directing council *regional committee*

PAN AMERICAN HEALTH ORGANIZATION

WORLD HEALTH ORGANIZATION

XXXVI Meeting XLIV Meeting

Washington, D.C.
September 1992

Provisional Agenda Item 5.5

CD36/15 (Eng.)
30 July 1992
ORIGINAL: ENGLISH

PLAN OF ACTION FOR THE ELIMINATION OF VITAMIN A DEFICIENCY FROM THE AMERICAS

This document presents a Regional Plan of Action for the Elimination of Vitamin A Deficiency in response to resolutions of the XXIII Pan American Sanitary Conference and the XXXV Meeting of the Directing Council regarding the eradication/elimination of certain diseases, including those disorders related to micronutrient deficiencies. The term micronutrient malnutrition is being used to indicate the deficiency of three essential nutrients: iron, iodine and vitamin A, which are needed in minute amounts to satisfy average physiological requirements of a healthy population.

This Plan of Action aims at identifying those population groups at risk, and at supporting the implementation of coordinated, integrated, affordable and sustainable measures to eliminate vitamin A deficiency as a public health problem. The Plan calls for the epidemiological assessment of the extension of vitamin A deficiency in the countries of Latin America and the Caribbean and outlines strategies and interventions at national and Regional level. The activities presented involve the coordination of international, bilateral and national institutions; mobilization of resources; dissemination of information to increase awareness of the vitamin A problem, its causes and possible solutions; manpower training; research promotion, and direct technical cooperation. The main interventions are related to health promotion, nutrition education and social communication activities; production of foods rich in vitamin A at community and family level; fortification of staple foods and weaning food mixtures with vitamin A and, as a short-term measure, distribution of single doses of vitamin A (50,000 to 200,000 IU) to children in areas of high prevalence of malnutrition and infectious diseases. The Plan of Action outlines immediate and intermediate targets in the context of an integrated micronutrient malnutrition control strategy towards the final goal of virtually eliminating vitamin A deficiency by the year 2000.

At the 109th Meeting of the Executive Committee, an earlier version of the document was reviewed. Members of the Committee highlighted the need for political will by the Governments to reach the goal of eliminating vitamin A deficiency by the year 2000. It was also indicated that the document should prioritize the short term national targets to be achieved between 1992 and 1994. Furthermore, the Committee stressed the importance of assessing the actual nutritional situation in terms of vitamin A, and emphasized the promotion of breastfeeding and supplementation with foods rich in vitamin A.

As a result of the discussions at the Executive Committee, changes have been made and are reflected in the present document. Finally, the Executive Committee approved a resolution which is reproduced below for consideration by the Directing Council:

RESOLUTION III

PLAN OF ACTION FOR THE ELIMINATION OF VITAMIN A DEFICIENCY FROM THE AMERICAS

THE 109th MEETING OF THE EXECUTIVE COMMITTEE,

Having seen the Plan of Action for the Elimination of Vitamin A Deficiency from the Americas (Document CE109/10),

RESOLVES:

To recommend that the Directing Council adopt a resolution along the following lines:

THE XXXVI MEETING OF THE DIRECTING COUNCIL,

Having seen Document CD36/15, "Plan of Action for the Elimination of Vitamin A Deficiency from the Americas";

Considering the impact that micronutrient deficiency, and specifically vitamin A deficiency, have on health, well-being, and human development;

Observing that vitamin A deficiency, in its moderate form, appears to be more widespread in the Region than had been previously estimated; and

Taking into account the scientific and technological advances that make possible the virtual elimination or control of these micronutrient deficiencies, including vitamin A deficiency, as public health problems;

RESOLVES:

1. To approve the objectives and activities proposed in the "Plan of Action for the Elimination of Vitamin A Deficiency from the Americas" (Document CD36/15).

2. To urge the Member Governments:

a) To formulate national plans of action that include policies and programs for the elimination of vitamin A deficiency as a public health problem by the year 2000;

b) To strengthen the technical and administrative capability of national and local institutions as required by the activities for implementing the plans of action;

c) To improve intersectoral cooperation in order to achieve a comprehensive approach in the prevention of vitamin A deficiency;

d) To establish a focal point as a coordinating mechanism in order to promote and integrate the common activities required for the control of iodine, iron, and vitamin A deficiencies.

3. To request the Director:

a) To provide the technical cooperation necessary for strengthening the capabilities of the countries for the surveillance, control, and elimination of vitamin A deficiency;

b) To promote the mobilization of national and external resources in order to provide greater support for the development of programs for the prevention and control of micronutrient deficiencies;

c) To promote and support cooperation between countries and bilateral and international agencies in order to implement national plans of action for the elimination of vitamin A deficiency from the Americas.

(Adopted at the sixth plenary session,
24 June 1992)

Annex

PLAN OF ACTION FOR THE ELIMINATION OF VITAMIN A DEFICIENCY FROM THE AMERICAS

CONTENTS

CONTENTS (cont.)

PLAN OF ACTION FOR THE ELIMINATION OF VITAMIN A DEFICIENCY FROM THE AMERICAS

I. INTRODUCTION

Hunger, undernutrition and some micronutrient deficiencies--vitamin A, iodine and iron--are of great social and economic significance in Latin America and the Caribbean, seriously affecting the health and well-being of the population, particularly those in the low income groups. Energy-protein malnutrition is associated with high morbidity and mortality in children below five years of age as a result of its interaction with diarrheal and acute respiratory infections, a common epidemiological trait of developing countries.

Persistence of the vicious cycle of malnutrition-infection-malnutrition also retards a child's physical growth and is often accompanied by impaired development and low psychosocial performance. Moreover, nutritional status has a definite effect on an individual's capacity to do productive physical work. Needless to say, the fulfillment of optimal development of each individual's genetic potential is mandatory to contribute effectively to his own well-being and to that of the society to which he belongs (1).

In this context, micronutrient deficiencies should be seen as an important, although not isolated, part of the broader and more serious problem of hunger and energy-protein malnutrition affecting a substantial number of mothers and children in rural areas and deprived communities of fast-growing urban centers.

National nutrition surveys carried out in Central America in 1966 by PAHO/INCAP indicated that vitamin A deficiency was a severe and widespread problem as determined by food intake and retinol serum levels. Over 67% of the families had an intake of vitamin A of less than one-half of the recommended dietary allowances, and the prevalence of deficient levels of serum retinol (below 20 μg/dl) in children ranged from 14.9% in Nicaragua to 36.5% in El Salvador (2).

From the public health point of view, vitamin A deficiency in Latin America and the Caribbean (LAC) does not appear to be a problem of great magnitude and, whenever present, it can be related to inadequate intake, recurring infections and/or malabsorption diseases. However, since vitamin A deficiency has been reported in various national studies, it is appropriate to reassess the current situation of this specific nutrition deficiency in the Region (3).

In recent years, new knowledge on the epidemiology of micronutrient malnutrition has opened new options for planning, implementing and evaluating activities for the prevention and control of such deficiencies.

Vitamins and minerals which are essential for human growth and functioning are referred to as micronutrients, i.e. nutrients needed in very small amounts. Given the significance of vitamin A, iron, and iodine deficiencies, the term micronutrient is being applied to these particular nutrients. Other nutrients such as calcium, zinc, vitamin C, and the B vitamins may prove to be critical as well in some regions and population groups.

A. Commitments for the Elimination of Vitamin A Deficiency

The World Health Organization has given particular attention to the prevention and control of vitamin A deficiency, recognizing the important role of this vitamin in human nutrition and the serious consequences of its deficiency in many parts of the world.

This concern was restated by the Thirty-seventh World Health Assembly, which called upon the Organization and Member States to assess the most appropriate approaches to preventing and controlling vitamin A deficiency and xerophthalmia, monitoring its incidence and prevalence and coordinating the launching and management of international action to combat vitamin A deficiency (4). WHO proposed in 1985 a 10 year program of support to countries for the prevention and control of vitamin A deficiency (5).

Most recently the XXIII Pan American Sanitary Conference in 1990 requested the Director to determine the feasibility of eradication/elimination of several diseases, including vitamin A deficiency.

In September 1991, the XXXV Meeting of the Directing Council urged the Member Governments to foster collaboration and coordination between the public and private sectors for the prevention, control and surveillance of, inter alia, iodine deficiency disorders and vitamin A deficiency, and to involve the local health systems in the prevention and control of those disorders (6).

At the World Summit for Children held in New York in 1990, seventy heads of State including those of several Latin American and Caribbean countries, approved the "World Declaration on the Survival, Protection and Development of Children" committing their governments, inter alia, to the virtual elimination of vitamin A deficiency and iodine deficiency disorders, and a one-third reduction in the number of women suffering iron deficiency anemia by the year 2000 (7).

Following the summit, the World Health Organization and UNICEF convened in 1991 a Policy Conference on Micronutrient Malnutrition: "Ending Hidden Hunger" in Montreal, Quebec, with the support of the World Bank, FAO, UNDP and other bilateral and international agencies. Over 300 policy leaders and scientists from about 55

countries, representing fields such as nutrition, health, agriculture, education, information, planning and industry, agreed to implement an integrated strategy for the control of the three most prevalent micronutrient deficiencies: vitamin A, iodine and iron (8).

Most recently the Forty-fifth World Health Assembly approved resolution WHA45.33 urging Member States to implement national strategies for overcoming micronutrient malnutrition, including vitamin A deficiency (9).

B. Significance of Vitamin A Deficiency

Retinol, the active form of vitamin A, is an essential nutrient which is obtained from animal foods such as milk, eggs and liver. Carotenoid precursors of vitamin A from dark green leafy vegetables, yellow meaty vegetables and non-citrus fruits are bio-available when they are consumed in a diet containing also appropriate amounts of fat.

In addition to its well known role in human vision, scientific evidence has demonstrated that retinol is indispensable for a proper immunological response, reproduction, growth and epithelial integrity. The International Vitamin A Consultative Group (IVACG) has described five levels of vitamin A nutritional status: satisfactory, marginal (mild and subclinical), excessive and toxic (10).

Signs of toxicity usually appear only with sustained daily intakes, for weeks or months, including both foods and pharmaceutical supplements, exceeding 15,000 μg of retinol (50,000 IU) in adults and 6,000μg of retinol (20,000 IU) in infants and young children. These doses are more than 10 times higher than the daily requirements (Table 1, Annex I) and usually can not be obtained from foods, except by the sustained ingestion of large amounts of liver or fish liver oils, which are particularly rich in vitamin A (11).

On the other hand, a marginal nutritional status could arise either because the diet is low in vitamin A or because it is poorly absorbed, or because there is a depletion of the body reserves caused by infectious diseases (12). This status is recognized by alterations in the epithelial tissue, night blindness and low serum retinol levels.

Extremely unfavorable dietary and morbid conditions, such as measles, prompt the emergence of specific clinical signs of vitamin A deficiency: conjunctival xerosis, Bitot's spot, corneal xerosis, corneal ulceration, keratomalacia, xerophthalmic fundus, blindness and eventual death (13). Children aged six months to five years are at greatest risk of suffering vitamin A deficiency and its consequences if, during and after weaning, no vitamin A-rich foods are given. Breastmilk is generally an excellent source of vitamin A and thus mothers should breastfeed their children as long as possible.

In 1986, Sommer et al, reported that prophylactic treatment with high doses of retinol for children with marginal deficiency of vitamin A, can provide protection against ocular problems, and reduce the mortality rate (14). Many other studies which support this conclusion have been carried out since then.

C. Assessment of Vitamin A Status

The nutritional status of vitamin A in human beings can be estimated using various techniques, from analysis of dietary intake to measurement of body reserves. A brief description of the current methodologies is presented below.

1. Dietary Intake

The amount of vitamin A intake can be estimated by direct observation or by assessing food frequency in the diet. The results are highly variable because dietary intake does not consider nutrient interactions, bio-availability, interference of intestinal parasites, infectious states, and changes in the vitamin A content of foods due to preservation and processing. However, it is a useful tool to monitor the efficacy of nutrition education and interventions aimed at stimulating consumption of vitamin A rich foods, as well as identifying communities at risk of suffering vitamin A deficiency due to inadequate diet.

2. Physiological Tests

Depletion of vitamin A reserves to a marginal level causes night blindness and longer restoration time of vision after strong light stimulation. Both conditions could be used to monitor vitamin A status. Although its application to preschool children is difficult, history of night blindness can be detected through interviews.

3. Histological Assays

The role of vitamin A on epithelial integrity is the basis for a mild non-invasive and indirect test to evaluate vitamin A deficiency. It consists of the examination of a sample of epithelium from the conjunctiva for changes in cellular composition and morphology: Conjunctival Impression Cytology (CIC) and Impression Cytology with Transfer (15,16).

4. Biochemical Methods

Biochemical methods are objective and require laboratory facilities. The simplest and most reliable is the determination of serum retinol level which is normally between 20 and 50 μg/dl (17). When liver vitamin A reserves are insufficient, the level of retinol in serum falls below that range. It has been accepted

that concentrations between 10-20 μg/dl should be considered indicative of mild vitamin A deficiency, and below 10 μg/dl of severe deficiency (13). However, studies carried out by Flores et al, suggest that the maximum limit for the marginal state should be increased up to 30 μg/dl, because children with serum retinol below that level respond to supplementation with vitamin A, an indication that their reserves are insufficient (18).

Another biochemical assay, the Relative Dose Response (RDR) method is based on the hypothesis that the Retinol Binding Protein (RBP), responsible for carrying retinol from the liver to the rest of the organism, accumulates when there is a reduction of vitamin A in the liver (19). When vitamin A is supplied, the RBP binds retinol and releases it into circulation. Five hours after a supplemental dose of retinol, levels in the serum rise 20% over the original value if there was a marginal status of vitamin A (20).

5. Clinical Signs

Conjunctival changes known as xerophthalmia are sure signs of deficient status of vitamin A but are not present in marginal conditions (13). Therefore, clinical signs are not adequate for monitoring vitamin A deficiency in most Latin American settings, where the vitamin A deficiency is expected to be sub-clinical.

In summary, for epidemiological purposes in Latin America the most reliable and practical method is the estimation of plasma or serum retinol. It is convenient to maintain the recommended cut-offs at 10 and 20 μg/dl, but it would be appropriate to add a third cut-off point at 30 μg/dl to detect population groups at risk of inadequate vitamin A status.

D. Prevention and Control of Vitamin A Deficiency

Four specific interventions for the elimination of vitamin A deficiency are: Dietary Improvement and Diversification; Food Fortification; Supplementation; and Community Education and Social Marketing. The selection of one or more of the first three interventions depends on the magnitude of the problem, while the fourth should always be included in support of the others.

1. Dietary Improvement and Diversification

Dietary improvement and diversification includes interventions aimed at improving the diet of at risk populations through better production, availability and consumption of vitamin A rich foods, utilizing strategies such as promotion of community and home gardens, domestic technology for food preservation and

processing, recipes for infants and small child feeding, and mass media communication and social marketing.

The main value of this intervention is that vitamin A is supplied through its natural sources. Changes in community attitudes can produce a permanent, self sustained increase in the of dietary intake of vitamin A, thus providing a long term solution for preventing and controlling this deficiency.

2. Food Fortification

The fortification of foods with vitamin A has the advantage of using already established channels of distribution and does not require changes in people's attitudes and dietary habits (21).

Fortification can be aimed at the whole population or targeted to special groups. An example of the latter is the fortification of weaning foods and snacks for pre-school and school-age children. Fortification with vitamin A generally does not change the appearance and taste of the food vehicle, as has been the experience in Central America with retinol fortification of sugar.

The conditions for successful results of this intervention are the presence of an appropriate staple food consumed by the "at-risk" group, a minimum level of industrial development, regulatory and quality control mechanisms, and the economical resources to purchase the nutrient, plus the political will to carry out the necessary changes. To fulfill all these requirements may require several years of work, which is why food fortification is considered a medium-term solution.

3. Supplementation

In severe conditions, the only intervention to insure an immediate delivery of vitamin A is supplying high doses in capsules or oily solution (22). The WHO, UNICEF and IVACG Task Force recommends this procedure in the case of xerophthalmia, measles, and severe undernutrition (23). It also could be useful during the case management of acute respiratory infections and prolonged diarrhea. This approach is being used as a temporary solution for populations at risk. The delivery system is the most serious limitation, because high doses of vitamin A should be administered to the target population every 4-6 months. WHO and UNICEF (24) have proposed adding vitamin A supplementation to the Expanded Program of Immunization (EPI), specifically at the time of measles vaccination.

The recommended dose is 50,000 IU of retinol for children 6 months to 1 year, and 200,000 IU for children older than 1 year at three to six months intervals. Supplementation for older children is logistically more difficult.

The effect of Vitamin A supplementation is short lived, resulting in this intervention being classified as a short-term measure.

4. Community Education and Social Marketing

Community education and social marketing strategies must be incorporated in all the three previous interventions. The involvement of the community in assessing its own vitamin A situation, formulating and implementing appropriate plans and programs and evaluating the results is fundamental to achieve the control and elimination of vitamin A deficiency.

There must be a combination of mass media communication; group education and interaction, and individual counselling in order to make the community and the individuals aware of the importance of vitamin A and the necessary changes in dietary habits.

Regarding the administration of high doses of the vitamin, the community has to be aware of its usefulness and limitations (as a short-term measure) as well as the potential risk of over-dosification.

Although emphasis has been placed in the community, the political leaders and technical authorities at all levels of the society may well need to be informed, about the importance of vitamin A.

E. Interagency Cooperation in Latin America and the Caribbean

Since 1965, USAID increased substantially its cooperation in the area of vitamin A nutrition. A milestone on international vitamin A nutrition development was the establishment of the International Vitamin A Consultative Group (IVACG) in 1975 to guide international activities to reduce vitamin A deficiency in the developing world.

IVACG receives support from the Nutrition Foundation of the International Life Science Institute (ILSI), and is recognized by the UN agencies as a scientific and technical advisory body in subjects related to vitamin A (25). It prepares, publishes and distributes technical reference documents, guidelines and manuals; formulates and proposes norms and standards; promotes communication among those working against vitamin A deficiency, co-publishes the Xerophthalmia Club Bulletin, and organizes a biennial worldwide meeting on vitamin A.

USAID established in 1988 the Vitamin A Technical Assistance Program (VITAP) to provide technical assistance to Private Voluntary Organizations (PVOs) and Non-governmental Organizations (NGOs). In 1989, the Vitamin A Field Support Project

(VITAL) was set up to assist host country institutions to carry out prevalence assessments, and to develop, implement and monitor collaborative control program activities.

VITAL has supported the assessment of the vitamin A situation in Bolivia, Dominican Republic, Ecuador, Honduras and Panama, and is promoting community-based supplementation programs in Bolivia, Dominican Republic, El Salvador, Guatemala, Haiti and Peru.

At a regional level, VITAL organized technical workshops in Guatemala (1990) and Puerto Rico (1991) in collaboration with PAHO/INCAP, UNICEF, IVACG and The Latin American Nutrition Society (Sociedad Latinoamericana de Nutrición: SLAN)(26,27).

The Task Force of Xerophthalmia Prevention/ Nutritional Blindness "Sight and Life", that Hoffmann-La Roche established in 1986, has provided free vitamin A capsules and oily solutions to international and local health organizations and PVOs, and has funded research projects.

The Program Against Micronutrient Malnutrition (PAMM), was established in 1991 to provide training and technical support to country programs on vitamin A, iodine and iron deficiencies, as a collaborative endeavor of the Emory University School of Public Health, the United States' Centers for Disease Control (CDC), and the Task Force on Child Survival and Development at the Carter Center (Atlanta).

Among the international NGOs and PVOs working on vitamin A in Latin America are: the International Eye Foundation (IEF) and Project Hope in Guatemala and Honduras; Save the Children Foundation in Bolivia, Haiti and Honduras; Planning Assistance in Bolivia, and World Vision, Eye Care and Hellen Keller International in Haiti.

PAHO has worked in close collaboration with UNICEF in the distribution and administration of high doses of vitamin A to selected at-risk groups in El Salvador, Guatemala, Haiti, Honduras and Panama. PAHO has also cooperated with FAO in the formulation of policies to increase production of foods rich in vitamin A in Brazil and Haiti. FAO is now considering including Bolivia, Ecuador and Peru within its programs of nutritional education and agriculture promotion (28).

The Institute of Nutrition of Central America and Panama (INCAP), one of PAHO's specialized centers in nutrition, has recently participated in vitamin A nutrition assessments in El Salvador, Guatemala and Honduras, and in the promotion of sugar fortification with retinol in Guatemala, Honduras and El Salvador (29).

F. Current situation in Latin America and the Caribbean

The First Workshop on Strategies to Improve the Nutritional Status of Vitamin A in Latin America and the Caribbean (1990) revealed the lack of recent epidemiological data (less than 10 years old) with very few exceptions (26). Some countries have carried out dietary assessments but without the support of biochemical or clinical studies.

1. Epidemiological Surveys

The lack of updated information on vitamin A deficiency could be attributed to the fact that generally, in this Region, clinical manifestations, such as eye damage, are rare. Northeast Brazil and Haiti are the exceptions. In the former, it is a public health problem in localities that include rural dry areas and areas with high level of population density and poverty. In the latter country, it is estimated that in certain areas as much as 2 to 3% of the preschool population present corneal lesions attributable to vitamin A deficiency (30).

Bolivia, Dominican Republic and Panama have also reported cases of xerophthalmia in certain population groups during the last ten years.

Table 2 (Annex I) presents the most recent biochemical data. There is evidence that vitamin A deficiency is a public health problem (more than 5% cases below 10 μg/dl serum retinol, or more than 15% cases below 20 μg/dl) in Northeast and South Brazil, Southwest Dominican Republic, Ecuador, El Salvador, Guatemala, and Mexico (Hermosillo). Haiti, even though biochemical evidence is lacking, must be added to the list because of the prevalence of clinical signs. Only the data from Ecuador, El Salvador and Haiti could be considered as representative of the country as a whole.

The biochemical data presented is valid only for diagnosing a deficient status of vitamin A; it cannot be used to recognize a marginal situation. For this purpose the RDR technique has been used in Belize, revealing that about 60% of children - specifically in the Garifuna and Kekchi populations-had insufficient body stores of vitamin A (31).

If 30 μg/dl serum retinol is taken as a cut-off point for estimating low vitamin A reserves, as suggested from the studies of Flores et al (18), a far higher percentage of the population could be found to be affected, as in the cases of Southwest Dominican Republic (45%), El Salvador (58%), and Guatemala (46.1%) (32,33,34).

2. Vitamin A Interventions

International concern has prompted several countries to implement various control measures, with or without the necessary supporting epidemiological data. Examples of community-based interventions include the following: in Bolivia improved gardening practices; in Dominican Republic education and fruit drying techniques; in Ecuador integrated health-projects; in El Salvador nutrition education and home gardening; in two western provinces of Guatemala promotion of production and consumption of carotenoid-rich vegetables; in Haiti garden and fruit drying promotion; and in Peru nutrition education.

Food fortification has been tried in Brazil using oil and most recently, reconstituted rice (35). A vegetable mixture rich in vitamin A called Nutriatol has been used during diarrheal episodes in rural indigenous areas of Guatemala. And, INCAP has been promoting and giving technical assistance in sugar fortification with retinol to El Salvador, Guatemala and Honduras.

Supplementation with vitamin A is being carried out in Brazil through community participation; in El Salvador through immunization programs; in Haiti through the health and child survival program (oral rehydration, immunization, growth monitoring, and breastfeeding); in Honduras through maternal and child health care programs. Guatemala carried out a national distribution campaign in 1988 and various NGO's are distributing high doses of vitamin A within their programs (29).

Regarding research activities, Brazil has been studying indigenous fruits and vegetables that may be potentially valuable as sources of vitamin A (37). In Guatemala, anthropological studies on intra-house distribution of vitamin A rich foods and the carotenoid composition of indigenous plants have been conducted. INCAP has recently started a project in El Salvador, Guatemala and Honduras, aimed at the development of adequate community-based interventions supporting governmental and NGO programs in nutrition and health. This project also includes technical assistance for quality control of sugar fortification and carotenoid composition of fruits, vegetables and plants of Central America.

II. JUSTIFICATION FOR THE PLAN OF ACTION ON VITAMIN A

There is a worldwide concern and commitment to eliminate vitamin A and iodine deficiencies and to significantly reduce the prevalence of iron deficiency by the year 2000. Global resolutions have been proclaimed and endorsed by governments and some have started programs to meet this goal with international support.

Many of the countries in Latin America and the Caribbean are receiving technical assistance, training and financial support for the implementation of national or regional projects, specially in the area of prevention and control of vitamin A deficiency because of its potentially high impact on the reduction of childhood mortality and morbidity. However, many of these actions lack coordination and sufficient information to evaluate the effects of the interventions. Nor are they supported by national and regional plans which could result in their becoming self sufficient programs.

Scientific and technological knowledge about the role of vitamin A in human health and the means to prevent and control its deficiency is overwhelming. However, its diffusion to policy makers, educators, health personnel, researchers and communities in the Region has been slow. Such diffusion has to be expanded as the political will of the countries is indispensable to achieve this proposed goal.

The socioeconomic conditions in Latin America and the Caribbean have declined dramatically during the last decade. Those conditions have not only increased the absolute number of the poor, but also have changed the dietary patterns making them susceptible to malnutrition including vitamin A deficiency. Thus the epidemiological assessment of vitamin A nutrition is a precondition in order to carry out appropriate actions.

The Governing Bodies of PAHO have called upon the Organization to prepare the appropriate plans of action for the elimination of vitamin A deficiency in the Region by the end of the century. PAHO/WHO has the responsibility to promote coordination of activities and to support national programs to achieve this goal.

III. GOAL

The goal of the Regional Plan of Action is the elimination of vitamin A deficiency as a public health problem in the Region of the Americas by the year 2000.

IV. STRATEGIES

To achieve this goal, the following strategies will be adopted:

1. Advocating the importance of vitamin A nutrition in support of preventive activities for the elimination of vitamin A deficiency.

2. Assessing the extent of vitamin A deficiency in selected countries of the Region.

3. Providing technical cooperation for the formulation of national plans of action and the implementation of specific interventions (food fortification, production of vitamin rich foods, targeted supplementation and public education).

4. Establishing systems to monitor micronutrient status (vitamin A, iodine and iron) within national food and nutrition surveillance systems.

5. Promoting operations research in support of the above strategies.

V. TARGETS

According to available information on the magnitude of the problem, the countries of Latin America and the Caribbean have been grouped into the following three categories:.

1. Countries with a significant problem, either country wide or in extensive areas (I).

   Brazil
   Dominican Republic
   El Salvador
   Guatemala
   Haiti
   Honduras[1]
   Nicaragua[1]

2. Countries with problem limited to specific local areas (II).

   Belize
   Bolivia[1]
   Ecuador
   Mexico
   Panama[1]
   Peru[1]

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[1]Pending results of recent surveys.

3. Countries only needing surveillance of at-risk and low-income groups (III).

Argentina
Chile
Costa Rica
Cuba
Guyana
Jamaica
Paraguay
Suriname
Uruguay
Venezuela

A. Immediate Targets (1992-1994)

Following are the targets for the period 1992 to 1994, provided according to relative priority and year:

At National Level:

1. Up-date epidemiological information on vitamin A status in all countries. (1992)

2. Formulate, whenever appropriate, national plans of action for the elimination of vitamin A as a public health problem. (1992, 1993)

3. Organize in all countries a national committee for micronutrient deficiencies (vitamin A, iodine and iron), and in countries of groups I and II, a subcommittee on vitamin A deficiency. (1993)

4. Undertake vitamin A supplementation in the treatment of xerophtalmia, measles, undernutrition, dehydration and respiratory infections. (1992, 1993, 1994)

5. Distribute vitamin A supplements during immunization campaigns in countries in categories I and II. (1992; 1993, 1994)

6. Evaluate vitamin A control activities in countries of categories I and II. (1993)

7. Establish surveillance mechanisms, within the health information and nutrition surveillance systems, to monitor vitamin A status. (1993)

8. Carry out in-service training workshops at national level about diagnosis, management, prevention and control of vitamin A deficiency aimed to health personal. (1993, 1994)

9. Initiate programs for public education and dissemination of information. (1992, 1993)

10. Promote community based interventions to improve the production and consumption of vitamin A rich in countries in categories I and II. (1993)

11. Carry out food fortification with vitamin A for the general population and specific food fortification programs for school children in countries in categories I and II. (1994)

12. Establish a system for mandatory notification of individual cases of xerophthalmia. (1994)

At Regional Level:

1. Organize a Regional Technical Advisory Group on Micronutrient Malnutrition with a Subcommittee on vitamin A. (1993)

2. Establish a Regional surveillance system for vitamin A and other micronutrients status. (1993)

3. Produce and distribute regular information on vitamin A status and the control of its deficiency. (1993)

4. Strengthen one institution in the Region to serve as a training and reference center on vitamin A. (1993)

5. Produce training and educational material on vitamin A deficiency and its control. (1993, 1994)

6. Strengthen coordination among international and bilateral agencies and funding institutions involved in vitamin A deficiency control. (1993, 1994)

B. Intermediate Targets (1995-1999)

At National Level:

1. Evaluate activities carried out during the first three years and adjust the national plans whenever necessary.

2. Maintain micronutrient surveillance and information system, supported by the Regional Operative Network of Food and Nutrition Institutions (Red Operativa Regional de Instituciones en Alimentación y Nutrición: RORIAN).

3. Strengthen and expand the food fortification programs in countries of categories I and II.

4. Strengthen and expand community based interventions to improve the production and consumption of vitamin A rich foods.

5. Strengthen public education and dissemination of information in Vitamin A deficiency and control programs.

6. Carry out in-service workshops and seminars at regional (subnational) levels.

At Regional Level:

1. Assure the continued monitoring of vitamin A status through targeted epidemiological surveys, adjusting Regional strategies and cooperation activities as necessary.

2. Achieve uniform criteria for the evaluation of vitamin A deficiency control programs.

3. Coordinate scientific exchange programs among RORIAN and research institutions working in vitamin A programs.

4. Organize subregional meetings with members of National Committees and international agencies to assess impact of ongoing programs.

5. Up-date food composition tables including carotenoid content of foods consumed in the Region.

6. Support operations research on interventions for the control of vitamin A and other micronutrient deficiencies.

7. Continue the publication of training and educational materials on vitamin A deficiency control.

8. Document successful experiences of community-based programs and other interventions for the prevention and control of vitamin A deficiency.

C. Long-Term Targets (By the year 2000)

1. Achieve the elimination of vitamin A deficiency as a public health problem in the Region.

2. Conduct a thorough evaluation of the Regional Plan of Action for the elimination of vitamin A deficiency.

VI. TECHNICAL COOPERATION ACTIVITIES

In order to achieve the targets stated in the preceding section, the Pan American Health Organization will carry out the following technical cooperation activities:

A. Interagency Coordination and Resource Mobilization

1. Organization of meetings with international and bilateral agencies, national institutions, donors and non governmental organizations to advocate vitamin A nutrition, disseminate information, coordinate activities and ensure necessary financial and other support.

2. Strengthening national capacity for adequate planning, implementation, monitoring and evaluation of country programs. Countries need to make resources available for the formulation and implementation of plans.

3. Establishment of a Regional Technical Advisory group on Micronutrient Deficiency, with a Subcommittee on Vitamin A, and coordination of meetings of the Subcommittee on vitamin A, every 2 years.

B. Increase Awareness and Dissemination of Information

1. Generation and dissemination of materials on technical and managerial matters related to vitamin A function, deficiency, control and surveillance for adaptation and use at national level by researchers and professionals in agriculture, education and health.

2. Adaptation of techniques in social communication and education in support of vitamin A deficiency interventions.

3. Dissemination of information about vitamin A to local, national and international food industry and academia and promotion of links with governments in search of feasible, locally supported solutions to its deficiency.

C. Manpower Training

1. Selection and strengthening of one institution in the Region to serve as training and reference center on micronutrient deficiency and its control. (INCAP is developing this capacity)

2. Organization of workshops and seminars at Regional and subregional levels on the prevention, surveillance and control of vitamin A deficiency. (Central America, Andean Region)

3. Preparation, validation and updating of technical manuals on methodologies for intervention, surveillance and monitoring of programs for the control of vitamin A deficiency.

D. Research Promotion

1. Coordination of anthropological and social studies aimed to attain the participation of the communities in the implementation of interventions, particularly long-term, to control vitamin A deficiency.

2. Promotion of research on indigenous foods rich in vitamin A to identify and develop appropriate techniques of production, processing, preservation and preparation.

3. Promotion of investigations aimed to assess the feasibility of hydroponic cultivation of vitamin A rich vegetables in urban dwellings.

E. Direct Technical Cooperation with the Countries

1. Collaboration in epidemiological surveys to update vitamin A deficiency status in children under five years in selected geographical areas in countries in categories I and II, and in poor rural and periurban communities in countries in category III.

2. Collaboration in the establishment of National Committees for micronutrient deficiency.

3. Provision of technical advice, training and support for institutional development, leading to the strengthening of vitamin A nutrition surveillance within the food and nutrition surveillance systems.

4. Promotion of, and collaboration in, technical workshops, in-service seminar and courses in vitamin A at national and subnational levels.

5. Encouragement of breastfeeding at least for the first four to six months of life and introduction of complementary foods rich in Vitamin A.

6. Collaboration in the formulation, implementation and evaluation of national plans to control vitamin A deficiency, particularly regarding:

   - Vitamin A supplementation in cases of xerophthalmia, undernutrition and measles.

- Vitamin A supplementation within local health systems (EPI, child-mother care, primary health care) aimed to mothers within 4 weeks of delivery, and to children six months to two years old.

- Food fortification with retinol and introduction of vitamin A fortified food mixes targeted to preschool and school children.

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ANNEX I

TABLES

Table 1

Estimated Requirements for Vitamin A (μg retinol equivalents per day)[1]

GROUP	AGE (Years)	BASAL REQUIREMENTS	SAFE LEVEL OF INTAKE
Both sexes	0-1	180	350
	1-6	200	400
	6-10	250	400
	10-12	300	500
	12-15	350	600
Boys	15-18	400	600
Girls	15-18	330	500
Men	18+	300	600
Women	18+	270	500
Pregnant Women		370	600
Lactating Women		450	850

NOTE: 1μ retinol equivalent = 3.333 IU Vitamin A

1/ FAO/WHO Report of a Joint Expert Consultation on Requirements of Vitamin A, Iron, Folate and Vitamin B_{12}. FAO, Food and Nutrition Series No. 23, 1988.

Table 2

Status of Vitamin A in Latin American and the Caribbean

COUNTRY	YEAR	REGION	AGE GROUP (Years)	VIT. A STATUS (%)	
				DEFICIENT	LOW
Belize [1]	90	Country	2-8	N.D.**	10.0
Bolivia [1]	91	La Paz	0-5	1.2	9.0
Brazil [1]	83	Northeast	0-6	3.3	17.5
	84	Northeast	1-7	N.D.**	13.2
	84	South	0-6	3.6	30.2
	86	South	2-8	1.8	48.8
Dominican Republic [2]	91	Southwest	0-5	4.2	19.6
		(Rural)	0-5	5.2	21.3)
		(Urban)	0-5	3.3	24.7)
Ecuador [1]	86	Country	0-5	0.2	14.1
		(Rural)	0-5	N.D.**	16.4)
		(Urban)	0-5	N.D.**	11.9)
El Salvador [3]	88	Country	1-5	N.D.**	36.0
		(Rural)	1-5	N.D.**	40.8
		(Urban)	1-5	N.D.**	32.7
Guatemala [4]	88	Country	1-5	3.2	21.6
Mexico [1]	90	Hermosillo	2-7	N.D.**	32.0

* According to serum retinol levels:
Deficient = below 10 μg/dl; Low = below 20 μg/dl.

** N.D. = Not Determined

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ANNEX II

Acronyms and Abreviations

ACC/SCN	Administrative Committee on Coordination/Subcommittee on Nutrition of the United Nations
CALMA	"Centro de Apoyo de la Lactancia Materna" (El Salvador)
CDC	Centers for Disease Control (U.S.A.)
CENISMI	"Centro Nacional de Investigaciones en Salud Materno Infantil" (Dominican Republic)
CFNI	Caribbean Food and Nutrition Institute
CIDA	Canadian International Development Agency
CSF	Community Systems Foundation
EPI	Expanded Program of Immunization
FAO	Food and Agriculture Organization of the United Nations
ICEPO	International Center for Epidemiological and Preventive Ophthalmology
ILSI	International Life Sciences Institute
INCAP	Institute of Nutrition of Central America and Panama
ISTI	International Science and Technology Institute
IVACG	International Vitamin A Consultative Group
LAC	Latin America and the Caribbean
NGOs	Non-governmental Organizations
PAHO	Pan American Health Organization
PAMM	Program Against Micronutrient Malnutrition

PATH	Program for Appropriate Technology on Health
PROCOSI	"Programa de Coordinación en Supervivencia Infantil" (Ecuador)
PVOs	Private Voluntary Organizations
RORIAN	"Red Operativa Regional de Instituciones en Alimentación y Nutrición"
SLAN	Latin American Society of Nutrition
UN	United Nations
UNDP	United Nations Development Program
UNICEF	United Nation Children's Fund
USAID	United States Agency for International Development
VITAL	Vitamin A Field Support Project
VITAP	Vitamin A Technical Assistance Program
WHO	World Health Organization