles

**I**t is important that appropriate services for the detection and assessment of refractive errors and for the provision of low-cost spectacles should be available to those in need, in conjunction with educational efforts. Otherwise, the demands generated may not be satisfied, giving rise to frustration and loss of confidence in the system.

Refraction and prescription of spectacles are usually carried out by ophthalmologists, medical officers, optometrists or opticians. However, they are sometimes undertaken by less qualified personnel, often without formal training.



The provision of services for refraction is just as important as the production of lenses

The numbers of trained personnel are usually inadequate to meet the needs of the people, particularly in developing countries and the development of a low-cost spectacle programme will undoubtedly increase the demands. Appropriate programmes for training in refraction, prescription of glasses, identification and motivation of those in need of referral will have to be developed according to local needs and available resources.

Consideration should be given to the possibility of providing these services in the context of primary health care.

## Production technology

The technology is currently available to produce frames and lenses at low cost and to assemble finished spectacles in most situations encountered in developing countries. It will be necessary to import several indispensable items, such as ophthalmic glass, plastic sheets for frame production, metal components, and, in some cases, temples (sides) for frames. There are, however, several ways of keeping the cost down and of conserving foreign exchange. These include:

- using only spherical lenses
- using larger power increments (steps of 0.5 or 1.0 D)
- using a standard range of frame sizes and styles
- manufacturing as much as possible locally.

The manufacturing process employed will vary with the technology available within different countries. Spectacles may be made completely by hand in a cottage industry in some countries, while elsewhere, the use of power-driven machines for some or all of the manufacturing processes may be possible. Existing manufacturing facilities should be assessed to determine whether they could be used as they are, or with some strengthening or modification. Manufacturers of spectacles and their components should be encouraged to collaborate in efforts to minimize the cost of spectacles.

The production of spectacles using local resources will require consideration of questions in four different fields:

- frame manufacture,
- lens production,
- assembly, and
- training.

### (1) *Frame manufacture*

The two most common methods used in frame production are:

*Injection moulding.* This technique may require some elaborate machinery that is not always available in developing countries.





*Sheet method.* This involves cutting a frame, with temples, by hand or machine from a sheet of plastic. The frame is then shaped, assembled, and polished. This method allows for greater manufacturing flexibility and has considerable potential for technical development.

Both methods require the importation of sheet plastic and metal hinges, screws, rivets and temple cores.

#### (2) *Lens production*

It is possible to produce lenses from inexpensive, "non-optical" glass but it is better to import high quality lens blanks made from ophthalmic glass. These can be ground and polished on both surfaces using machines that can either be imported or made from locally available components. Polishing compound will also be required.

A small workshop, employing two or three workers, can produce 2000–3000 pairs per year, with a capital investment of US\$2000–2500, which should make it possible to produce a pair of lenses to correct presbyopia, for example, at a cost of approximately US\$0.80.

#### (3) *Assembly and edging*

The assembly of spectacles includes the process of cutting the ground and polished lenses (edging) to fit into the finished frames. This requires very limited resources and facilities. With the aid of two electric edging machines and some hand tools, one person can assemble over 3000 pairs of finished spectacles per year. The capital investment is between US\$600 and US\$900, and will allow the cost of finished spectacles to be kept within the range of US\$2.50–3.50.

#### (4) *Training*

The skills required for production, assembly and fitting can be acquired with 2–3 months of training. No special prior education is needed for such training. There is evidence that experience of manufacturing and dispensing at a relatively simple level can provide a solid base for the subsequent development of a more sophisticated system.



## **Strategies for the provision of low-cost spectacles**

**T**here are several options for the provision of spectacles at low cost. In terms of increasing complexity, they are:

- *Importation of complete spectacles from a country already producing inexpensive spectacles.* This option should be considered if demand is less than 2000 pairs per annum. Such spectacles generally cost between US\$2 and US\$6, but can sometimes be obtained for as little as US\$1. However, importing complete spectacles costs more in foreign exchange than other options and does nothing to stimulate local technical development.
- *Importation of finished lenses and finished frames.* The lenses subsequently require simply cutting to shape and fitting into the frame. This is working well in many places.
- *Production of lenses from imported blanks and importation of finished frames.* These are then assembled as above.
- *Importation of raw materials only.* Equipment, tools, and those components not yet locally available are all imported, to maximize local production.

These options can be considered both for peripheral, small-scale optical workshops possibly attached to hospitals or health centres and for centralized factory-type production on a larger scale.

### *Subsidized provision*

In some instances, it may be possible to take advantage of the existing production and retailing facilities of the private sector, particularly where only a minority of those in need of spectacles cannot afford them. Government authorities can identify such people, who would become eligible to receive their glasses through regular channels at reduced cost. The difference between the standard and the reduced price might be made up by government or voluntary subsidy, or special arrangements could be made with spectacle producers and retailers to provide subsidized spectacles for the needy. Programmes of this sort may assist

the optical industry by advertising their social awareness and responsibility, without reducing the number of individuals purchasing glasses at full retail cost, and by expanding the market.

*Distribution, repair, and maintenance*

Facilities should be developed for the delivery of spectacles to those already identified and tested for correction of refractive errors. These facilities should be easily accessible and, ideally, the distribution outlet should be located where examinations are carried out, for example, in a health centre. Such an arrangement would involve the examiner in the distribution process and thus help in monitoring the system.

Alternatively, community cooperative stores that already exist in many countries, village pharmacies or other retail outlets, whether governmental or private, could serve as distribution points. The use of these village or community-level facilities would encourage community participation in these activities and involve community health or rural development workers. Community insurance or revolving fund schemes may lend themselves easily to the provision of spectacles at low cost.



In areas with a low density of population, a system of distribution through itinerant traders may be the most practical method.

The repair and maintenance of spectacles must also be considered. Depending on the local setting, this may be taken care of by opticians, particularly in urban areas, or through the optical workshops that produce the low-cost spectacles. The use of standardized spectacle components is of great importance in facilitating repair and exchange of spectacles in such workshops. Similarly, if spherical lenses are used, this simplifies the replacement of broken lenses from available stocks.



In many countries, used spectacles are available in local markets and may be useful for the correction of simple presbyopia in adults

## **The involvement of other sectors in the provision of spectacles**

**A**dequate provision of low-cost spectacles for those in need requires an integrated approach involving medical, educational, commercial, and other sectors. For example, teachers can identify schoolchildren with visual defects and encourage them to undergo further examination and obtain spectacles. They may also ensure that the spectacles obtained are properly used. Such a programme requires direction and strong coordinated support jointly from the ministries of health and of education.

Availability of low-cost spectacles depends on suitable production or importation facilities — involving ministries concerned with commerce, industry, customs, and finance — or the negotiation of special provisions with established local spectacle producers to serve the needs of indigent citizens — a concern of the ministry of social welfare.

The support required to boost efficiency and coverage will depend upon local circumstances and may include cooperation between the private and public sectors, assistance from international agencies, or the involvement of philanthropic and other nongovernmental organizations, many of which are already concerned and active in this area.



## Identification and mobilization of resources

The spectacle industry is at different levels of development in different parts of the world. Most of the developed countries use sophisticated techniques for the manufacture of frames and lenses. Some countries, however, have developed somewhat simpler techniques for a small-scale or cottage industry that are labour-intensive and use locally-made, simple, and relatively inexpensive machines. In this manner the costs have been significantly reduced to meet the need for low-cost, durable, and safe spectacles. Countries that do not have their own production technology at present depend to a large extent on imports of finished frames, lenses, and spectacles. Such countries would benefit from increased support for local spectacle production utilizing appropriate technologies.

In this field, there are only a handful of sources for raw materials, all of which are at present located in the most developed countries. Importation is, therefore, unavoidable. Glass for lenses, plastic for frames, and metal components for hinges, for example, are included in these irreducible costs over which importing countries will have little control. However, more choice exists as regards the equipment and mode of production selected for processing the raw materials, and the facilities to be provided — buildings, space, manpower — can be geared to local needs and resources.

Depending on the strategy selected for the provision of low-cost spectacles, production equipment may be manufactured locally or it may have to be imported initially, if large-scale production with relatively limited manpower is the method of choice. It is worth noting that useful second-hand machinery may be available from countries that have changed over from one type of production to another. Production should be carefully thought out — it would not necessarily be economical to plunge into the sophisticated production of low-cost spectacles without allowing time for developing the skills of the operators and the maintenance staff.

The facilities required will vary, but it is advisable to have no fewer than two to three people in any one unit. Planning should preferably be based on five-year periods, to take account of advances in techniques and materials, and any changes in the relevant market forces.

It is obvious that the mobilization of financial resources for the production of spectacles must be considered at an early stage in planning. The initial investment needed for small-scale local production of spectacles is modest, and contributions may be available within the framework of health services, community development schemes, the promotion of local industries, or from corporate, financial, or commercial sources. External financial and technical assistance may be requested from interested non-governmental organizations or governmental agencies. Organizations within the United Nations system may respond to requests for assistance as part of economic and industrial development schemes. The concept of technical cooperation between developing countries may be particularly applicable to the setting up of projects for the production of low-cost spectacles.

Experience from several countries has shown that it may be necessary to provide only the initial investment or loan, as even on a modest scale, systems for the production of low-cost spectacles appear to become commercially viable quite quickly.





## Evaluation

**E**valuation is an integral component of any primary health care initiative. Both process and outcome are of interest, the one indicating how the system is proceeding, the other the impact it has had. Information obtained is fed back to the programme managers, allowing them to deal with problems and deficiencies in a timely manner.

The provision of low-cost spectacles is a complex, multidisciplinary operation, but a number of parameters are easily monitored, and can serve as simple indicators of performance: the number of persons trained in refraction; the number of pairs of spectacles produced, prescribed, and distributed, by type of correction; and geographical distribution of those reported to have received them. These data can be obtained through simple reporting systems that often exist already.

Active data collection may be needed to assess more subtle aspects of the programme. Visits to reported spectacle recipients will determine how much, in fact, they were charged, the accuracy of the refraction and of the spectacles provided, the proportion of recipients still using their spectacles at varying intervals after first receiving them, and the reasons for non-compliance (unacceptability, loss, breakage, etc.).

Further evaluation will necessitate interaction with people still without spectacles: what proportion needing them were never screened, referred, or educated about the value of spectacles or their availability?

In addition to evaluating the process of providing spectacles, it may be important to include assessment of output, or impact. This assessment should include psychosocial and behavioural aspects — for example, to determine whether schoolchildren provided with spectacles show, apart from any improvement in their educational performance, any changes in behaviour.

## **Experience gained in selected countries**

### **Africa**

It is possible to provide low-cost spectacles in most countries in Africa with a minimum investment of capital, personnel, and time. A system for producing spectacles locally has been developed by one nongovernmental organization, the Christoffel Blindenmission (CBM). To date they have established over 25 workshops in more than 15 African countries.

One of the main emphases in this endeavour is that of training indigenous workers in local production, aiming toward self-sufficiency. Local workers who have little formal education can be trained in about four weeks to make simple spectacles.

Experience shows that 80% of the demand for spectacles in many African countries south of the Sahara can be met with spherical lenses, mainly for presbyopia and secondly for aphakia. At present the demand for correction of myopia is low. The average rural dweller is not able to afford the price of the spectacles that are often available in the major cities.

#### **Guidelines used by the Christoffel Blindenmission in establishing optical workshops**

- Demand for spectacles should be sufficient (2000 pairs per year or more) before a workshop is established.
- Workshops should preferably be located in hospitals that have eye departments.
- Only basic equipment should be used.
- Indigenous workers should be employed, priority being given to the physically handicapped.
- Spherical lenses should be supplied.
- There should be a limited selection of frame styles and sizes.
- Importation should be kept to a minimum.

The approximate cost of setting up one workshop is US\$625–875. The initial costs involved are related to equipment, stock (lenses and frames), and the workspace. An edging machine, frame heater, and a very few hand tools are all that is needed by way of imported equipment. All other necessary tools are usually available locally, if not in the area, within the country.



Lenses and frames can be imported at the following approximate costs:

- Lenses to correct presbyopia — US\$128 per 100 pairs (including freight)
- Lenses for aphakes — US\$188 per 100 pairs
- Plastic frames — US\$125–188 per 100, depending on the quality.

The workspace required is as little as 3 m<sup>2</sup> per person. A water tap and drain are helpful but not necessary. A simple workbench and a stool are sufficient as regards furniture, but the lighting — daylight or artificial — should be above average. The equipment normally requires an electrical supply, with two or three outlets available at the workbench; however, there are methods of doing this work completely without electricity, for example using a pedal-driven lens grinder.

The volume of production can readily be maintained at two pairs per hour of work and this can easily add up to over 3000 pairs of spectacles per year. This is enough to keep the average eye clinic or mobile eye unit well stocked with the necessary glasses. Most of these simple optical workshops can soon become financially self-sufficient and even return a profit if properly managed.

A more recent development is that of lens surfacing. The lenses can be processed on machines made of locally available material, necessitating in the beginning the importation of only a few tools. Indigenous workers (including the handicapped) can be trained rapidly to produce high grade lenses. Importation of unfinished lenses (lens blanks) reduces the cost of the spectacles and also the need for foreign exchange. Further, more local employment is achieved, which is also important.

## **Asia**

### *India*

India has developed an important ophthalmic optics industry. There are over 3000 frame manufacturing units, mostly at the cottage industry level, with about 10-12% small- or medium-scale units, scattered all over the country.

The spectacle frame industry produces a wide selection of frames ranging from low-cost styles to sophisticated shapes and designs. It is able to meet the growing domestic needs and also to export a considerable proportion of its production at competitive prices. Ophthalmic lens blanks are at present imported in bulk quantities. Ordinary local glass sheets are used for very low-cost spectacles. Indian craftsmen have developed intermediate technology for lens grinding, polishing, and fitting of precision spectacle lenses of all kinds.

The growing needs for refraction services in the rural areas are now being met by a new category of health worker, ophthalmic assistants.

Ready-made, low-cost spectacles for aphakes are available in the range of +9.0– 13.0 D, costing US\$2– 3. Similarly, spectacles to correct presbyopia and, in a simplified way, myopia and hypermetropia, are available in different frame sizes in the same price range. These spectacles, particularly those for aphakes, are distributed in the eye camps organized under the auspices of the National Programme for the Control of Blindness.

### *Pakistan*

A WHO low-cost spectacle project was started in Pakistan with the collaboration of the Ministry of Health in May 1980. It addressed itself to a number of specific topics:

- *Training of opticians.* As in many other developing countries, the provision of spectacles is in the hands of commercial establishments, which rarely employ trained personnel. Accordingly, a three-month training course has been introduced covering basic science, refraction, and elementary techniques.



- *Teachers.* With schoolchildren specifically in mind, the Ministries of Health and of Education have introduced a simple course, acquainting schoolteachers with the elements of visual screening. This has been incorporated into the teachers' syllabus.
- *Provision of spectacles.* Both public and private sources are participating in the provision of low-cost spectacles for children in need. Others obtain them in the usual manner.

In addition, both the Ministry of Health and Social Welfare and a private hospital (in Taxila) have introduced refraction camps. These involve specialists visiting both rural and urban areas with the object of examining schoolchildren.

#### *Other Asian countries and the South Pacific*

Thailand, Indonesia, the Philippines, and other countries of this region, where socioeconomic development has reached an intermediate stage, all experience similar problems with respect to the provision of spectacles to certain population groups.

Because these countries produce large quantities of ophthalmic lenses for export and have frames of various qualities, which are locally made or imported, the domestic market is flooded. However, relatively high prices and the uneven distribution of refraction services limit the access of certain disadvantaged population groups in both urban and rural areas.

In the South Pacific, the provision of spectacles is a common problem on many small islands — it is irregular, and usually related to visits of medical teams.

## South America

### *Brazil*

A proposal for a National Eye Care Programme, based on primary health care, was submitted to the Ministry of Health in 1983. São Paulo State was chosen as the first pilot area, and "Guidelines to implement eye health action" were prepared by a working group and subsequently approved.

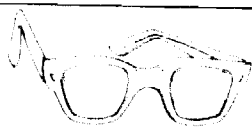
Demand for spectacles was expected to increase with implementation of the project. In readiness for this the *Serviço de Oftalmologia Sanitária* had already contacted private producers and retailers of blanks, lenses and frames.

The *Associação Brasileira de Cine, Foto, Optica e Som* (ABCI), a national association, developed low-cost spectacles that could be sold for US\$8–15 (one-third of the regular retail price). These were approved by the government after the frames had been submitted to a pilot testing. These low-cost spectacles are produced in eight models covering all age groups, and are sold by opticians to eligible persons selected by the social services attendant at the health centre at the time of the ophthalmic examination.

This project began in 1985 in one area of São Paulo, where two ophthalmologists work in the principal health centre. Nineteen opticians provide the spectacles on the basis of a contract with ABCI.

Ophthalmic prescriptions are prepared in triplicate: the first copy remains with the wearer; the second goes to ABCI via the responsible optician, who receives a replacement frame and lens from them — in this way, the ABCI controls and supervises the programme; and the third copy is sent to the *Serviço de Oftalmologia Sanitária* for statistical purposes.

The project is being expanded to cover the whole of São Paulo State.



## Annex 1

### LIST OF PARTICIPANTS

#### **Working Group on the Provision of Low-cost Spectacles**

*Geneva, 10–14 June 1985*

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