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WHODOC

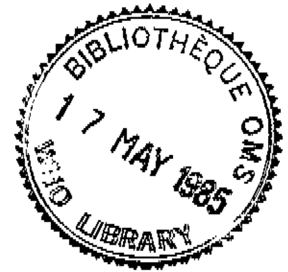
WORLD HEALTH ORGANIZATION

ORGANISATION MONDIALE DE LA SANTÉ

NUT/85.6

ORIGINAL: ENGLISH
May 1985

PREVENTION AND CONTROL OF VITAMIN A DEFICIENCY, XEROPHTHALMIA AND NUTRITIONAL BLINDNESS: SUMMARY OF A PROPOSAL FOR A TEN-YEAR PROGRAMME OF SUPPORT TO COUNTRIES



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PREVENTION AND CONTROL OF VITAMIN A DEFICIENCY, XEROPHTHALMIA AND NUTRITIONAL BLINDNESS: SUMMARY OF A PROPOSAL FOR A TEN-YEAR PROGRAMME OF SUPPORT TO COUNTRIES

I. INTRODUCTION

1. The Thirty-seventh World Health Assembly, in May 1984, adopted a resolution[1] that called upon the Director-General to support Member States in assessing the most appropriate approaches to preventing and controlling vitamin A deficiency and xerophthalmia; collaborate with them in monitoring these conditions' incidence and prevalence; prepare training materials concerning the prevention and control of vitamin A deficiency; and coordinate the launching and management of international action to combat vitamin A deficiency.

2. The present document is a summary of the proposal[2] for a ten-year programme of support to countries for the prevention and control of vitamin A deficiency, xerophthalmia and nutritional blindness that was prepared in response to the Health Assembly's resolution. It is also WHO's contribution to the multisectoral strategy endorsed by the United Nations Administrative Committee on Coordination in 1984, on the basis of recommendations concerning the prevention and control of vitamin A deficiency made by this body's Subcommittee on Nutrition.

3. The World Health Organization introduced its programme proposal at a meeting of interested parties that was convened in Geneva on 12 March 1985. The purpose of this meeting was twofold: to provide information on steps the Organization is taking to give effect to the Assembly's resolution, and to initiate the process of mobilizing financial and other resources for this purpose. Participants[3] included representatives of governments and government-sponsored agencies; agencies and bodies of the United Nations system; nongovernmental organizations and experts active in the prevention and control of vitamin A deficiency; and the chemical industry, producers of vitamin A.

4. There was unanimous agreement at this meeting that WHO is, and must remain, a major force in promoting nutritional blindness prevention, and that it has a vital role to play in coordinating and harmonizing the efforts of all interested parties to ensure that they have the greatest impact. By maintaining an up-to-date global needs inventory, WHO is able to identify and call attention to gaps in prevention and control programme coverage. Governments may wish to make voluntary contributions to WHO to fill these gaps, or may prefer to fund prevention and control programmes on a direct bilateral basis. If the latter, it is essential that WHO be informed of all support provided in order for it to play its assigned coordinating role. WHO is prepared to exercise leadership in this regard, and anticipates that sufficient interest is being generated among governments so that the resources necessary for it to carry out its responsibilities will be forthcoming.

II. THE PROBLEM AND ITS GEOGRAPHICAL DISTRIBUTION AND MAGNITUDE

5. The most dramatic impact of vitamin A deficiency involves the eye, producing night blindness, keratinization of the conjunctiva and cornea, and ultimately corneal ulceration and necrosis of the cornea (keratomalacia). Xerophthalmia literally means "dry eye" and in a restricted sense is a term used exclusively by ophthalmologists; in a broader sense, and in a public health context, the term xerophthalmia applies to all the ocular manifestations of vitamin A deficiency.

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[1] Resolution WHA37.18. World Health Assembly, Geneva, May 1984, document WHA37/1984/REC/1, p. 10.

[2] Document NUT/84.5 Rev. 1.

[3] See Annex 1 of the report of the meeting of interested parties, document NUT/85.2 Rev.1, for the list of participants.

6. Multiple factors affect vitamin A status in the individual, two of the most important being availability and adequacy of intake and absorption. Vitamin A is present as retinol (preformed vitamin A) in animal products, for example liver, milk, butter and eggs; and as carotene (provitamin A) in several cereals, in some yellow-coloured tubers, in yellow- and green-coloured vegetables such as carrots, cassava leaves and spinach, in yellow-coloured, non-citrus fruits such as mangoes and papayas, and in red palm oil. The biological activity of carotenes is only a fraction of that of retinol, and intestinal absorption of the former is influenced by the presence or absence of fat in the diet. Populations at risk of developing xerophthalmia appear to receive most, if not all, of their vitamin A in the form of carotenes.

7. Diarrhoea, parasitic infections, and other intestinal disorders interfere with the absorption of vitamin A, as do respiratory tract infections, measles and other febrile illnesses that increase metabolic demands, interrupt normal feeding patterns, and thereby reduce vitamin A intake. Severe forms of protein-energy malnutrition are also known to interfere with absorption, storage and use of the vitamin. In all situations where these contributory factors are common, individual vitamin A requirements are necessarily increased. At the same time, vitamin A deficiency reduces considerably resistance to infection, thereby increasing morbidity and mortality due especially to respiratory disease and diarrhoea.

8. Young children are at the greatest risk of developing xerophthalmia, both because their vitamin A requirements are proportionately higher than any other group's, and because they suffer the most from the infections described in the preceding paragraph. As a result, severe, blinding corneal destruction is most frequently observed in children between the ages of six months and six years. Vitamin A deficiency is, in fact, the single most frequent cause of blindness among pre-school children in developing countries. The younger the child and the more severe the disease, the higher the risk that corneal destruction will be followed by death. Sixty to 70% of all untreated cases result in death within a few weeks following the onset of blindness.

9. When disaster strikes, for example drought and famine, the negative effects of vitamin A deficiency are intensifieid. An already marginal vitamin A status deteriorates rapidly, resulting in xerophthalmia, nutritional blindness and death.

10. WHO has developed prevalence criteria[1] for determining the public health significance of vitamin A deficiency. These criteria have been used in preparing the following global survey.

11. In 1985 the countries where vitamin A deficiency has been identified as a significant public health problem in Africa are located in the Sahelian and sub-Sahelian regions: Benin, Burkina Faso, Mali and Mauritania; and in the east and south: Ethiopia, Malawi, United Republic of Tanzania, and Zambia; in the Americas: El Salvador, Haiti, and parts of Brazil and Mexico; in Asia: Bangladesh, India, Indonesia, Nepal and Sri Lanka; in the Eastern Mediterranean: Oman and Sudan; and in the Western Pacific: the Philippines and Viet Nam.

12. In addition to these countries, there are others where indirect evidence strongly suggests that vitamin A deficiency is a significant public health problem, but where direct evidence, based on a formal assessment of the condition's prevalence and magnitude, is lacking. In still other countries, although sporadic cases of xerophthalmia have been reported, the prevalence picture is such that vitamin A deficiency does not appear to warrant priority attention at this time. Additional information should nevertheless be collected there and the situation monitored closely. Countries corresponding to the above classification are found in Fig. 1 and Tables 1 and 2 below.

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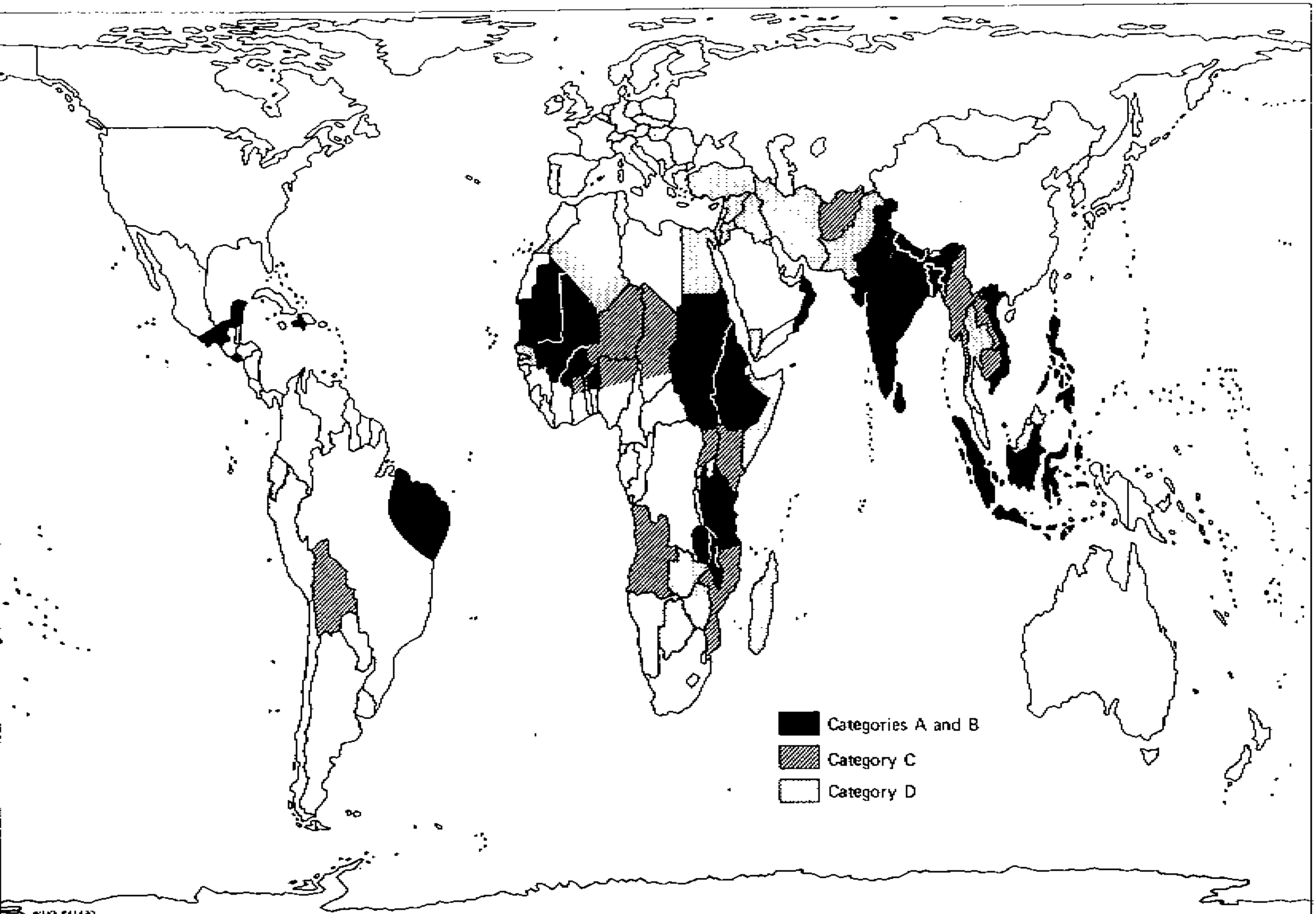
[1] Report of a joint WHO/UNICEF/USAID/Helen Keller International/IVACG Meeting: control of vitamin A deficiency and xerophthalmia, WHO Technical Report Series No. 672, Geneva, 1982, pp. 13-17.

FIG. 1

THE GEOGRAPHICAL DISTRIBUTION OF VITAMIN A DEFICIENCY AND XEROPHTHALMIA IN THE WORLD IN 1984, BY COUNTRY CATEGORY[a]



A: Vitamin A deficiency a significant public health problem. National programme under way.
B: Vitamin A deficiency a significant public health problem. National programme not yet under way.
C: Vitamin A deficiency most probably a significant public health problem.
D: Vitamin A deficiency not a significant public health problem. Sporadic cases that should be monitored.

This map - based on the "Peters projection" - does not express any opinion on the legal status of any country, territory or area, nor is it concerned with the delimitation of frontiers or boundaries.

TABLE 1. COUNTRIES WHERE VITAMIN A DEFICIENCY, XEROPHTHALMIA AND NUTRITIONAL BLINDNESS ARE SIGNIFICANT PUBLIC HEALTH PROBLEMS, BY REGION

Region	Category A[a]	Category B[b]	Category C[c]
Africa		Benin Burkina Faso Ethiopia Malawi Mali Mauritania U.R. of Tanzania Zambia	Angola Chad (north) Ghana (north) Kenya Mozambique Niger Nigeria (north) Uganda
Americas	El Salvador Haiti	Brazil (north-east) Mexico	Bolivia
South-East Asia	Bangladesh India Indonesia Nepal Sri Lanka		Burma
Eastern Mediterranean		Oman Sudan	Afghanistan
Western Pacific	Philippines	Viet Nam	Dem. Kampuchea Lao People's Dem. Republic

[a] Problem assessment made, national prevention and control programme under way.

[b] Problem assessment made, or partially made, national prevention and control programme not yet under way.

[c] Problem assessment not yet made, or insufficient information, high probability based on indirect evidence.

TABLE 2. COUNTRIES WHERE VITAMIN A DEFICIENCY DOES NOT APPEAR TO BE A SIGNIFICANT PUBLIC HEALTH PROBLEM BUT WHERE THE PREVALENCE PICTURE SHOULD BE CLOSELY MONITORED, BY REGION (category D)

Africa	Europe
Algeria	Morocco
Botswana	Turkey
Burundi	
Lesotho	Eastern Mediterranean
Madagascar	
Rwanda	Egypt
Senegal	Iran
Zimbabwe	Iraq
	Jordan
Americas	Pakistan
	Somalia
Ecuador	Syria
Peru	Yemen
South-East Asia	Western Pacific
Thailand	China
	Malaysia

13. Although the fragmentary nature of available data makes it difficult to give precise global figures for the number of new cases of vitamin A deficiency and xerophthalmia occurring each year, it is possible to estimate the magnitude of the problem by referring to recorded information and survey results obtained in countries where it has been closely followed.

14. In Indonesia, for example, the incidence of active corneal disease has been estimated at 63 000 new cases annually among pre-school children, or a rate of 2.7 per 1000. Given an incidence of this order, it is likely that each year some 400 000 preschool children in Bangladesh, India, Indonesia, and the Philippines combined will develop active corneal lesions resulting in partial or total blindness. These figures, because they assume an identical incidence rate for all four countries, are in fact conservative; available evidence suggests a higher rate for both Bangladesh and India. The total incidence of non-corneal xerophthalmia (mild, and generally reversible, forms of the disease) in these countries is probably on the order of five million pre-school children per year.

15. A worldwide projection made on the basis of estimates for Bangladesh, India, Indonesia, and the Philippines exceeds 500 000 cases annually of new active corneal lesions, and 6-7 million cases of non-corneal xerophthalmia. These are conservative estimates; countless other children, although not presenting active signs of xerophthalmia, are vitamin A deficient with all that this condition implies by way of decreased resistance to infectious diseases and increased morbidity and mortality.

III. DESIGNING A STRATEGY FOR PREVENTION AND CONTROL

16. Vitamin A deficiency occurs when body stores are exhausted and supply fails to meet the body's requirements. Ideally, therefore, the most important steps in preventing vitamin A deficiency are first, ensuring regular and adequate consumption, especially by young children, of vitamin A in the daily diet, together with an appropriate intake of protein and energy. The increase in vitamin A should be accompanied by efforts to reduce the prevalence and severity of contributory factors such as diarrhoea, measles, protein-energy malnutrition, and respiratory tract infections in order to maintain vitamin A intake and reduce the body's requirements for this nutrient. Even in the presence of these contributory factors, however, increasing vitamin A intake in order to build up sufficient stores in the liver will effectively prevent nutritional blindness.

17. An overall strategy designed to prevent and control vitamin A deficiency, xerophthalmia and nutritional blindness may be defined in terms of action taken in the short, medium and long term:

(1) short term: The administration to vulnerable groups of single, large doses of vitamin A on a periodic or *ad hoc* basis can be initiated quickly and with a minimum of infrastructure. It is essentially an emergency measure that will prevent and control vitamin A deficiency and xerophthalmia while awaiting a permanent solution to the problem.

Infants (under twelve months of age) should receive orally 100 000 IU, and older children (1 to 6 years) 200 000 IU, of vitamin A on a regular basis, say every four to six months. Alternatively, children with protein-energy malnutrition, measles, gastroenteritis, and pulmonary and other infections, and who are consequently at risk of developing xerophthalmia, should receive a similar dose of vitamin A. Mothers during the month immediately following delivery should also receive a massive dose in order to increase the vitamin A content of their breast milk. This approach has been used with considerable success as the basis for national prevention and control programmes in such countries as Bangladesh, India and Indonesia.

Ideally, vitamin A distribution should be part of the responsibilities of the primary health care worker, particularly in areas where xerophthalmia is known to be a significant public health problem. In addition to such routine preventive distribution, health workers should administer, at the time of diagnosis, 200 000 IU of vitamin A to every child who is affected by xerophthalmia. The same dose should be provided the following day and two weeks later (100 000 IU below one year of age).

(2) medium term: The fortification of a dietary vehicle with vitamin A takes longer to initiate and can only be undertaken when a number of pre-conditions are met. This approach requires, for example, selection of an appropriate vehicle, development of the fortification process, testing of the acceptability and stability of the fortified food, initiation of quality control measures, and adoption of relevant legislation. This approach is widely used in many industrialized countries to foster regular and adequate consumption of vitamin A. As to developing countries, a key to success with fortification is the choice of a vehicle that is likely to be consumed in sufficient quantities by groups at risk. Sugar fortification in Honduras and Guatemala, for example, has shown excellent results, while fortification trials using monosodium glutamate, which are currently under way in Indonesia and the Philippines, hold considerable promise.

(3) long term: Increased dietary intake of vitamin A is the long-term solution to preventing and controlling vitamin A deficiency. It implies changes in the daily intake of natural food sources of this vitamin to a level that minimizes the risk of developing a deficiency. While preformed vitamin A (retinol) is present only in products of animal origin, provitamin A in the form of carotenes is found in several cereals (though not in rice), in some tubers such as yellow sweet potatoes, in vegetables such as carrots and dark green leafy vegetables, in yellow fruits such as mangoes and papayas, and in red palm oil. Increasing the production and consumption of vitamin A- and carotene-rich foods requires the close collaboration of a number of parties, the agriculture, education and health sectors, for example, in addition to communities and families.

18. In cases where both vitamin A- and provitamin A-rich foods are readily available and relatively inexpensive, it may be necessary to develop or reinforce nutrition education programmes in order to motivate their being consumed by high-risk groups, especially pre-school children. In areas where such foods are expensive, or only irregularly available, the introduction of home gardening and associated horticultural practices, and the development of horticulture in general, may be effective. Edible oils, if added to the diet, will enhance the absorption of carotenes.

19. There is no doubt that a flexible strategy, combining short-, medium- and long-term interventions with nutrition education, will achieve the most effective results. Primary health care and other community workers are well suited to influencing the vitamin A status of populations by striving to reduce the prevalence and severity of diseases and infection that contribute to a deficiency of this vitamin. They can also educate families and individuals in regard to sound nutritional practices, while simultaneously dispensing prophylactic high doses of vitamin A to groups at risk.

20. The right mix of required elements for vitamin A deficiency prevention and control programmes can be determined following a critical analysis of the prevailing circumstances in a given area. Such variables as the magnitude, geographical distribution, and seasonal variations of the problem; food production and distribution systems; household expenditure patterns and family dietary practices; existing health and related social infrastructure; and human and financial resources are among the most important factors to be considered in assessing approaches to problem resolution.

IV. IDENTIFYING SUITABLE STRUCTURES FOR PREVENTION AND CONTROL

21. Successful programmes for the prevention and control of vitamin A deficiency rely on direct, regular and widespread coverage. Because primary health care readily provides the necessary framework for this coverage to take place, it is particularly well suited to reducing the prevalence of vitamin A deficiency and xerophthalmia to a point where they are no longer significant public health problems. As the principal vehicle for the delivery of health care at the most peripheral level of the health system, appropriately trained community health and other workers, whose interrelated actions contribute to health, can be indispensable to the creation of efficient and effective prevention and control programmes.

22. In the case of large-dose distribution, for example, health and other community workers require training in such areas as programme strategy; prevention, detection and treatment of xerophthalmia; job tasks, including dosing techniques, record keeping and reporting; and nutrition education. Continuing education and retraining, especially at district and local levels, can be expected to have a measurable impact on these workers' performance; yet with proper supervision, minimally trained village health, family welfare, and family nutrition improvement workers (in India, Bangladesh, and Indonesia respectively) have more than demonstrated their suitability as the basis on which to build successful national programmes.

23. However, the prevention, detection and treatment of xerophthalmia need not - indeed, should not - await the extension of primary health care to all members of the population. Health workers and other personnel, whatever the stage of health system development, should be able to diagnose and treat xerophthalmia when they come into contact with it, while at the same time taking necessary preventive action among high-risk groups, for example children suffering from a high prevalence of protein-energy malnutrition, measles and gastroenteritis.

24. Depending on local circumstances, it may be possible to use a "case control" approach for identifying and treating high-risk groups; that is, community outreach by, for example, mobile teams could be organized on the basis of individual cases encountered. This may, in fact, be initially the only feasible approach to isolated, dispersed or migratory populations, or something of a "first aid" measure during famines and other emergencies.

25. In most cases, integration of large-scale vitamin A deficiency prevention and control activities into existing structures presents a number of advantages, even imperatives, where successful programme formulation and implementation are concerned. Such an approach can be expected to help keep prevention and control costs to a minimum, ensure appropriate institutional support and continuity, and strengthen overall national capacities for health service delivery. Thus where health systems based on the primary health care approach are more advanced and able to cover substantial portions of high-risk groups, effective distribution of large doses of vitamin A by health, nutrition, primary school, or other community workers becomes possible. Variously, broad coverage single-purpose programmes, such as immunization and malaria control, may also be used for this purpose.

V. THE TEN-YEAR PROGRAMME OF SUPPORT TO COUNTRIES

26. In accordance with the objectives and targets established by the World Health Assembly for the Organization's Seventh General Programme of Work covering the period 1984-1989,[1] the objective of the ten-year programme of support to countries is to reduce the worldwide prevalence and severity of vitamin A deficiency, xerophthalmia and nutritional blindness to a point where they are no longer significant public health problems. Although the achievement of this objective may in fact take longer than ten years, the actual time frame does not affect the initial programme planning stage.

27. In order to achieve this objective, the programme will include support to countries in undertaking five main types of action:

(1) assessment of the prevalence and severity of vitamin A deficiency and identification of high-risk groups;

(2) prevention of vitamin A deficiency in those areas and among those groups where prevalence rates are known, or can be expected, to be high;

(3) treatment of those persons suffering from vitamin A deficiency, xerophthalmia and nutritional blindness, as part of routine primary health care interventions;

(4) training of health personnel and community workers in prevention, detection and control techniques in relation to vitamin A deficiency, xerophthalmia and nutritional blindness;

(5) investigation of problems (technical, logistical, human resources, and other) in relation to the formulation, implementation, monitoring and evaluation of prevention and control programmes.

28. The success of the programme will also depend on the extent of action taken by other sectors. Thus, while the programme emphasizes action within the health sector, it will actively promote close collaboration with related sectors, for example agriculture and education, in pursuit of a common objective.

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[1] Geneva, World Health Organization, 1982 ("Health for All" Series No. 8).

29. WHO will provide support to countries on the basis of the classification described in Fig. 1 and Tables 1 and 2 above:

In category A countries, particular emphasis will be placed on strengthening the management of existing prevention and control programmes and extending them to cover all groups at risk, both by reinforcing already successful interventions and introducing additional ones, and on developing measures and estimates of programme effectiveness.

In category B countries, particular emphasis will be placed on design of prevention and control programmes, management, training, choice of delivery system(s), logistics support, and selection of type or mix of interventions.

In category C countries, particular emphasis will be placed on problem assessment, training of public health and other personnel in diagnostic procedures, and programme formulation.

In category D countries, particular emphasis will be placed on monitoring the national prevalence picture.

Support at the global level

30. WHO headquarters will be responsible for:

(1) preparing background documentation, including the present proposal, and launching the programme of support to countries;

(2) meeting with prospective sponsor governments and their bilateral development agencies, and international nongovernmental and voluntary organizations within the health and related sectors, in order to ensure necessary financial and other support for the programme;

(3) coordinating financial, technical and material inputs with organizations of the United Nations system and other intergovernmental bodies, bilateral development agencies, and appropriate nongovernmental and voluntary organizations in support of national programmes for the prevention and control of vitamin A deficiency and xerophthalmia;

(4) generating suitable materials on technical and managerial matters, for adaptation and use at the national level, for training health and development workers in the prevention and control of vitamin A deficiency and xerophthalmia and for formulating and implementing national programmes for this purpose;

(5) collecting information on relevant topics such as scientific developments, the geographical distribution and magnitude of the problem, and means and approaches for preventing and controlling it, and disseminating this information to interested parties (governments, other organizations and bodies, researchers, the general public, etc.);

(6) developing and coordinating research;

(7) establishing and maintaining an up-to-date reporting system in order to facilitate global monitoring and evaluation of the support programme, and to satisfy the information needs of donors, the governing bodies of WHO, and the general public;

(8) identifying those areas where additional research and development may be required to fill gaps in current knowledge and ensuring that this research is undertaken, and its results applied, in a timely and productive fashion;

(9) ensuring interregional cooperation.

Support at the regional level

31. The WHO regional offices will be responsible for:

(1) determining the interest of governments in participating in the support programme, and organizing, on request, technical cooperation between WHO and its Member States, including:

(a) for category A countries: evaluating the effectiveness of existing prevention and control programmes; and extending programmes to cover all groups at risk, both by reinforcing already successful interventions and introducing additional ones, as appropriate;

(b) for category B countries: verifying precisely the geographical distribution and magnitude of the problem; formulating national prevention and control programmes; selecting the type or mix of interventions to be used; and organizing managerial and technical training on behalf of national health staffs and others who are responsible for programme implementation;

(c) for category C countries: evaluating the geographical distribution and magnitude of the problem, training public health and other personnel in diagnostic procedures, and formulating prevention and control programmes;

(d) for category D countries: collecting additional information and monitoring the prevalence situation closely.

(2) recruiting and briefing, when required, experts to undertake country visits for purposes of (a) problem identification, (b) prevention and control programme formulation, and (c) programme evaluation;

(3) organizing intercountry educational and training activities concerning technical and managerial aspects of national programmes;

(4) encouraging and facilitating technical cooperation among countries including the sharing of training facilities and of information on national experiences, and the joint generation of appropriate technology and approaches to applying it;

(5) supporting research and development efforts in connection with national prevention and control programmes.

Support at the national level

32. WHO country staff will be responsible for:

(1) ensuring direct technical cooperation on request to support the formulation, implementation, monitoring and evaluation of national prevention and control programmes;

(2) disseminating relevant information to ministries of health and other appropriate ministries and bodies;

(3) collaborating with other United Nations agencies, and with relevant nongovernmental and voluntary organizations, working in countries in support of national prevention and control programmes.

Programme development and financial implications

33. Support at country, regional and global levels will take various forms including organization of regional and country workshops, national problem assessment and programme formulation and development, provision of vitamin A supplements, support for transport and maintenance, design and provision of educational materials, and the provision of technical expertise.

34. An interregional advisory group, composed of representatives of participating countries, bilateral and multilateral sponsoring agencies, and appropriate intergovernmental organizations, will be established to assist in the implementation of the programme of support to countries.

35. The WHO Secretariat (global and regional levels) will be responsible for the development of plans of action, including their financial implications, and for the technical and administrative management of the programme.

36. Table 3 below presents the projected regional and global costs of the programme for the first five years. The projected costs of the global support component alone for the same period are summarized in Table 4, while Table 5 shows the apportionment of resources in percentage terms according to programme component.

TABLE 3. RECAPITULATION OF PROJECTED TOTAL COST OF SUPPORT PROGRAMME, 1985-1989
(in thousands of US$)

Regional/global level	1985	1986	1987	1988	1989	Total	%
Africa	395	630	850	1 025	1 135	4 035	20.8
Americas	150	485	615	340	560	2 150	11.1
South-East Asia	255	1 120	1 725	2 125	2 065	7 290	37.6
Europe		20				20	0.1
Eastern Mediterranean		40	160	370	235	805	4.1
Western Pacific	100	505	645	695	515	2 460	12.7
Global support	500	580	550	500	500	2 630	13.6
Sub-total	1 400	3 380	4 545	5 055	5 010	19 390	100.0
After adjustment for programme support costs (13%)	1 582	3 819	5 136	5 712	5 661	21 910	
After adjustment for inflation (estimated at 5% per year)	1 582	4 010	5 650	6 626	6 906	24 774	

TABLE 4. ESTIMATED COST OF GLOBAL SUPPORT COMPONENT, 1985-1989
(in thousands of US$)

	1985	1986	1987	1988	1989
Interregional advisory group (8 members, interpretation and documents)	35	35	35	35	35
Secretariat (global)[a]	150	230	230	230	230
Consultants	90	90	60	60	60
Assistance to research	150	150	150	100	100
Development of educational materials	25	25	25	25	25
Contingencies	50	50	50	50	50
Total	500	580	550	500	500

[a] Includes senior medical officer, secretary and duty travel for 1985-1989 and technical officer (programme management) for 1986-1989.

TABLE 5. APPORTIONMENT OF RESOURCES BY MAJOR PROGRAMME COMPONENT (%)

Problem assessment and planning, implementation and evaluation of prevention/control programmes	73
Training (regional and country levels)	9
Management (regional level) consultants, staff duty travel	6
Management (global level)	
staff/consultants	7
contingencies	1
Interregional advisory group	1
Research	3
	100%

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