

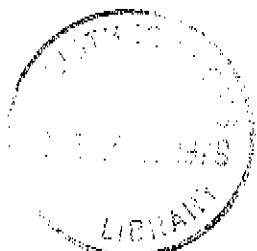


*Blindness - conf. -
 - prevention*

INDEXED

WHO PROGRAMME ADVISORY GROUP ON THE PREVENTION OF BLINDNESS

Report of the first meeting, Geneva, 19-22 February 1979



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1. Introduction

The Group welcomed the readiness of the World Health Assembly to give priority status to the prevention of blindness through its resolutions on the subject, and the consequent action taken by the Organization in establishing a programme at the global interregional level and at the regional level.

The Group reviewed the progress which has been made since the Advisory Meeting held in February 1978. The activities in the period under review included:

- the establishment of the Programme Advisory Group;
- the identification of potential collaborating centres for the prevention of blindness and the initiation of the procedure for their formal designation;
- the establishment of task forces to deal with strategic planning, data on blindness and training of auxiliary personnel;
- the convening of a meeting on the technical and operational aspects, leading to the preparation of "Guidelines for Programmes on the Prevention of Blindness" to be published shortly;
- the activities of the central core of the programme and of the regional offices, which included visits and provision of advisory services to a number of countries.

The Group welcomes the increased level of priority given to the prevention of blindness in some regions, notably in the Eastern Mediterranean and South-East Asia Regions, the formulation of national plans and the establishment of national programmes in a number of countries in different regions.

2. Recommendations for further action

Recognizing these advances, the Group now believes that in order to sustain the momentum, the following developments amongst others are necessary.

2.1 The strengthening of WHO staff resources at the central and at the regional level, both professional and administrative. The minimum amount required is in the order of US\$ 140 000 a year at the central level and of US\$ 100 000 a year for each of the regions where a programme is developing. Since extrabudgetary resources are required for this purpose, every endeavour should be made to secure them by special contributions to the prevention of blindness account within the WHO Voluntary Fund for Health Promotion.

2.2 The Group is of the opinion that there is urgency to develop further regional and national programmes in all WHO Regions, especially in the African Region.

2.3 One of the main obstacles to progress in this field is the lack of scientific personnel with the interdisciplinary understanding and training necessary for the development of regional and national programmes. The development of such personnel should be encouraged with the participation of the collaborating centres.

2.4 In determining priorities in health programmes, special attention should be given not only to mortality but to morbidity and the ensuing disability. To facilitate the establishment of priorities, it will be necessary to set up a task force to consider the economic consequences of blindness, and their implications for national planning and budgeting.

2.5 In mobilizing resources to develop programmes in countries with a massive problem of avoidable blindness, it is essential that there should be a political will expressed in the budget and the allocation of the necessary national resources. In developing this political will, the nongovernmental organizations (NGOs) have a crucial role and the Group noted with satisfaction that the International Agency for the Prevention of Blindness (IAPB), recognizes this as one of its most important potential contributions.

2.6 The emphasis must be on action and delivery with the already stated objective of assisting in the promotion of national programmes in at least 30 countries by 1983 with priority on the countries with an excess of avoidable blindness.

2.7 In connexion with the International Year of the Child, the Group urges that everything possible be done, with the active participation of UNICEF, to restore sight to children suffering from curable blindness. A significant number of such children may be found in schools for the blind.

2.8 In connexion with the International Year for Disabled Persons (1981) an increased effort should be made to restore sight to those suffering from curable blindness, on the principle that the most effective rehabilitation for any blind person is to restore his sight. Similar efforts should be made to preserve the residual vision of those with severe visual impairment. It is urged that WHO, in collaboration with other United Nations agencies, in particular ILO, and together with concerned NGOs, draw attention to the importance of the crippling disability of blindness and call for stronger priority in the provision of preventive and rehabilitative services.

2.9 With regard to publications and dissemination of relevant scientific, technical and other information by WHO, this can be grouped under four categories: books, articles, documents and visual aids. The Group stresses the need for illustrated instructions on prevention and cure of common eye conditions in the manuals for primary health workers. Manuals are also required for the training of more specialized auxiliary personnel. There is also a need for greater and easier access to essential documents pertinent to the prevention of blindness. WHO in collaboration with appropriate NGOs should facilitate this.

2.10 The Group emphasized the importance of further involving UNDP and United Nations agencies, notably the World Bank and ILO. In view of the consequences of blindness in terms of economic loss, it should be recognized that action to prevent blindness deserves a higher priority in economic planning.

2.11 The Group appreciates that some countries prefer technical cooperation through bilateral agreements. At the same time it underlined that even in relation to bilateral agreements, WHO may play an important coordinating role.

2.12 The Group wishes to underline the essential role of NGOs active in this field, notably IAPB. In addition to the mobilization of interests and resources, NGOs are increasingly reinforcing political will and at times are becoming involved in the implementation of programmes. It is essential that the action of voluntary organizations should be coordinated within the national plans. It is equally important to realize that NGOs might not be able or willing to participate unless their role is clearly identified and they can document their participation to their subscribers.

2.13 The Group reviewed the report of the task force on strategic planning and endorses the broad principles and strategy outlined therein.

2.14 The Group reviewed the report of the task force on data on blindness and considers it a very practical and useful contribution. It endorses its contents, as modified and included in Section 5 of this report. It further recommends that this section, "Data on Blindness, February 1979", be published and given wide circulation. With regard to the proposed information system which is part of the report of the task force on Data on Blindness, 1978, the Group agreed that it would be inappropriate to take further action on it now. It also agreed, however, that all possible efforts be made to facilitate the collection of further data, according to the criteria indicated in Section 5 of this report. It recommends that the possibility be explored of obtaining more data in connexion with activities to be promoted during the International Year for Disabled Persons (1981).

2.15 The Advisory Group recognizes the necessity to maintain close contact with the ICD unit at WHO headquarters in order to provide the necessary input to improve the existing classification of causes of blindness and eye diseases. It recommends that this be done as a continuing activity of the Secretariat with the active participation of the Advisory Group and appropriate consultants.

2.16 The Group stressed the role of the WHO Collaborating Centres for the Prevention of Blindness, with regard to the areas identified in Section 4 of this report as requiring further research and to the need to identify other priorities for research. The Centres should have a similar role in the collection of data and the promotion of surveys and field studies.

2.17 In view of the urgency of the problem in certain regions, the Group recommended that the WHO Regional Offices convene, as early as possible, planning groups composed of responsible national officials and advisers. Such groups would review the problems and needs in each region, and help formulate plans of action to be implemented on a country by country basis, over the next six years, and review progress on a yearly basis.

2.18 The Group agreed that the next meeting will be held from 18 to 21 February 1980. The Group expressed its appreciation for the prompt response and for the invitation received from the Onchocerciasis Control Programme (OCP) to offer its facilities to hold the next meeting at the headquarters of OCP in Ouagadougou, Upper Volta, and agrees to hold it there.

3. Functions of the Programme Advisory Group

Note was taken of the terms of reference of the Programme Advisory Group on the Prevention of Blindness (Annex I). It is recommended that the Advisory Group should include at least one representative from each of the WHO Regions who will also be ex officio members of their regional advisory groups, when established. It is suggested that whenever practicable, the meetings should be held in areas with major problems of blindness.

The functions and activities of the Advisory Group should include:

- Advising on evolution of broad strategies for the prevention of blindness.
- Promoting worldwide interest including that of policymakers in the prevention of blindness, and support for the WHO Programme for Prevention of Blindness.
- Reviewing:
 - results obtained and problems encountered;
 - collection and quality of data on blindness and visual impairment;
 - available resources and financing of the programme;
 - progress of manpower development;
 - progress of health education (community participation and information of the public);
 - establishment and activities of regional advisory groups.
- Advising on coordination of related activities with:
 - the International Agency for the Prevention of Blindness;
 - the International Federation of Ophthalmological Societies;
 - the International Union of Nutritional Sciences;
 - the World Council for the Welfare of the Blind;
 - related activities within other WHO programmes.

- Assisting in identifying suitable candidates for consultancy services as required.

The Advisory Group should establish further task forces and/or subcommittees for specific purposes as and when required.

4. Technical aspects requiring special attention

There is no doubt that an adequate delivery of existing technology could have a decisive impact on avoidable blindness at a cost that is acceptable. However, it is also necessary to improve and refine this technology.

On behalf of the Advisory Group, the Programme Manager should draw both from within WHO and outside it, any scientific and other resources which might be necessary to develop the Programme for the Prevention of Blindness. The aim of such consultations will be to review scientific progress in all relevant subject areas, to identify opportunities for applicable research, and to stimulate appropriate studies.

4.1 Methods for surveys

In order to identify programme priorities, it is necessary to define optimal, simple and reliable techniques for use in field surveys to assess the amount of visual impairment in a population. Such surveys should ascertain also the occurrence of conditions leading to preventable or curable blindness, such as trachoma, onchocerciasis, xerophthalmia and cataract, even when they have not yet produced visual impairment.

Operational and applied research is needed to define survey techniques which can be used by auxiliary personnel. Suitable screening procedures need to be developed and evaluated in large scale operations.

4.2 Trachoma

Research should be stimulated to develop more effective chemotherapy, which could be safely administered by medical assistants, and which would prevent blindness by reducing the reservoir of chlamydial infection in the population. The emphasis should be on minimizing the number of treatment applications. Potential candidate drugs for oral chemotherapy include erythromycin, doxycycline and sulfametyprazine. Alternative possibilities for effective ocular chemotherapy following a single application, include ocular drug inserts and other long acting medicinal forms. Further research is required to determine optimal topical antibiotic preparations suitable for wide distribution and family-based administration for the control of recurrent bacterial and chlamydial eye infections.

The evaluation of surgical techniques to correct entropion and trichiasis is required to determine the simplest and most suitable techniques for large-scale application.

4.3 Onchocerciasis

The Advisory Group noted that research activities in the area of onchocerciasis are actively pursued by the Special Programme for Research and Training in Tropical Diseases (TDR) that supports both basic and applied research. In addition, the Onchocerciasis Control Programme (OCP) carries out operational research activities. There is an urgent need for research in chemotherapy, including:

- Modification of therapeutic schedules to minimize side-effects by alterations in dosage, drug delivery systems, combination therapy with other drugs, etc.

- Development of an effective macrofilaricide that can be safely administered by medical assistants.
- Establishment of criteria for treatment of heavily infected cases at a high risk of blindness.

4.4 Xerophthalmia including keratomalacia

The results of large-scale programmes indicate that the distribution of vitamin A supplements to pre-schoolchildren improves health and reduces the prevalence of the early signs of xerophthalmia. In areas where vitamin A is widely administered, the attack rate of keratomalacia in recipients and non-recipients of vitamin A should be monitored to provide a measurement of its effect in preventing blindness.

Other desirable studies include:

- A search for factors differentiating severely malnourished children with and without corneal ulceration.
- Determining whether the frequency of xerophthalmia and keratomalacia is altered in ongoing programmes to control and treat diarrhoea in children.
- Research on the role of enzymes in corneal liquefaction.
- Development of alternative methods for optimum treatment to speed healing of keratomalacia.
- Identification of further foods suitable for fortification in countries where vitamin A deficiency is endemic and an evaluation of the effectiveness of this supplementation.

4.5 Cataract

Measures to reduce the time of convalescence need investigation; for example, it may be possible to develop instruments and techniques that simplify cataract surgery. Eye camp procedures in various areas should be defined and guidelines set out that describe alternative approaches.

Research into the cause of cataract is needed. If the age at which cataract surgery becomes necessary could be postponed by 10 years, the number of cases requiring surgery would be reduced substantially.

4.6 Health services research

In applying the general principle of health services delivery, there are certain problems that are specific to programmes for the promotion of eye health and the care of eye disorders. Problem-oriented research in this field should be fostered within the context of these programmes. It is desirable that this research include studies on the best use of auxiliary, medical and specialized personnel in eye care. Specifically these studies would include research on:

- Educational objectives for each category of worker.
- Effectiveness, efficiency and costs of different systems of eye care delivery.

5. Data on blindness, February 1979

5.1 Definition of blindness

The definition of categories of blindness recommended by WHO and now incorporated in the International Classification of Diseases (ICD) is gradually gaining international acceptance. It satisfies present requirements and adherence to it should be encouraged. The differentiation between "low vision" (categories 1 and 2) and "blindness" (categories 3, 4 and 5) is recommended, although it is understood that different dividing lines might still be used because of different legal or social requirements. In this case an attempt should be made to classify cases by categories in order to facilitate comparability.

This classification has now been refined by adding inability to count fingers in daylight at a distance of three meters for the upper limit of category 3 (less than 3/60 or its equivalent). This criterion would facilitate screening of visual acuity by non-specialized personnel even in the absence of appropriate vision charts. Different equivalents of "less than 3/60" may be defined and utilized when appropriate and in accord with local cultural conditions.

5.2 Types of blindness

For reporting blindness, the minimum desirable differentiation would be in four types as follows:

- Type 1: Blindness caused by obvious lesions of the cornea
- Type 2: Blindness caused by lens opacity (cataract)
- Type 3: Blindness caused by other known or identified conditions
- Type 4: Undetermined or unspecified

In cases with more than one identified type, only the more obvious type should be listed.

The above corresponds in general to differences in anatomical localization and in etiology, and to the potential for their control.

Type 1 usually is caused by infections or nutritional deficiencies or accidents, and most blindness of this type would be preventable, or possibly curable.

Type 2 is cataract which is usually curable.

This description of types is not meant to supplant more accurate and more detailed classification but only as a practical tool to increase comparability of data and a pragmatic approach to reporting large population surveys for blindness.

5.3 Review of present estimates

The statistics of blindness at present available from various countries differ so widely in reliability and comprehensiveness that it is impossible, from them, to reach a credible total. The best approach is to concentrate on those statistics which have been reliably ascertained and to use them to construct a statistical pattern likely to apply over broad areas with similar disease profiles, age structure and stage of development, especially with regard to eye care services. One difficulty is the multiplicity of definitions of blindness but, if a conservative estimate rather than exactitude is the aim, it is possible to adjust the figures to take account of these different definitions, using as a basis the criterion proposed by WHO in 1972, that is less than 3/60 or its equivalent.

It is recommended that blindness prevalence rates be expressed in terms of percentages instead of the traditional "rate per 100 000". In case of low rates, especially with regard to relatively small population groups, it would be desirable to give absolute figures in addition to the rates.

Countries or areas may be broadly grouped as follows in relation to the prevalence of blindness:

- (a) Countries or areas where, at least amongst the rural majority, eye care has not yet reached the interim stage mentioned in (b). Shorter life expectancy and proportionately fewer elderly people diminish the overall prevalence of blindness associated with old age. Blindness rate reaches the proportions of "overburden" because of the massive prevalence of one or more of the following major causes:

- (i) Trachoma. In areas of severe endemicity, uncontrolled trachoma is likely to increase the blindness rate to 1% or even up to 3%. The latter applies to some areas or countries in the Middle East, Africa and South-East Asia.
- (ii) Onchocerciasis. In areas heavily affected by onchocerciasis, this disease dominates all other causes and is likely to produce blindness rates from 3 to 7%.
- (iii) Xerophthalmia/keratomalacia. Where malnutrition is an important cause of blindness among children, it alone adds substantially to the blindness prevalence rate. In India, it is estimated that at least 250 000 people are blind from xerophthalmia/keratomalacia.
- (iv) Cataract. Amongst underserved rural populations, untreated cataract may be the major factor, accounting for more than half the blindness rate in the Indian subcontinent. In India alone there are an estimated 3.5 million cases of blindness (visual acuity less than 3/60) caused by cataract.
- (v) Accidents, even minor ones, often complicated by infection.

In many cases the above conditions coexist and further compound the problem emphasizing the need for a multidisciplinary approach to prevention and treatment.

(b) Countries or areas at an interim stage of development where the blindness rate is not massively augmented by the major causes mentioned in (a). In addition to other basic causes of blindness, blinding infections are only partially controlled and people can remain blind from curable conditions as surgical treatment is not readily available. In such countries the blindness rate is likely to range around 0.40-0.65%. Within this group, a critical factor is the prevalence of untreated cataract and undetected glaucoma. For instance, statistics from the Caribbean indicate that untreated cataract alone adds at least 0.2% to the blindness prevalence rate. Industrial accidents are an increasing hazard.

(c) Countries or areas with advanced medical services where blinding infections are controlled, where most curable blindness is treated and where the main causes of blindness are age-related, e.g. glaucoma, diabetes, and macular degeneration. The blindness prevalence rates are likely to range around 0.15-0.25%. Within this group, the critical factor is the proportion of the population in the older age-groups. In the United Kingdom, with a rate of 0.20% for the whole population, this rate increases to 2.3% in the over 75 age-group.

Applying the above criteria, available data allow to make a gross estimate that there are some 28 million blind people in the world, if the definition of blindness is fixed at less than 3/60 or its equivalent. Such a handicap precludes an individual from functioning effectively in his community without special assistance including rehabilitation. If the definition were fixed at less than 6/60 or its equivalent, a level considered as legal blindness in some industrialized countries, the number would be about 42 million. Based on available data from various countries, a conservative estimate of prevalence has been developed for each of the three groups of countries as indicated in the following table.

The table represents a minimum estimate; in certain areas or population groups higher rates have been reported, up to 3 or 5% or more. This estimate, based on available data, might well need to be revised as better and more comprehensive figures become available. This revision is particularly needed with regard to populations included in group a, for which blindness prevalence rates are higher and statistical data more limited and less reliable.

Population in each group	Total estimated population in millions	Estimated blindness (less than 3/60)		Estimated blindness (less than 6/60)	
		Prevalence rate (%)	Number of blind (in millions)	Prevalence rate (%)	Number of blind (in millions)
a	2 100	1.0	21.0	1.5	31.5
b	1 100	0.5	5.5	0.75	8.3
c	800	0.2	1.6	0.3	2.4
Global total	4 000	-	28.1	-	42.2

5.4 Compilation of available data

Notwithstanding the limitations of available data, it would be useful to maintain a summary file of available national data on blindness (see Annex II).

This data bank would be set up as an open-ended file. The data would be listed under seven headings as follows:

1. Country, region, locality
2. Type of data (registration, survey or special study, census, estimate)
3. Date of data collection
4. Definition(s) of blindness used
5. Number of blind and denominator (population base) by standard age-group and sex according to age at time of data collection
6. Type of blindness
7. Source of data

With regard to point 6, data will be classified as considered appropriate by the country of origin taking into account the ICD codes. This data might later be condensed into the types suggested in item 5.2 ("Types of blindness"). The data could serve as a basis for determining the cost and productivity implications of blindness and help in setting priorities for reducing the burden which blindness represents for society. One aspect of this problem is shown by the cost of blindness, which is estimated to be eight billion dollars per year for the United States of America.

5.5 Collection of data

There are a number of difficulties in collecting reliable data on blindness. Some of these are related to social, psychological or cultural factors.

Much potentially useful information may be lost through inadequate or inappropriate use of existing hospital records; however, the reverse is also true, and a biased picture can be conveyed by extrapolation from such records. The active participation of ophthalmologists is of value in any assessment of the problem, but observations and experience based largely on urban clinical practice may be misleading for this purpose.

Relevant data on the prevalence of blindness are usually obtained through sample surveys of the population. Registration systems, regularly maintained, with exactly defined criteria and with ensuing benefits sufficient to induce all classes of registrants, can provide important data.

Data on persons considered by themselves or their families to be blind can be collected during a population census. In certain circumstances, it may be practicable to carry out vision testing at the time of census taking.

TERMS OF REFERENCE

Programme Advisory Group on the
Prevention of Blindness

1. The Advisory Group will:

- (a) promote worldwide interest and support for the WHO Programme for the Prevention of Blindness;
- (b) advise the WHO Secretariat with regard to the priorities of the Programme and its coordination with other related activities of the World Health Organization and of others.

2. Members of the Advisory Group will be appointed by the Director-General. The Group will normally consist of 12 members, selected after consultation with the following international organizations, in addition to the Regional Offices of WHO:

- the International Agency for the Prevention of Blindness (IAPB);
- the International Federation of Ophthalmological Societies (IFOS);
- the World Council for the Welfare of the Blind (WCWB).

In the selection of the members, due consideration will be given to attaining an optimum diversification and balance of personal experience, professional background, international standing, affiliations and geographical origin.

3. The term of appointment to the Group will be two years, with possibility of reappointment for not more than a further two terms, with the objective of achieving a turnover of approximately one third of the Group every two years. Reappointments will not generally be considered before two years have elapsed from the previous termination date.

4. The Chairman, Vice-Chairman and Rapporteur will be elected by the Advisory Group at each meeting. The Programme Manager of the WHO Programme for the Prevention of Blindness will serve as Secretary to the Advisory Group.

5. Meetings of the Advisory Group will normally be convened on an annual basis. A report of each meeting will be prepared and circulated appropriately.

6. The Advisory Group will be assisted in its work by consultants and small task forces as required.

AVAILABLE DATA ON BLINDNESS

The main purpose of this compilation is to provide a starting point for the establishment of a data bank on blindness.

This compilation is mainly based on data which have become available in connexion with the development of the WHO Programme for the Prevention of Blindness and is limited to data from 1960 onwards. No attempt has been made to include all published data.

Additional data would be welcome and should be addressed to: Programme for the Prevention of Blindness, World Health Organization, 1211 Geneva 27, Switzerland.

EXPLANATORY NOTES

1. Countries and territories (Column 1) are listed according to the order followed in the Demographic Yearbook 1976, United Nations, New York, 1977.
2. Population estimates for 1976 (Column 2) are those given in the above Yearbook.
3. Type of data (Column 3): E = Estimate; S = Survey or special study; C = Census; R = Registration.
4. Definitions of blindness (Column 5):

<u>Visual acuity with best possible correction</u>	<u>Category of visual impairment^a</u>
1. Totally blind (no light perception)	5
2. 1/60 or less	
3. Less than 1/60 or its equivalent	4
4. 2/60 or less	
5. 3/60 or less	
6. Less than 3/60 or its equivalent	3
7. 20/300 or less	
8. 6/60 or less	
9. Less than 6/18	1

^a International Classification of Diseases, WHO, Geneva, 1977, p. 242.

5. Population covered (Column 6): m. = millions.
6. Sources of data (Column 10): see page 18.

Continent, country or territory	Population estimate 1976 (in millions)	Date of data	Type of data	Definition of blindness	Population covered	Number of blind	Prevalence rate %	Main causes	Sources of data
1	2	3	4	5	6	7	8	9	10
<u>Africa</u>									
Chad	4.12	1972 1977	B S	6	3. Sm. whole country Rural areas in the south: (a) onchocerciasis not endemic (b) onchocerciasis endemic	100 000-175 000	2.9 - 5.0 0.8 3.2		1 2
Egypt	38.07	1974	S	7	Northern Egypt: (a) rural population (b) urban population Whole country	1.0m.	4.7 1.5 2.6	50% in rural areas and 30% in urban areas caused by trachoma and other infectious diseases	3
Ethiopia	28.68	1976	B		Trachoma endemic rural areas		4.0		4
Ghana	10.31	1970 1972	E S		8.5m. Whole country Upper and northern region Upper region, rural areas, onchocerciasis endemic	60 418	0.7 3.0 6.5	cataract 39%, glaucoma 20%, onchocerciasis 12%, corneal disorders 11%	2 2
Kenya	13.85	1965	E		8.9m. whole country	70 000	1.2	cataract 45%, infections including trachoma 35%	6
Malawi	5.18	1975	E		Children under 5 years of age (lm.): yearly incidence of 340 cases			infections 32%, congenital cataract 14.7%, other congenital conditions 16.0%, optic atrophy 14.7%, retinoblastoma 8.0%, trauma 5.3%	7
Mali	5.84	1978	E		Whole country	30 000-100 000	0.5 - 1.6	onchocerciasis 36.5%, infections 18.9%, trachoma 14.1%, cataract 7.5%, degenerative conditions 2.8%, glaucoma 2.4%, trauma 2.1%	8
Mauritius	0.89	1960	C		Whole country	250	0.04		9
Morocco	17.83	1968	S	6	Trachoma endemic areas		4.1		10
Nigeria	64.75	1975 1977	E E		Northern Nigeria, onchocerciasis endemic areas Whole country Northern Nigeria Southern Nigeria	800 000	≥ 5.6 1.0 1.5 0.5		11 2
Southern Rhodesia	6.53	1960 1962	S C	5 1	187 300 Whole country	1 108 12 040	0.6 0.3		9

Explanatory notes, see page 11.

1	2	3	4	5	6	7	8	9	10	
Africa (cont'd) Sudan	16.13	1976	S	6	(1) 95 000, Northern Sudan, trachoma endemic: (a) rural areas (b) urban areas (2) 122 300, Blue Nile Province, trachoma non-endemic (a) rural areas (b) urban areas (3) 45 000, Bahr-el-Ghazal, onchocerciasis endemic area		4.5 1.4	Trachoma, acute conjunctivitis, cataract, glaucoma, trauma	12	
	5.74	1960	S	5	4n. whole country	18 000	0.5	Cataract, infections, glaucoma, trauma	9	
	11.94	1965 1970	R S	1	9.5n. whole country 3 146, Sokedi district	175 000 38	1.8 1.2	Trachoma 40.6%, corneal opacities from other causes 35.4%, cataract 13.4%, trauma 5.6%, uveitis 2.8%, optic atrophy 1.5%, glaucoma 0.7%	13 14	
	6.53	1977	E		12.2n. whole country	82 000	0.7		2	
	15.61	1969	C		5.7n. whole country	15 630	0.3		13	
	6.17	1974	E		12n. whole country	30 000-40 000	0.3		15	
	25.63	1971	E		Whole country Onchocerciasis endemic areas		0.9 up to 4.5		16	
	5.14	1976	S		16 022, Kasai-Oriental Province	281	1.8		16	
		1961 1964	E S		2n. whole country 127 733 Luapula Province 563 040 Northern Province 485 560 Eastern Province 363 480 Barotseland	10 000-15 000 723 1 190 1 582 616	0.5-0.8 0.6 0.2 0.3 0.2	Measles 55%, Smallpox 12.5%, trachoma 9.3%, cataract 4.3%, trauma 0.8%, glaucoma 0.6%, leprosy 0.5%	9 17	
		1978	S	6	876 examined, Western Province 1 118 examined, Southern Province 1 375 examined, Eastern Province	20 13 11	2.3 1.2 0.8	Infections, cataract, glaucoma	8	
	America Barbados	0.25	1975	S	5	Whole country	1 255	0.5	Cataract, glaucoma, optic atrophy	8
	Bolivia	5.79	1970	R		4.9n. whole country	1 070	0.3		13

Explanatory notes, see page 11.

1	2	3	4	5	6	7	8	9	10
America (cont'd)									
Brazil	109.18	1971	S	2	156 422, Sao Paulo State	96	0.1	Glaucoma 31.3%, infections 12.5%, cataract 10.4%, optic atrophy 9.4%	18
Canada	23.14	1969	R		2ln. whole country	27 184	0.1		13
Chile	10.45	1976	E		Whole country	100 000	1.0		19
Dominican Republic	4.84	1977	E		Whole country	5 000	0.1		2
El Salvador	4.12	1976	E		Whole country	8 000	0.2		19
Bahri	4.67	1976	E		Whole country	60 000	1.3		19
Peru	16.09	1976	E		Whole country	30 000	0.2		19
United States of America	215.12	1970	R	8	18 States (Model Reporting Area), 30.1% of total population	93 347	0.2	Retinal disease 25.0%, cataract 13.1%, glaucoma 11.0%, optic nerve disease 9.2%, uveitis 5.1%, cornea or sclera 4.7%, myopia 3.0%	20
		1974	E		Whole country	462 850	0.2		21
Asia									
Afghanistan	19.80	1978	B		Whole country		2.0	Trachoma, cataract, glaucoma, trauma, xerophthalmia	8
Bahrain	0.26	1969	R		Whole country	62	0.03		13
Bangladesh	76.82	1976	E		Whole country	150 000-200 000	0.2-0.3	Xerophthalmia 15%, cataract 14%, glaucoma 6%, infections and traumas 18%, uveitis 4%	22
		1976	S		20 523 children up to 6 years of age	25	0.1		
Burma	11.00	1960 1975	E S	5	Whole country 17 392 Central Burma	214 440 354	1.0 2.0	Trachoma, glaucoma, cataract, trauma	22
China	832.15	1978	E		Heilungkiang rural areas		0.1	Glaucoma 19.5%, trachoma 17.2%, cataract 13.4%, keratomalacia 7.5%, trauma 2.1%	2
Cyprus	0.64	1965	S		Greek population only	1 269	0.3		13
Hong Kong	4.38	1975	R		Whole territory	7 001	0.2	Cataract 34.3%, glaucoma 18.3%, corneal leucoma (trachoma) 10.3%, retinal disorders 8.9%, myopia 8.0%, phtchisis bulbi 7.9%, optic atrophy 5.0%, uveitis 4.3%	23
		1976 1977	E R	5		6 500 7 318	0.1 0.2		13 8

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1	2	3	4	5	6	7	8	9	10
Asia (cont'd)									
India	610.08	1974	S	5	74 820, Allahabad	1 548	2.1	In children up to 15 years: infections 43.9%, malnutrition 27.2%, trauma 16.4%, congenital disorders 4.3%, hereditary conditions 4.3%, neoplasms 3.0%. Cataract 55%, trachoma and other infections 20%, smallpox 3%, malnutrition 2%, trauma 1.3%, glaucoma 0.5%	24
		1976	E	8	Whole country	9 000 000	1.5		22
		1976	S		Orissa (a) rural population (b) urban population		3.6 2.2		25
Indonesia	139.62	1974	E	2	Whole country	1 000 000	0.8	Trachoma, xerophthalmia, infections, glaucoma, cataract	24
Iran	33.90	1960	E	5	20m. whole country	150 000	0.8		9
		1976	E		Trachoma endemic areas		4.5		5
Iraq	11.51	1961	E		7.5m. whole country	35 000-70 000	0.5-1.0		9
Israel	3.47	1961	S	5	2.1m. whole country	5 285	0.3		9
Japan	112.77	1975	E		Whole country	256 700	0.2	Microphthalmos 16.4%, cataract 14.7%, optic atrophy 11.6%, myopia 8.4%, retinitis pigmentosa 8.1%, buphthalmos 7.1%	8
		1976	R		35.2m. under 19 years, whole country	7 200	0.02		
Jordan	2.78	1963	S		Whole country	256 455	0.2		26
					S 324, trachoma endemic rural areas	77	1.5		27
Malaysia	12.30	1971	E		Whole country	22 300	0.2		13
Maldives	0.12	1970	R		Whole country	128	0.1		13
Nepal	12.86	1976	E	8	Whole country	80 000	0.8	Corneal ulcers, glaucoma, optic atrophy	22
Pakistan	72.37	1976	E		Whole country, trachoma endemic rural areas		4.3		5
		1976	E		Whole country	1 500 000	2.0	Corneal infections, glaucoma, cataract, retinal lesions	4
Singapore	2.28	1972	R	8		1 442	0.06	Retinal disorders 22%, glaucoma 20%, optic atrophy 20%, corneal disorders 12.3%	24

Explanatory notes, see page 11.

1	2	3	4	5	6	7	8	9	10
Asia (cont'd) Sri Lanka	14.27	1963	C		Whole country	10 341	0.1	Cataract, glaucoma, corneal disorders, fundus lesions, myopia	28
		1973	E		Whole country	23 800	0.1	Cataract 45.8%, corneal disorders 20%, glaucoma 7.7%, trauma 6.7%	22
	7.60	1973	S	1	49 500, trachoma endemic area	152	0.3	Cataract 34.9%, infections 27.1%, glaucoma 19.7%	3
	40.16	1965	C		32m. whole country	38 178	0.1		9
	6.87	1960	E		4.5m. whole country	180 000	4.0		9
	1.75	1973	S		3 042, rural areas	108	3.6	Cataract 40.9%, trachoma 17.4%, glaucoma 14.7%, corneal disorders 12%, phthisis bulbi 8%, amblyopia 4%, uveitis 1.3%, retinal detachment 0.7%	16
Europe	7.51	1967	R		Whole country	11 005	0.2		13
	9.89	1963	R		Whole country	4 779	0.05		13
	8.76	1970	S	4	Whole country	3 312	0.04	Hereditary condition 27.7%, inflammatory diseases 18.8%, glaucoma 10.3%	24
	5.07	1970	R		Whole country	9 350	0.2		13
	4.73	1967	R		Whole country	3 345	0.7		13
	61.50	1977	R	3	Whole country	65 000	0.1		8
	0.03	1961	C	5	20 000, whole territory	141	0.7		9
	10.60	1973	E		Whole country	25 000	0.2		29
	56.19	1963	E		Whole country	>100 000	>0.2		9
	0.36	1966	R		Whole country	204	0.06		23
	0.30	1970	R		Whole country	570	0.2	Myopia 19.4%, cataract 18.7%, glaucoma 17.7%, diabetes 14.9%, trachoma 12.9%, optic atrophy 7.5%, uveitis 2.1%, trauma 1.8%	13
		1973	C		Whole country	565	0.2		30

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1	2	3	4	5	6	7	8	9	10	
Europe (cont'd)	0.02	1970	Z		Whole country	15	0.07		13	
	34.36	1969	R		33.6m. whole country	21 523	0.07		13	
	9.45	1960	C		8.8m. whole country	8 225	0.1		9	
	21.45	1969	R		20.7m. whole country	15 918	0.08		13	
	8.22	1968	R	9	8.0m. whole country	15 716	0.2		13	
		1977	R		Whole country	27 650	0.3		8	
	6.35	1969	Z		Whole country	9 000	0.1		13	
	55.93	1968	R		Whole country	116 414	0.2		13	
	Oceania	13.64	1968 1978	Z E	8	Whole country except Victoria Whole country	18 821 28 000	0.2 0.2		13 8
		0.58	1969 1976	S R		20 000, Madraga, Western Division Whole country	50 392	0.3 0.07	Trachoma 20.9%, corneal opacities 13.5%, glaucoma 12.2%, trauma 9.4%, congenital 6.7%, optic atrophy 7.9%	8
0.13		1970	R						13	
			R		70 000	96	0.1			
			R		110 000	30	0.03			
3.14		1968	R		2.7m. whole country	3 687	0.1		13	
2.83		1975	Z	1	Whole country	12 500	0.4		31	

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LIST OF PARTICIPANTS

Members of Programme Advisory Group

Professor L. P. Agarwal	Chief Organizer, Dr Rajendra Prasad Centre for Ophthalmic Sciences, <u>New Delhi</u> , India
Sheikh Abdullah M. Al-Ghanim	President, the Regional Bureau of the Middle East, Committee for the Welfare of the Blind, <u>Riyad</u> , Saudi Arabia
Dr W. Fougère	Director, Bureau de Nutrition, <u>Port-au-Prince</u> , Haiti
Dr D. A. Henderson	Dean, School of Hygiene and Public Health, Johns Hopkins University, <u>Baltimore</u> , United States of America
Professor B. R. Jones (Chairman)	Director, Department of Clinical Ophthalmology, Institute of Ophthalmology, University of London; Director, WHO Collaborating Centre for Trachoma and other Chlamydial Infections, <u>London</u> , England
Dr C. Kupfer	Director, National Eye Institute, National Institutes of Health, <u>Bethesda</u> , United States of America
Professor I. F. Maitchouk	Head, Department of Viral and Allergic Eye Diseases, Helmholtz Research Institute of Ophthalmology, <u>Moscow</u> , USSR
Dr A. Maumenee*	Director, The Wilmer Institute, Johns Hopkins Hospital, <u>Baltimore</u> , United States of America
Professor A. Nakajima (Vice-Chairman)	Chairman, Department of Ophthalmology, Juntendo University School of Medicine, <u>Tokyo</u> , Japan
Dr R. Pararajasegaram	Regional Chairman for Southern Asia, International Agency for the Prevention of Blindness, <u>Colombo</u> , Sri Lanka
Professor C. O. Quarcoopome	Department of Ophthalmology, University of Ghana Medical School, <u>Accra</u> , Ghana
Mrs E. Molina de Stahl	President, Comité Nacional Pro-Ciegos y Sordomudos, <u>Guatemala</u> ; President, Comité Latino-americano de Servicios para Ciegos y Deficientes visuales, <u>Guatemala</u> , Guatemala
Sir John Wilson	President, International Agency for the Prevention of Blindness; Director, Royal Commonwealth Society for the Blind, <u>Haywards Heath</u> , England

* Unable to attend.

Representatives of other organizations

United Nations Children's Fund
Dr L. J. Teply, Senior Nutritionist,
New York, NY, United States of America

International Labour Organisation
Mr K. Gunther, Vocational Rehabilitation
Section, Geneva, Switzerland

Nongovernmental organizations in official relations with WHO

International Agency for the Prevention
of Blindness
Dr V. Clemmesen, Secretary/Registrar,
Naestved, Denmark

International Organization against Trachoma
Professor G. Coscas, President, Créteil,
France

International Union of Nutritional Sciences
Dr A. Pirie, Nuffield Laboratory of
Ophthalmology, Oxford, England

World Council for the Welfare of the Blind
Mrs D. de Gouvea Nowill, Vice-President,
Sao Paulo, Brazil

Secretariat

Dr J. O. Bond
Communicable Diseases, Regional Office for
the Americas, PAHO/WHO, Washington DC,
United States of America

Dr C. R. Dawson (Rapporteur)
Co-Director, WHO Collaborating Centre for
Reference and Research on Trachoma and other
Chlamydial Infections, San Francisco, CA,
United States of America (Temporary Adviser)

Dr P. J. DeIon
Epidemiological Surveillance of Communicable
Diseases, WHO, Geneva, Switzerland

Dr E. M. DeMaeyer
Nutrition, WHO, Geneva, Switzerland

Dr B. O. L. Duke
Filarial Infections, WHO, Geneva, Switzerland

Dr H. Koudry
Information Systems Programme, WHO, Geneva,
Switzerland

Dr R. Krastev
Dissemination of Statistical Information,
WHO, Geneva, Switzerland

Dr N. V. K. Nair
Nutrition, WHO Regional Office for the
Western Pacific, Manila, Philippines

Dr B. Nizetic
Research Promotion and Development, WHO
Regional Office for Europe, Copenhagen,
Denmark

Dr V. Parisi
Epidemiological Surveillance of Communicable
Diseases, WHO Regional Office for the
Eastern Mediterranean, Alexandria, Egypt

Dr M. L. Tarizzo

(Secretary)

Prevention of Blindness, WHO, Geneva,
Switzerland

Dr B. Thylefors

Onchocerciasis Control Programme,
Ouagadougou, Upper Volta

Dr A. Zahra

Director, Division of Communicable Diseases,
WHO, Geneva, Switzerland

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