directing council | *regional committee*

PAN AMERICAN HEALTH ORGANIZATION

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REPORT ON THE STATUS OF THE ERADICATION/ELIMINATION OF CERTAIN DISEASES FROM THE REGION

Resolution XVI of the XXIII Pan American Sanitary Conference, held in 1990, requested that the Director consult with Member Governments and present a report on the status of eradication/elimination efforts in relation to those diseases for which decisions have already been made to proceed on a regional basis to their eradication/elimination, as well as to establish mechanisms to determine the feasibility of eradication/elimination of several other communicable and noncommunicable diseases.

The advances made by the countries of the Region toward the goals of universal immunization services for the children of the Region, the efforts to eradicate the indigenous transmission of wild poliovirus from the Americas, as well as the achievement of further control of other immunizable diseases, such as neonatal tetanus and measles, are outlined. Considerable progress has been made in all these areas, but there is still much to be done if the goals are to be reached as proposed. Poliomyelitis transmission is on the verge of being interrupted, with only a few remaining foci which are being aggressively addressed. Activities related to neonatal tetanus elimination have been launched by several countries, and preliminary results are encouraging. The efforts to eliminate measles by Cuba and the English-speaking Caribbean countries are to be examined closely as they may serve as models for future control or elimination of measles in the rest of the Western Hemisphere.

The situation concerning urban rabies, as described, signals the danger of vampire bat-transmitted rabies. In this light, a possible timetable for rabies control in the Region is presented.

Continuous progress has been made on the eradication of foot-and-mouth disease, mainly through the use of an oil adjuvant vaccine in different ecosystems. A chronogram for further actions is presented.

The report also describes the main priorities for immediate action by Member Countries in order that the gains of eradication can be consolidated and further improved and that new targets can be set for the decade and addressed with the same energy as the previous ones. All international agencies that collaborate with the Member Countries in this area of activity are called upon to continue and expand support, and the countries themselves are urged to renew and increase their commitment, including the allocation of financial and human resources needed for program implementation, based on cost analysis and feasibility studies.

In regard to those communicable diseases which have not been targeted for eradication/elimination but for which the possibility exists--diseases such as American trypanosomiasis, leprosy, non-venereal treponematoses, and onchocerciasis, and those related to specific nutritional deficiences like iodine deficiency disorders and vitamin A deficiency--elimination is technologically feasible in several countries of the Region provided that control programs are strengthened. A possible timetable for reaching specific goals is presented. However, it it crucial to keep in mind that the implementation of measures for the elimination of these diseases implies the further development of epidemiological capability and strengthening of health services and of health education in order that multinational plans be effective.

The 107th Meeting of the Executive Committee enthusiastically expressed its support for the goals and targets for disease eradication and elimination set forth in Document CE107/10, which, with a few minor editorial changes, is presented as Annex to this document. The Directing Council is requested to consider these recommendations, as well as the following resolution:

THE 107th MEETING OF THE EXECUTIVE COMMITTEE,

Having seen Document CE107/10 reporting on the status of the eradication/elimination of certain diseases from the Region,

RESOLVES:

To recommend to the XXXV Meeting of the Directing Council the adoption of a resolution along the following lines:

THE XXXV MEETING OF THE DIRECTING COUNCIL,

Having seen Document CD35/16 on the status of the eradication/elimination of certain diseases from the Region;

Having regard to Resolution XVI of the XXIII Pan American Sanitary Conference; and

Recognizing that some countries have eradicated or eliminated poliomyelitis, neonatal tetanus, urban rabies and foot-and-mouth disease, that the decision has been made to eliminate measles (in the Caribbean), and that it is feasible to seek to eradicate or

eliminate from the Region of the Americas other communicable diseases such as American trypanosomiasis transmitted through blood transfusion, leprosy, the nonvenereal treponematoses and onchocerciasis, and micronutrient deficiencies,

RESOLVES:

1. To adopt the recommendations contained in Document CD35/16 for the elimination, eradication or control of certain diseases.

2. To urge the Member Governments:

a) To continue giving priority to the effective prevention, control and surveillance of diseases preventable by immunization until they are eliminated;

b) To foster the necessary collaboration and coordination between the different levels of the public sector, and between it and the private sector, for the completion and execution of updated plans of action to prevent, control, and maintain surveillance of:

i) the following infectious diseases: trypanosomal infections transmitted by blood transfusion, leprosy, the nonvenereal treponematoses (yaws and pinta), and onchocerciasis, and

ii) deficiencies of the following micronutrients: iodine and vitamin A;

c) To introduce activities for the prevention and control of these diseases in their local health systems and encourage community participation and local programming so that the measures taken will be comprehensive and make use of all available resources.

3. To request the Director:

a) To promote the mobilization of institutional, human and financial resources in the countries, the Region, and the rest of the world for the development and use of the infrastructures required to execute and maintain effective and consistent eradication/elimination programs;

b) To foster the establishment, strengthening and proper functioning of epidemiological services that can analyze health situations, risk factors, and the characteristics of ecosystems, and evaluate social and health services;

c) Promote technical cooperation for the development of epidemiological programs and surveillance in joint efforts for the preservation of transmission-free areas;

d) Support the development of managerial and administrative capabilities at the lowest decision-making levels in order to promote local programming and the evaluation of prevention, control and surveillance methods in local situations.

Annex

REPORT ON THE STATUS OF THE ERADICATION/ELIMINATION OF CERTAIN DISEASES FROM THE REGION

CONTENTS

REPORT ON THE STATUS OF THE ERADICATION/ELIMINATION OF CERTAIN DISEASES FROM THE REGION

INTRODUCTION

During the discussion of the Plan of Action for the eradication of indigenous transmission of wild poliovirus in the XXXIV Meeting of the Directing Council of the Pan American Health Organization, it was pointed out that the eradication of disease could serve as a fundamental strategy for giving new value to the health sector. The successes achieved in the eradication of smallpox and the advances made with respect to eradication of poliomyelitis should be regarded as a new beginning. It was proposed formally to the Council that the Organization study a calendar of eradication of diseases for the coming years.

The Director of Pan American Sanitary Bureau accepted the proposal and indicated that setting of eradication goals could be extraordinarily useful, not only for mobilizing the Region's resources, but also for enhancing the credibility of the health sector and its capacity to give concrete responses to real problems through highly visible actions. The Region of the Americas has often taken a leading role in disease eradication, being the first to eradicate smallpox. In 1985 the Region also decided to eliminate the transmission of poliomyelitis. Specific target dates have been set for the elimination of neonatal tetanus, urban rabies, foot-and-mouth disease, and measles in the English-speaking Caribbean. Other infectious diseases which may be considered for eradication/elimination include onchocerciasis, leprosy, the non-venereal treponematoses, Chagas' disease and disorders resulting from the deficiency of iodine and vitamin A.

This topic was discussed at the 105th Meeting of the Executive Committee. The global efforts at disease eradication were presented, specifically the plans and programs of the International Task Force for Disease Eradication. Particular stress was laid on the necessity to distinguish clearly between eradication and elimination.* The setting and meeting of targets was considered to be important not only for the control of each specific disease, but because of the impact of meeting specific targets on the health infrastructure and on public health in general.

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* Eradication of an infection implies that the infection has disappeared from all countries of the world, because transmission of the causative organism has ceased in an irreversible manner.

Elimination is the disappearance of transmission of an infection from a small or large area, with a country or continent ultimately becoming free from infection.

The XXIII Pan American Sanitary Conference (1990), upon reviewing the recommendations of the Executive Committee, adopted Resolution XVI, requesting that the PAHO Director consult with Member Governments and present to the next meeting of the Governing Bodies a detailed report on the status of eradication/elimination efforts in relation to those diseases for which decisions have already been taken to proceed on a regional basis towards eradication/elimination. These diseases are: polymyelitis, neonatal tetanus, measles, urban rabies, and foot-and-mouth disease. The PAHO Director was also requested to consult with Member Governments and establish mechanisms to determine the feasibility of eradication/elimination of those diseases which have not yet been targeted, but for which a possibility of eradication/elimination exists, e.g. communicable diseases like onchocerciasis, leprosy, chagas' disease and non-venereal treponematosis, or dietary deficiencies such as iodine deficiency disease, and xeropthalmia due to vitamin A deficiency.

In order to comply with the mandate, this document provides information on the present efforts to eradicate/eliminate diseases for which regional targets have already been established and analyzes the feasibility of eradication/elimination of other diseases for which no decisions have yet been taken toward eradication/elimination by PAHO's Governing Bodies.

A. Status of eradication/elimination efforts related to those diseases for which regional or subregional eradication/elimination targets have already been established.

1. Poliomyelitis*

Poliovirus transmission is on the verge of being interrupted throughout the Western Hemisphere. Despite examination of over two thousand stool specimens during 1990, only 14 revealed wild poliovirus. Over four years have elapsed since the last isolation of wild poliovirus in the Southern Cone countries; more than eight years since an isolate was found in the English speaking Caribbean; more than three years since the last isolation of indigenous wild poliovirus in Central America (the last three isolates originated from a recent introduction from Mexico); two years since the last in Brazil and five months in Mexico. It is notable that the 14 wild poliovirus isolates detected during 1990 represented a decrease of 40% compared with the 24 registered in 1989. These findings are remarkable when one takes into account the enormous improvement in surveillance for acute flaccid paralysis during the last year. In all, 2572 reports were investigated, the largest number investigated to date in a single year. As of 20 May 1991, only two cases have been detected in 1991, both in Colombia.

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* A detailed report on the subject is presented in Document CD35/15, to be discussed under Agenda Item 5.3.

Of highest priority is the elimination of what appears to be the only few remaining foci of wild polio virus infection. The Andean countries are of special concern and demand urgent attention. A number of foci are undoubtedly present along both the Atlantic and Pacific coastal areas of Colombia.

Neighboring areas of Venezuela and Ecuador are at special risk. Intensive measures are indicated, especially in Colombia where mop-up activities are more limited in intensity and scope than appears to be required.

Foci are also present in Northern areas of Peru adjacent to Ecuador and could well be present in other parts of the country. Peru's present problems involving both socio-political disturbances and a cholera epidemic are recognized. Because of these problems, all possible assistance should be provided to strengthen their surveillance-containment-vaccination program. Overall, a special program (such as the one conducted in Central America late in 1990) encompassing Colombia, Peru, Ecuador, and neighboring areas of Venezuela appears to be needed.

2. Neonatal Tetanus*

From 1985 to 1990, between 1,100 and 1,400 cases of neonatal tetanus were reported annually in the Americas. The 1990 data is still provisional and surveillance for neonatal tetanus is not yet fully developed. Preliminary information from studies that took place over the last three years indicates that as many as 10,000 cases of this disease could be occurring every year in the Region of the Americas.

The PAHO approach to eliminate this disease in the Region of the Americas by 1995 is to vaccinate all women of childbearing age in all areas that are identified as at high risk for the disease. This strategy is based on the fact that the prevalence of the disease differs in the different geographical areas within a country. Surveillance must be established to determine the magnitude of the problem in those areas that do not report cases and to evaluate the impact of the vaccination programs in those areas targeted for action.

The studies conducted so far have identified that 57% of the cases of neonatal tetanus in the Americas occurred in only 5% of the total number of the "municipios," districts or counties, where only 10 million of the 86 million women of childbearing age in Latin America reside. In other words, the vaccination of 10 million women of childbearing age could prevent 57% of the cases of neonatal tetanus that are known to occur in the Americas during any given year. Almost half of the cases are occurring in urban areas, where the populations have better access to health services, both preventive as well as curative. It is therefore concluded that these women are not receiving good prenatal and delivery care. This fact is confirmed by the information that shows that 70% of the cases investigated occurred in women who had never received tetanus toxoid.

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* A more detailed report is contained in Document CD35/15, to be discussed under Agenda Item 5.3

3. Measles*

An average of over 600,000 cases per year were reported before the introduction of measles vaccine in the Region of the Americas, with rates of over 150 cases/100,000 population. After the vaccine was introduced, the average number of cases, per annum, decreased to 300,000 with the implementation of EPI in the late seventies. A second decrease was observed in the eighties, with 100,000 cases being reported in 1989, a rate of 15 cases per 100,000 population. Thus, rates reported by the end of the 1980s represent only 10% of the rates reported twenty years ago.

Coverage rates for measles vaccine have increased from 30% in 1978 to over 70% in 1990, which have resulted in changes in the epidemiology of the disease, particularly an increase in the interval between epidemic years. The recent outbreaks observed in several countries in the last two years is a consequence of this change in epidemiology of the disease and the accumulation of susceptibles after a certain lull period.

The strategies for measles control will have to rely on two important components: (a) achievement and maintenance of high immunization levels, and (b) intensive epidemiological surveillance to detect all suspect cases and to institute appropriate control measures. Utilizing these strategies, Cuba has reported no cases of measles since September 1990. The English-speaking Caribbean initiated its measles elimination activities in May 1991, with the vaccination of all children under 15 years of age and the start of intensive surveillance activities. The already established target is to eliminate measles in the English-speaking Caribbean by 1995.

4. Urban Rabies**

Rabies transmitted by dogs continues to be a public health problem in Latin America, where 95% of the human cases of the Region occur.

During the decade of the 1980s, the political decision was made, and the resources mobilized, to eliminate urban rabies through vaccination campaigns and increased surveillance in the large cities of Latin America (Plan of action for the implementation of the regional strategies for the achievement of the goal of HFA/2000 approved by the XXVIII Meeting of the Directing Council, 1981; Resolution XVIII approved by RIMSA III, 1983). As a result, canine-transmitted human rabies has been controlled in all principal urban areas. Nevertheless, the risk remains, since canine rabies continues to be endemic in rural and suburban areas.

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* A more detailed report is contained in Document CD35/15, to be discussed under Agenda Item 5.3.

** A more detailed report on the subject is contained in Annex I.

On average, the number of human deaths caused by canine rabies between 1986 and 1989 was 200 per year, which indicates a 38% decrease over the previous four-year period. The majority of human deaths occurred in small rural communities with less than 50,000 inhabitants.

The experience of the program has demonstrated that elimination of urban rabies is feasible through massive use of available vaccines, epidemiological surveillance and community participation.

During the III Meeting of Directors of National Rabies Control programs, held in Porto Alegre, Brazil in 1989, recommendations were made to implement the final attack phase of urban rabies elimination during the 1990-1991 period in order to consolidate the goal of eliminating the disease from large cities. Recommendations included strengthening the massive anti-rabies vaccination campaign, establishing a regional system of weekly information on syndromes compatible with rabies in humans and in dogs, and increasing medical attention given to those people in rural and suburban areas who are exposed to the disease. In recent years, however, an increase has been noted in rabies transmitted by wild animals, particularly the vampire bat which has caused the greatest number of wild animal associated rabies deaths in humans. For this reason, the Organization has begun consultation meetings to extend surveillance of the disease and to define strategies which could control rabies transmitted by vampire bats.

Following the results of the evaluation of the 1980-1989 decade of the Regional Program for the Elimination of Urban Rabies, it is expected that during the quadrennium 1991-1994 there will be a consolidation of the final attack phase of urban rabies elimination activities in large cities in order to make the 50 remaining cities under the program free of rabies. The rabies free situation achieved in large cities will be maintained through epidemiological surveillance.

According to the mandate of RIMSA VII, Resolution II, from 1992 to the year 2000, efforts will be made to extend the coverage of the program to medium and small settlements in suburban and rural areas where rabies virus transmission persists. In addition to the risk for human population, these areas pose a large risk for the reintroduction of the disease in cities which are already rabies free.

On the other hand, the control of rabies transmitted by the vampire bats will be initiated by 1992. The control effort requires a continuous supply of vaccine, the active participation of the community, and strengthening of the diagnostic laboratory network for the continental surveillance system.

A new plan of action will be developed and implemented for the second stage of the urban rabies eradication program. This plan should include the mobilization of financial resources and the means to achieve more active community participation.

5. Foot-and-Mouth Disease*

Foot-and-mouth disease is a serious animal disease which causes great losses, estimated at US$510 million per year in the countries of South America. The formal development of national programs for the control of foot-and-mouth disease began during the 1970's with the help of financial support from the Interamerican Development Bank (IDB). These programs were the basis for the organization of structures of national animal health services and programs for the maintenance of disease-free areas.

As a direct result, foot-and-mouth disease was eliminated in Chile and in the northwest part of Colombia, in the countries of North America, Central America and the Caribbean, as well as in the Argentinean Patagonia, Guyana, French Guiana and Suriname, which have remained free of the disease.

In the areas where programs are being carried out, the annual incidence of the disease has diminished from 13-20 flocks affected per 1,000 to only 1 flock affected per 1,000 during the past few years, which is equivalent to a reduction of more than 90%. The annual morbidity dropped from more than 200-300 cases per 10,000 bovines to 5.9 per 10,000 at the present time. Over the past four years, the foot-and-mouth disease situation has been stable. The Member Governments, with the active involvement of cattle producers, along with the Ministers of Agriculture, have promoted the policy of eradication since 1985. The hemispheric plan for eradication contains, as principal strategies, the relation of the disease's ecosystems to the control methodology, the use of foot-and-mouth disease vaccine with an oil adjuvant (which was developed by the Pan American Foot-and-Mouth Disease Center), an information and epidemiological surveillance system to monitor and continuously evaluate the program, and the active participation of the community. The plan subdivides South America into three subregions: Southern Cone, the Andean Area, and the Amazon area and Brazil.

In the plan of action, three stages have been identified:

- In a first stage of 6 years (1989-1994) an advanced level of control with the elimination of clinical disease will be reached in the Southern Cone subregion, and some areas of the Andean and Amazon sub-Regions. In all other affected areas, there will be an enhancement of the animal health infrastructure.

- In a second stage of 6 years (1995-2000), the creation of new free areas in the three subregions is expected.

- In a third stage of 8 years (2001-2009), there will be the consolidation of the free status in all subregions, which will imply the elimination of endemic foci.

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* A more detailed report on the subject is contained in Annex II.

During the three stages special attention will be given to protect the existing disease free areas.

The goal of eradication by the year 2000 established in the initial Plan of Action was not sustainable due to constraints such as the economic crisis of the developing countries which has seriously affected the infrastructure of animal health services and has delayed initiation of eradication efforts in several countries. By the year 2000 it will be possible to eliminate the clinical disease; however, it will be necessary to continue the elimination of endemic foci and to establish a solid prevention program to maintain the virus free status. These activities require an additional stage of eight years.

B. Feasibility of eradication/elimination on a regional basis of those diseases which have not yet been targeted, but for which a possibility of eradication/elimination exists

I. Communicable Diseases

1. American Trypanosomiasis*

American Trypanosomiasis is an autochthonous zoonosis of the Americas. Human infection is found from the North of Mexico to the South of Argentina and Chile. It is estimated that 12 to 16 million people are infected, and at least 60 million others live in areas where there is a risk of acquiring the infection.

Being a zoonoses with a sylvatic cycle, it is not possible to eradicate T. cruzi infection. However, the tools for interrupting the domestic cycle of T. cruzi transmission, such as chemical control, housing improvement, and health education have been available for decades. In fact, the prevalence of the infection has decreased in those countries which have consistently applied control measures. However, only a few countries have attempted to interrupt domestic transmission (Venezuela, and some parts of Brazil).

Transmission through transfusion could be prevented if blood is screened by serology and those units which are positive are discarded. In a few countries of the region, serology for T. cruzi is mandatory for blood donors.

Available knowledge indicates that the most common routes of transmission of human T. cruzi infection could be interrupted by the implementation of vector control activities in houses in order to first reduce and then eliminate the vector transmission of T. cruzi, and by strengthening the capability of blood banks to prevent transmission of Chagas' disease through blood transfusions.

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* A more detailed report on the subject is contained in Annex III.

Since the vector of T. cruzi, Triatoma infestans, is intradomiciliary in the countries of the Southern Cone, sustained implementation of multisectoral control measures could interrupt transmission within ten years. In the rest of Latin America, vectoral transmission may be interrupted within fifteen years. In South America, transfusional transmission could be eliminated within five years where available infrastructure already exists, and in the rest of the continent within eight years.

To interrupt vectoral transmission of T. cruzi, countries of the Southern Cone can implement vector control through housing improvement, health education, and the use of chemical applications, within the context of sustained development of the rural and semi-urban areas. In areas of Brazil and Venezuela, vectoral transmission can also be interrupted. After the identification of areas of high transmission, control measures could be implemented in the Andean and Central American countries.

Finally, targets can be established to develop legislation requiring screening for T. cruzi antibodies of all blood donors from the endemic areas of the Americas, and to establish the required infrastructure, or the strengthening of the available infrastructure within the health services for universal blood screening.

Recommendations:

Sufficient information is not yet available in order to establish a regional goal for the elimination of American trypanosomiasis. However, certain steps may be taken to improve the control of this disease in the Americas, as follows:

- Where T. cruzi infection is endemic, distribution of the infection is known and the vector is domiciliary, a plan of action should be developed to interrupt vectoral transmission of T. cruzi through a combination of control methods selected after cost-efficiency, cost-efficacy and cost-benefit analyses are made.

- Where T. cruzi infection is endemic but the distribution of the infection is not well defined, epidemiologic surveys should be conducted in order to identify areas of high risk of transmission, and then to proceed as in 1 above.

- Where T. cruzi infection is induced by blood transfusion, a plan of action should be developed to promulgate and implement policies for the use of human blood, including the strengthening of health services to perform serologic tests for blood-transmitted disease.

2. Leprosy*

Leprosy is endemic in all countries of the Americas, with the exception of Chile. The estimated prevalence between 1984-1986 was 340,000 cases, 70% of them in Brazil.

Early detection and multi-drug therapy (MDT) are required for the rapid reduction of prevalence and controlling the transmission of the disease. However, only 23.8% of leprosy patients in the Region are on MDT, while the world rate is 55.7%.

It is possible to eliminate leprosy in a relatively short period of time as a public health problem in most countries of the four sub-Regions: Caribbean, North and Central America, and the Southern Cone. However, in the Amazon Region, the quality of epidemiological information and the level of understanding the pathogenicity of M. leprae and the immune response of the population must be improved before a similar goal could be established. Regardless of the subregion, it will be necessary to strengthen the coverage and efficiency of health services and at the same time improve the rate of early diagnosis and initiation of MDT for the disease.

Complementary activities must be the protection of susceptible populations with BCG vaccination, and prevention and treatment of possible physical disabilities with simple rehabilitation techniques, at the primary health care level.

The 44th World Health Assembly, meeting in Geneva, Switzerland, in May 1991, adopted a goal of attaining the global elimination of leprosy as a public health problem by the year 2000. For this purpose, elimination is defined as the reduction of prevalence to a level below one case per 10,000 population.

In order to reduce the prevalence of leprosy to this level in the Americas, it will be necessary to strengthen general health services to carry out diagnosis and MDT, to assure an adequate supply of drugs which will be properly administered, to strengthen case registration and reporting activities, to monitor MDT, and, in the Amazon region, to conduct epidemiological stratification studies and to identify the risk factors for disease transmission.

Recommendation:

To develop a plan of action for the elimination of leprosy in the Americas, defined as a prevalence of less than one case per 10,000 population, and to present the plan of action to the Governing Bodies in 1992.

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* A more detailed report on the subject is contained in Annex IV.

3. Non-Venereal Treponematoses*

Non-venereal treponematoses have significantly decreased as a consequence of the widespread availability and use of penicillin, a very effective drug at the present time. However, available statistics do little to clarify the epidemiological situation that currently prevails in the Americas regarding both yaws and autochthonous pinta. The most recent information indicates that yaws has been reported sporadically in the northern part of South America (Brazil, Venezuela, Suriname, Guyana, and Colombia). Pinta has appeared to be limited to certain areas in the south of Mexico, Central America, and Colombia. Recently, some foci of endemic yaws were reported among rural populations in Haiti in the course of surveys for HIV infection. In addition, there are reports of pinta in some indigenous communities of Venezuela.

Even though there is a low level of knowledge about signs and symptoms on the part of primary health care personnel and nonexistence of measures for protecting susceptible individuals, the technology available -laboratory detection that permits mass screening and effective low-cost therapy using a combined dose- makes the interruption of transmission a realistic and feasible objective for well executed control programs.

Although non-venereal treponematoses are extremely susceptible to appropriate treatment, the lack of knowledge of its distribution makes it necessary to carry out epidemiological studies before establishing any target date for eradication/elimination. Therefore, there is a need for an initial period of approximately three years to categorize the reported cases for the purpose of clinical, bacteriological, and serological confirmation, to carry out serological surveys based on these "index" groups in order to establish prevalence, proportion of recent latent/delayed cases, and distribution by sex, age, urban/rural origin, etc, and to conduct epidemiological (seroepidemiological and operational) research to establish strata and gain a better understanding of risk factors. A subsequent stage would include the training of primary health care personnel to assume responsibility for clinical confirmation, treatment management, and surveillance. The implementation of intervention measures will then be possible in endemic areas.

Recommendation:

The goal of the elimination of non-venereal treponematoses should not be established at this time. However, as a first step, the target can be established that, by 1994, affected countries will have conducted epidemiological studies in order to define the geographic and population distribution of the disease, the social conditions of the affected population, and the risk factors for disease transmission.

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* A more detailed report on non-venereal treponematoses is presented in Annex V.

4. Onchocerciasis

Human onchocerciasis exists mostly in localized foci in Brazil, Colombia, Ecuador, Guatemala, México and Venezuela. Although information on prevalence is somewhat limited, it is estimated that Ecuador, Guatemala and México have the highest number of cases, approximately 4,000, 40,000 and 22,000 confirmed cases, respectively. Taking into account that the only confirmed reservoir of O. volvulus is the human being, that the black fly vector involved in transmission has a low vectorial capacity, and that the drug, ivermectin, in a single dose, administered on an annual or semi-annual basis, effectively decreases microfilaria counts, it can be concluded that elimination of pathological expression of the disease is indeed feasible. Recently it has been demonstrated that when the administration of the drug is appropriately sustained, it can interrupt transmission. The drug is free of charge and there are already two countries with ongoing control programs.

Achieving the goal of elimination will require:

- Strengthening the ongoing control program activities in Guatemala and Mexico, with emphasis on health education for community participation.

- Assessing the epidemiological status of the disease in Brazil, Colombia and Venezuela, through a standardized protocol, before using ivermectin.

- Continuing to administer semi-annual, or annual doses to all onchocercosis patients in the six endemic countries until the end of this century.

- Strengthening the information systems at country level in order to achieve efficient epidemiological surveillance, thus assuring a systematic and well structured monitoring process.

The Governments of the endemic countries should assign the highest priority to onchocerciasis control, in order to achieve the standardization of diagnostic and treatment procedures. This will also assure the initiation or continuation of plans toward onchocerciasis elimination through concerted and coordinated actions among the affected endemic countries. If these measures are followed, the pathological manifestations of the disease, as well as the incidence of new cases could be eliminated in the Region by the end of this century. Transmission will be interrupted and eradication may be accomplished within the next 20 years.

Recommendation:

It is recommended that the Plan of Action for elimination of onchocerciasis in the Americas, developed by a multi-agency, multinational technical consultation (contained in Annex VI) be adopted.

II. Micronutrient Deficiencies

1. Iodine Deficiency Disorders

Iodine deficiency disorders (IDD) persist as a public health problem in certain areas of Central and South America. In some Andean areas, a high incidence of mental retardation and cretinism associated with endemic goiter affects as much as 14% of the population. Although these two manifestations are the best known, there is a wide range of organic and functional problems associated with iodine deficiency that constitute a serious threat to the genetic potential of millions of people. These problems include birth defects, deaf-muteness and various degrees of neurological impediments.

IDD can be eliminated as a public health problem in the Region (less than 10% prevalence) provided there is an adequate intake of iodine in those areas where it is naturally deficient. The scientific knowledge and the technology exists to eliminate IDD by the year 2000. The most effective and economic method of preventing IDD is the fortification of salt with iodine.

The strategy for elimination of iodine deficiency disorders, therefore, consists of:

- Maintenance of surveillance systems to monitor endemic goiter and other manifestations of the deficiency.

- Fortification of salt with iodine and monitoring its quality, marketing and use.

- Adoption of legislation and regulations regarding salt fortification for human as well as animal consumption.

- Use of social marketing approaches to educate the public about the necessity of using iodized salt.

- Administration of iodized oil to at-risk population groups.

In 1988, PAHO developed a regional project for the control of iodine deficiency disorders in Latin America (see Annex VII). Funds have been provided by the Government of Belgium through UNICEF, to initiate activities in the Andean subregion, where PAHO is providing technical cooperation.

The projected timetable for 1991 includes an assessment of the present situation in Brazil, Chile, Colombia, Uruguay and Venezuela; formulation of projects to support programs in Colombia and Venezuela within the Andean subregional Program supported by Belgian Government funds; expansion of Peru's control program to include it within the Program of the Andean subregion; consolidation of the programs in Bolivia and Ecuador; and formulation and implementation of control programs in Argentina, Paraguay and Uruguay.

In 1992-1993, IDD epidemiological surveillance and salt evaluation programs in all countries will be consolidated. Support will be continued for program implementation in the Andean and Southern Cone countries. At the same time, control programs will be formulated and implemented in Central America and in Brazil.

Support to the national programs will continue from 1994-1999.

Recommendations:

It is recommended that the goal of eliminating iodine deficiency disorders by the year 2000 be adopted and that an updated Plan of Action for this purpose be developed. This updated Plan of Action should include activities oriented toward:

- The formulation, by Member Countries, of appropriate legislation and regulations regarding iodization of salt and establishment ofmechanisms for their implementation.

- The implementation of national programs for the production, marketing and control of iodized salt with the necessary administrative, technical and operational support.

- The formulation and implementation of national programs for social participation and community education to prevent the use of non-iodized salt.

- The mobilization of resources at country, subregional and regional levels in order to provide adequate financing to implement the regional plan of action and the national programs.

2. Vitamin A Deficiency

Vitamin A deficiency is a serious public health problem in some areas of this Region. It alters cellular metabolism, causes eye disorders which may result in blindness, retards growth and development of the immune system and increases risk of death in preschool children. Measles is a viral disease that affects epithelial tissue and increases the utilization of vitamin A. Children with marginal liver stores of vitamin A may thus develop acute vitamin A deficiency, resulting in eye damage and possibly increased mortality from respiratory and diarrheal diseases.

Vitamin A deficiency occurs when body stores are exhausted and nutritional supplies fail to meet the requirements. It affects particularly the children of the poor in rural areas.

In the Region of the Americas, it is estimated that, in certain areas of Haiti, as much as 2% to 3% of the preschool population present corneal lesions attributable to vitamin A deficiency. It is also a public health problem in the Northeast of Brazil, in localities with high levels of population density and poverty. Other countries (such as

Bolivia, El Salvador, Guatemala and Honduras) are concerned that vitamin A deficiency may be a public health problem, although no recent representative data exist.

A food consumption survey in Belize and Mexico in 1980 indicated that the intake of vitamin A is inadequate. Similar results were obtained in Ecuador in 1986, although only 0.2% of a sample of children had serum retinol levels below 10ug/dl. and 13.9% between 10 and 20 ug. In El Salvador a dietetic survey in 1988 showed that 74.2% of families consumed less than 50% of the recommended dietary intake of vitamin A and 36% of children 12 to 59 months old showed serum levels below 20 ug/dl. In Colombia between 1978-80, 24.1% of a sample of children showed levels of serum retinol below 20ug/dl, but no cases below 10ug/dl., which would have indicated a serious problem.

Elimination of vitamin A deficiency

It is possible to eliminate vitamin A deficiency as a public health problem in the Region provided there is adequate intake of vitamin A, through fortification of certain staple foods, administration of massive doses of vitamin A to high risk population groups and the production and consumption of foods rich in vitamin A.

The projected timetable for 1991-1992 includes the assessment of the present situation in selected countries, strengthening sugar fortification programs in Central America, surveillance of Vitamin A deficiency within Food and Nutrition Surveillance Programs, formulation of National Programs for elimination of the deficiency, and the massive administration of Vitamin A to specific at-risk population, such as, mothers and children.

Program implementation will continue in 1993-1995, while consolidation of the epidemiological surveillance and activities directed to the increased production and intake of vitamin A rich foods will continue through 1999. Thus, the deficiency can be eliminated as a public health problem by the end of the decade.

Recommendations:

It is feasible to eliminate vitamin A deficiency by the end of the decade. To accomplish this goal, the present situation regarding prevalence of vitamin A deficiency in the countries, including determinations of retinol in serum, should be carried out during the next year. Based on this information, a detailed plan of action for the elimination of Vitamin A deficiency as a public health problem in the Americas by the year 2000 should be formulated for presentation to the Governing Bodies in 1992. This plan should include:

- Evaluation and strengthening of food fortification programs in those countries where there is Vitamin A deficiency (e.g. fortification of sugar with retinol in the Central American countries).

- Formulation and implementation of programs for community education and social marketing.

- Increasing the production of foods rich in Vitamin A at national, community and family level.

- Distribution, as a short-term measure, capsules of vitamin A to children in priority areas.

- Fortification with Vitamin A of staple foods, weaning food mixtures and foods distributed through food aid programs.

Annexes

ANNEX I

ELIMINATION OF URBAN RABIES

ELIMINATION OF URBAN RABIES

I. BACKGROUND

In the countries of Latin America, particularly in the more densely populated areas, the presence of urban rabies has constituted a high risk for the human population.

Analysis of the information available at the beginning of the 1970's showed that rabies in man had increased to 292 cases a year as compared with the average of 178 cases reported during the period 1947-1956.

That same year, 21,300 cases of canine rabies were reported, and 1,222,000 people were bitten by dogs. Of the latter, 360,000 received the complete rabies treatment, representing 7,560,000 doses of vaccine.

This situation was noted by the health authorities in the countries, and the Ten-Year Health Plan for the Americas, approved at the III Special Meeting of Ministers of Health of the Americas held in Santiago, Chile, in October 1972, included a recommendation to:

> "4. Control and eventually suppress canine rabies in the main cities of Latin America with a view to eradicating human rabies in those areas."

During the 1970's the national health services of Latin America directed their sectoral policies toward extending coverage based on the strategies of primary health care and community participation. For this purpose it was necessary to assign priority to actions aimed at streamlining the administrative processes and providing a multisectoral approach to the health problem.

At the time, control policy in the countries was focused on the containment of widespread epidemic diseases (measles) and certain endemic diseases (malaria), especially among vulnerable groups such as mothers and children, scattered rural populations, and the marginal urban populations created by internal migration. Another major concern was obtaining the economic resources to organize family planning programs to counteract rapid population growth.

In this context, it was impossible to assign high priority to the zoonoses--among them, urban rabies--for the allocation of financial resources to attain the target specified in the Ten-Year Health Plan for the Americas.

The 1978 Declaration of Alma Ata, ratified by the World Health Assembly in 1979, set the worldwide goal of Health for All by the Year 2000 (HFA/2000). This marked the beginning of a new effort on the part of the American countries to review the health situation in the Hemisphere, which led in turn to the Plan of Action for Implementation of the Regional Strategies of HFA/2000, approved in Resolution XI of the XXVIII Directing Council of the Pan American Health Organization in 1980.

Among the priority areas identified in the Plan of Action was veterinary public health. The regional targets and objectives in this area included control and eradication of the principal zoonoses, in particular urban rabies.

Against this background and within the framework cited, the Pan American Health Organization convened the III Inter-American Meeting, at the Ministerial Level, on Animal Health in Washington D.C., in April 1983. The Program for the meeting included a panel on "Strategies for the Control of Urban Rabies in the Hemisphere to the End of the 1980's." As a result of these deliberations, the Ministers of Agriculture or their representatives unanimously approved Resolution XVIII on the elimination of rabies.

This political decision led PAHO to convene a meeting of directors of rabies programs in the Latin American countries, which took place in Guayaquil, Ecuador, in December 1983. Evaluation of the epidemiological situation, in addition to its technical and administrative problems, led to approval of an overall target and several strategies for the Hemisphere as a basis for initiating the Regional Program for the Elimination of Urban Rabies in the Principal Cities of Latin America by the End of the 1980's, as follows:

Overall target:

Elimination of urban rabies in the principal cities of Latin America.

Strategies:

a) Assurance of an adequate public health infrastructure for attaining the territorial coverage programmed.

b) Establishment of adequate financial mechanisms at the national level, to be supplemented by external financing.

c) Intersectoral articulation in order to increase efficiency in the use of available resources.

d) Strengthening of international technical cooperation in order to address critical areas of the Program in which the countries' own capacity is not sufficient.

e) Strengthening of Technical Cooperation among Developing Countries (TCDC).

The Final Report of the III Inter-American Meeting, at the Ministerial Level, on Animal Health, held in April 1983, including Resolution XVIII on Rabies, was ratified by the XXXI Directing Council of the Pan American Health Organization held in Washington D.C., in September 1983.

Both meetings confirmed the national commitment of the Latin American Member Countries of PAHO/WHO to adopt the goal of eliminating urban rabies from their principal cities.

As expected, in each country the commitment was expressed in the form of a sectoral policy decision and appropriate priority was assigned to it within the countries' national health programs in accordance with their characteristics and complexity.

Clearly there were differences between the Latin American countries in terms of the nature and frequency of their health problems and the quantity and quality of the resources available for solving them. Thus, some countries had areas that were free of the disease or had it under control, such as Argentine Patagonia and the southern part of Chile, while the rest of them showed varying degrees of progress in the implementation of activities aimed at preventing or controlling rabies within their territories.

Many countries had to reconsider the strategies of their control programs and mobilize extrasectoral resources; others, which had comprehensive health programs, had to initiate administrative and technical decentralization processes in order to increase coverage using the resources available. In addition, it was necessary to publicize the political decision to eliminate urban rabies, and agreements had to be drawn up with the authorities of the local governments to strengthen their rabies prevention and control activities in their areas of influence.

A considerable amount of time--no less than two years--was involved in adapting the strategies for the Hemisphere outlined above into the national programs, which involved, inter alia, dealing with matters of a technical, administrative, legal, and financial nature.

II. EPIDEMIOLOGICAL SITUATION AND STATUS OF THE CONTROL PROGRAMS

In terms of rabies epidemiology, there are two groups of countries in the Region of the Americas: one, in which the wild species have greater public health importance, which includes Canada, Cuba, Grenada, and the United States of America, and the other, in which dogs are the principal transmitters of rabies.

The countries of the Caribbean, with the exception of Cuba, the Dominican Republic, Grenada, and Haiti are rabies-free.

The program to eliminate urban rabies from the principal cities of Latin America undertook to cover 414 capitals and cities that the health authorities of 20 countries in the Region of the Americas defined as principal cities by virtue of their political, demographic, or economic importance. The sum total of their populations were estimated at 178,700,000. This figure represents approximately 42% of the total population of Latin America and 56% of the urban population in 1989. The distribution of the cities in question and their populations by program area is as follows:

Andean Area	37,188,000 in 100 cities
Central American Area	17,995,000 in 55 cities
Southern Cone Area	28,263,000 in 71 cities
Latin Caribbean Area	10,393,000 in 51 cities
Brazil Area*	39,266,000 in 26 cities
Mexico Area*	45,618,000 in 111 cities

Although some demographic studies and studies of canine population dynamics show variations in the ratio of people to dogs depending on certain local characteristics, it may be said in general that the overall ratio for the countries of Latin America is 10 humans to one dog, which suggests that approximately 18,000,000 dogs are also involved in the elimination program and are also the main focus of the control measures applied.

Among the principal cities, special importance is given to the capitals, since in many cases they are considered to be true megalopolises--a factor that poses serious technical and logistical difficulties for rabies programs. Eight of the capitals (40%) initiated rabies programs and remained free of human rabies during the entire decade; on the other hand, 12 others (60%) reported that in the same period cases had occurred among their inhabitants. At the end of the decade there were 16 capitals in which no deaths from rabies were reported. This notable increase in capital cities in which no cases of human rabies occur is one of the main achievements of the program.

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* Brazil and Mexico are considered individually in view of their population differences and territorial dimensions. Their inclusion in any one area would have repercussions on analysis of the overall situation.

The same trend may be observed in data for the entire 414 cities targeted by the program. Seventy-nine of these cities, including the capitals (19), had cases of human rabies at the beginning of the decade, but by 1989, 364 cities (87.9% of the total) were free of the disease.

The total number of cities without cases of human rabies is more important epidemiologically. The public health impact on the real magnitude of the problem can be seen from an analysis of the population at risk. Thus, in 1980, of the 71 principal cities in the Southern Cone (Table 2), three of them had rabies and a population at risk of 565,561; by 1988 this figure had declined to two cities with rabies; and in 1989 no major city in the Southern Cone had cases of rabies.

In the Andean area, which includes 100 cities (Table 2), the number of cities with cases of human rabies declined from 33 to 19 between 1980 and 1989 respectively, while the population at risk, which was 17,760,794 in 1980, fell to only 8,560,786 in 1989, representing 52% of the initial population.

In Central America (Table 2) the situation has shown a slight improvement: between 1980 and 1989 the number of cities with rabies declined from 15 to 11.

The Latin Caribbean (Table 2) had six cities with rabies at the beginning of the decade, whereas in 1989 it had only one, for a reduction on the order of 97% in population at risk.

The situation in Brazil (Table 2) has improved substantially relative to the initial data. In 1980 this country had 11 principal cities with rabies with an aggregate population of 11,662,975, and by 1988 there were only two cities with rabies and 2,327,295 persons were at risk for rabies. In 1989, however, the situation deteriorated slightly with the appearance of four cities with rabies.

In Mexico (Table 2) a gradual increase was observed in the number of cities with human rabies, going from 11 in 1980 to 15 in 1989, with a current population at risk of 20,494,612.

Specific mortality from human rabies for the 414 cities at the beginning of the decade was 1.3 per 1,000,000 population, and at the end of the period, 0.3 per 1,000,000. Table 1 shows this rate by geographical area.

TABLE 1

HUMAN RABIES IN LATIN AMERICA
TREND BY GEOGRAPHICAL AREA,
1980-1985-1989, RATE PER MILLION POPULATION

GEOGRAPHICAL AREA	1980	1985	1989
Andean Area	2.2	1.2	1.2
Central America	1.8	2.3	0.8
Southern Cone	0.2	0.1	0.0
Latin Caribbean	0.8	0.6	0.1
Brazil	1.6	0.3	0.3
Mexico	0.6	0.7	0.5

Source: Information from the files of the Veterinary Public Health Program, PAHO/WHO.

According to the above figures, the Andean, Central American, Southern Cone, and Latin Caribbean areas have shown a declining trend, whereas Brazil, after a significant initial decline, has remained stationary during the last five-year period. For Mexico, it can be seen that the death rate from rabies showed a slight decline.

The situation in the Southern Cone is worth a special comment, since this is the first area that achieved a total absence of cases in its principal cities.

With regard to canine rabies, there was an an overall decline on the order of 37.1% in the number of cases between 1980 and 1989.

In 1980, 20 cities in the Southern Cone (28.1%) reported a total of 842 cases of canine rabies, while in 1988, 259 cases were reported in only 14 cities. At the end of the decade, two cities in Argentina and 9 in Paraguay had 207 cases, which means that the decline in the number of cities involved was 55.5% and the reduction in cases, 24.5%. The principal cities of Chile and Uruguay ended the decade without any cases of canine rabies (Table 3).

In 1980 the Andean subregion had 69 cities (69%) with canine rabies and a total of 4,764 cases. By 1989 this figure was reduced to 50 main cities with rabies and a total of 3,436 cases, which means that there were reductions of 19% and 28.0%, respectively (Table 3).

In the Central American area, 34 of the 55 main cities reported rabies at the beginning of the decade, and a total number of 2,957 rabid

dogs reported. By 1989 a very significant reduction was reported, with rabies in only 23 of the main cities and a total of 587 cases. (Table 3).

The Latin Caribbean area has also experienced a perceptible improvement in its rabies situation, although information is not available for Haiti. In Cuba and the Dominican Republic cases were reported in only two cities (3.8%), and during the same period the number of cases dropped from 29 to 2, for a reduction of 93% of the total (Table 3).

In Brazil there was a marked decline in the number of cities with rabies, which by the end of the decade numbered only 10 (30%). In the same period the number of cases declined from 1,633 to 146, representing a reduction of 91% of the total (Table 3).

The situation in Mexico is different from the other areas, since there has been a sharp increase in canine rabies. In 1980 there were 48 cities with canine rabies (43%) in the 111 cities that the authorities had identified as principal cities. In 1989 this figure had increased to 78. In other words, the decade ended with 70.2% of the major cities infected with the rabies virus.

Cases of canine rabies are also on the rise. At the beginning of the decade 3,292 animals with clinical or laboratory diagnosis of rabies were reported, and by the end of the decade the figure was 6,258, representing an increase of 90.0% (Table 3).

III. FEASIBILITY OF THE ELIMINATION OF RABIES

Sustained action through a program of regional strategies directed toward the elimination of urban rabies and specifically focused on the major cities of Latin America has increased the efficiency of resource utilization.

A total of 62.6% of human cases of rabies during the two last years (1988 and 1989) occurred in smaller urban conglomerations and rural areas.

The efforts carried out by the countries during the last six years of the 1980's was responsible for the achievements described above. If this same energy in mobilizing national and international resources can be sustained, there is no doubt that the elimination of urban rabies will be achieved in the largest and most important cities during the next quadrennium, 1991-1994.

Furthermore, it is possible that the experience acquired in organizing and administering the programs, combined with community participation, will make it possible to extend the goal to include medium and small-sized cities, which in turn will increase the protection of 44% of the inhabitants, another step closer to reaching the entire urban population in Latin America, as proposed in Resolution II of RIMSA VII. In order to attain these targets, it will be necessary to prepare a new plan of action to cover the period 1992-2000.

The process of decentralizing the health sector and strengthening local health systems will help to extend the Program's rabies elimination coverage to the limits specified in the preceding paragraph.

Information systems have improved notably, as seen, for example, in the data obtained from the weekly information system on human and canine rabies syndromes that were implemented at the regional level in 1990.

The crucial issue continues to be the availability of vaccines for campaigns to immunize the canine population. This difficulty should be overcome during the next quadrennium. A number of countries are expected to become self-sufficient in this regard, such as Guatemala, Honduras, Ecuador, Peru, and Venezuela, since they have the trained personnel and only lack a guarantee of basic supplies for vaccine production. Some of the countries are self-sufficient, such as Argentina, Brazil, Chile, Colombia, Cuba, Dominican Republic, Mexico, and Uruguay, whose installed capacity can be geared to increasing production for export.

The rabies diagnostic laboratories in Latin America operate satifactorily and provide broad support for epidemiological surveillance system where rabies exists and also for keeping cities and areas of the Region of from the disease.

Source of Information

Regional Program for the Elimination of Urban Rabies: Report on the Evaluation of the 1980-1989 Decade. (Preliminary Report). VII Inter-American Meeting, at the Ministerial Level, on Animal Health, Washington, D.C., 1991.

Table No. 2

HUMAN RABIES IN LATIN AMERICA BY GEOGRAPHICAL AREAS, PRINCIPAL CITIES WITH RABIES, NUMBER OF CASES, AND POPULATION, 1980, 1988 AND 1989

Geographical Areas	No. principal Cities	1980			1988			1989		
		Cities with rabies	No. of cases	Population	Cities with rabies	No. of cases	Population	Cities with rabies	No. of cases	Population
Southern Cone	71	3	4	565,561	2	1	76,442	0	0	0
Andean Area	100	33	63	17,760,794	17	32	12,190,594	19	46	8,560,786
Central America	55	15	32	8,361,437	14	34	7,663,975	11	17	6,269,526
Latin	51	6	6	2,148,288	3	3	322,966	1	1	56,704
Caribbean*	26	11	46	11,662,975	2	3	2,327,295	4	10	5,463,269
Brasil	111	11	18	12,320,082	18	26	17,395,743	15	21	20,494,612
Mexico										

Sources: Information from the files of the Veterinary Public Health Program, PAHO/WHO.

Table No. 3

CANINE RABIES IN LATIN AMERICA BY GEOGRAPHICAL AREAS, PRINCIPAL CITIES WITH RABIES, AND NUMBER OF CASES 1980, 1988 AND 1989

Geographic Area	No. Principal Cities	1980		1988		1989	
		Cities with Rabies	No. of Cases	Cities with Rabies	No. of Cases	Cities with Rabies	No. of Cases
Southern Cone	71	20	842	14	259	11	207
Andean Area	100	69	4,764	61	3,850	50	3,436
Central America	55	34	2,957	31	1,020	23	587
Latin Caribbean*	51	8	29	15	49	2	2
Brasil	26	18	1,633	12	168	10	146
Mexico	111	48	3,292	78	6,054	78	6,258

* Haiti not included

Source: Information from the file of the Veterinary Public Health Program, PAHO/WHO.

ANNEX II

FOOT-AND-MOUTH DISEASE ERADICATION

FOOT-AND-MOUTH DISEASE ERADICATION

BACKGROUND

The V Inter-American Meeting, at the Ministerial Level, on Animal Health, held in April, 1987, requested that the Directive Council of PAHO develop a Hemispheric Program for the Eradication of Foot-and-Mouth Disease. The same meeting requested the creation of the Hemispheric Committee for Foot-and-Mouth Disease Eradication (COHEFA), composed of government representatives and producers of each of the following subregions: Southern Cone, Andean Subregion, Amazon Subregion, Central America and the Caribbean, and North America. The fundamental objectives of this Committee are: ensure the maintenance of the political decision to eradicate the disease, obtain funding and resources, and evaluate the progress of the continental eradication plan.

The decision made in 1987 by the Governments of the PAHO member countries to assume the commitment of carrying out a Hemispheric Foot-and-Mouth Disease Eradication Plan in South America resulted from the economic losses that the disease causes in livestock production and productivity, plus its interference on the national, intraregional and intercontinental trade of the affected countries, coupled with the ensuing adverse social impact.

The two COHEFA meetings, held in 1988 and 1989, approved the Hemispheric Plan of Action for the Eradication of Foot-and-Mouth Disease. The specific objectives of the foot- and-mouth disease eradication program on the South American continent are the advanced control and subsequent elimination of the disease in affected areas, and the prevention of its introduction, as well as other exotic diseases, into free areas of the Americas.

The strategy for carrying out the program encompasses three levels: the national animal health programs, the subregion projects, and the Hemispheric Plan for Foot-and-Mouth Disease Eradication. The strategy is based on four aspects: the regionalization of the continent and of the sanitary action based on the characterization of the production systems and disease ecosystems; the gradual securing of new free areas over time; the technical and administrative coordination of the programs; and the inclusion and participation of the community.

EPIDEMIOLOGICAL SITUATION

The disease is only present in South America. The existing virus types are A, O and C, out of the seven types which have been identified in the world. The virus has high antigen variability and presents many new variants.

The main susceptible species are cattle, swine, sheep and goats. Based on the information and epidemiological surveillance system for vesicular diseases established in the countries of South America, it has been possible to characterize the risks and patterns of presentation of the disease and to identify the disease ecosystems. The presentation of Foot and Mouth Disease (FMD) depends on the inter-relationship between the form of the livestock

industry's social and economic organization and the interaction of the virus with the environment.

The following ecosystems can be defined:

- Endemic (primary endemic), which have the optimum conditions for maintaining the virus. This condition is found in the traditional extensive forms of beef cattle breeding areas such as that of the pantanal in the Central West part of Brazil, North of Argentina, etc.

- Epiendemic (secondary endemic), where the conditions for maintaining the virus endemic are favorable largely as a result of the introduction of sources of infection and/or susceptible animals endemic ecosystems. These are the typical beef fattening areas such as that of the humid Pampas in Argentina.

- Paraendemic or sporadic ecosystems, which have different levels of risk of disease introduction of the disease, but do not have the conditions to maintain the virus.

NOTE:

These characteristics of the disease cause the establishment of differential regional strategies in order to achieve goals for eradication.

The frequency of presentation of the disease is variable according to the ecosystems. The highest incidence is observed in the epiendemic ecosystems. In the endemic ecosystem the frequencies are lower but more persistent.

ACTUAL STATUS OF CONTROL PROGRAMS

In the 1970's all the affected countries had initiated national control programs which, by 1990, were covering approximately 90% of South America's bovine population.

An overall balance of the foot-and-mouth disease national control programs in South America in the last three decades show evidence of significant accomplishments, such as:

- Development of an extensive infrastructure of laboratories and technical and administrative field services, including the development of human resources in the Region's countries, all of which foster not only the prevention, control and eradication of foot-and-mouth disease, but also animal health in general;

- Increased vaccine-production capability, which has grown to such an extent that official and private laboratories now are equipped to provide the quantities of doses required by the national programs;

- A substantial improvement in vaccine quality as a result of the

technical and methodological efforts. Nevertheless, there are still unresolved problems to attain effective and sufficient vaccination coverage;

- The large-scale use of oil-adjuvanted vaccines has reached the phase of consolidation. This vaccine was developed by the Pan American Foot and Mouth Disease Center and produces an extended immunity in cattle and swine;

- Development of methodologies for improving the programs, including: development of schemes of production and use of epidemiological and sanitary information, characterization of livestock production systems and ecosystems as regional situational analysis, characterization of political and social scenarios related to the programs, selective regional strategies of disease prevention, control and/or eradication;

- Inclusion of the concept of virus-fee area (creation, protection and expansion) as an operational strategic element of the programs;

- Promotion of community participation and the mobilization of their political and material resources as a strategy to render the programs viable;

- Promotion of administrative decentralization of the operations as an administrative strategy of the programs;

- The subregional integration of the animal-health systems was accomplished by means of foot-and-mouth disease subregional subprojects that encompass areas of various countries belonging to a common subregion, whose geoecological, economical, productive, ethnic and social characteristics draw them together and make them interdependent, such as in the case of the River Plate Basin. This integration also encompasses the economical and commercial agreements among countries to facilitate trade;

- The interaction and coordination among the countries in the fight against foot- and-mouth disease has been achieved through the systematic functioning of the South American Commission for the Control of Foot and Mouth Disease (COSALFA), the border agreements and the subregional programs established by international agreements;

- Significant changes in the presence and behavior of the disease have been achieved, which include: elimination in Chile, the disappearance of highly intensive epidemics; the advanced control of the disease in large regions and the reduction in disease incidence from 13-20 per thousand herds annually affected in previous decades, to 1 per thousand currently; likewise, general morbidity has declined over the same period from 200-300 per 10,000 heads of cattle to the current 5 x 10,000;

- The area free of the FMD virus in the Americas, which encompasses North America, Central America, the Caribbean, Panama, Guyana

Suriname, French Guiana and, since 1981, has expanded to Chile, has been maintained free of the disease. A prevention buffer zone has been attained on the border between Panama and Colombia through the creation of a free area in Colombia that is undergoing expansion. The Argentine Patagonia has also been maintained virus free;

- Within the framework of the plan of Action for the Eradication of Foot-and- Mouth Disease and according to the strategy of regionalization established the following activities have been carried out:

The River Plate River Basin Subregional project for the Control and Eradication of FMD was initiated in 1989 on the basis of an agreement between Argentina, Brazil, Uruguay and PAHO. The first stage encompasses part of Argentina (Misiones, Corrientes and Entre Rios), part of Brazil (Rio Grande do Sul), and Uruguay. The program covers approximately 500,000 bovine herds with 30 million head and 35 million of sheep distributed over 640,000 Km2 of territory.

In the Cartagena Agreement Subregion the main developments included the conclusion of the negotiations concerning extension of the area involved in the ICA (Colombia Agricultural Institute) USDA (United States Agricultural Department) cooperation agreement for the eradication of FMD on the northern coast of the country. The area

of Uraba was declared free without vaccination. Resolution W/255, approved by the Ministers of Agriculture of the Andean Pact countries, within the Cartagena Agreement Board (JUWAC), states that the control and the eradication of foot-and-mouth disease is a priority for the countries in the region. PAHO/PANAFTOSA and JUNAC presented a project to the European Economic Community and there is possibility to obtain financing from this entity.

In the Amazon Subregion and East and Northwest of Brazil the main activities have been focused on the organization of the program in the "Pantanal" area which is considered a very important endemic area of the continent, training of personnel and surveillance at the border with Guyana, which is free of the disease.

In the countries of the area free of foot-and-mouth disease, activities centered on strengthening the epidemiological surveillance and information systems, as well as the bilateral animal health agreements for the organization of prevention programs. Progress was also made on the organization and holding Of the first meeting of the Subcommissions of Foot-and-Mouth Disease-Free Countries in the area of Central America and North America and in the Caribbean. With the technical cooperation of PAHO/PANAFTOSA all the countries of the disease free area are organizing and operating epidemiological surveillance systems as the basis to strengthen the prevention programs.

The projection of activities for the first stage (1989-1994) of the Hemispheric Program are as follows:

In general, an increase in the area of the Americas free of foot-and- mouth disease and advanced control in other areas of the affected countries;

The promotion and conclusion of bilateral and multilateral agreements setting up intercountry programs for the prevention, control, and eradication of foot-and-mouth disease;

In the South Cone of South America, absence of the clinical disease in the present area of the River Plate Basin project, extension of the area of the project, and the eradication of foot-and-mouth disease from the Argentine provinces of San Juan, Mendoza, Neuquén and Río Negro, adjacent to Chile.

In the Andean area, the eradication of foot-and-mouth disease in the departments of Tacna, Moquegua and Arequipa in Peru, expansion of the area of eradication on the Atlantic Coast of Colombia, eradication of clinical foot-and-mouth disease on the coast of Ecuador and in eastern Venezuela, and advanced control on the borders between Colombia and Ecuador and between Peru and Bolivia.

In Brazil and in the Amazon territories, eradication of clinical foot-and- mouth disease in the state of Roraima, advanced control in the west- central and southeastern regions, structuring of a control plan for the northeast, and integration of the foot-and-mouth disease programs in the Amazon areas into environmental protection projects.

FEASIBILITY OF ERADICATION/ELIMINATION

The feasibility of eradication of foot-and-mouth disease from South America is given by the following socioeconomic, political and technical considerations:

The domestic animal population of the Americas is of great importance in the national and international context. Foot-and-mouth affects cloven-hoofed species, jeopardizing the region's livestock economy because of losses and reduction of available protein of animal origin it causes.

Foot-and-mouth disease in South America causes an average of annual economic losses estimated at US$510 million. This amount includes what the public and livestock-raising sectors spend just to keep the disease at its present levels. However, it should be remembered that the annual total of economic losses caused by the disease prior to the 1970's was much higher than currently.

Because of the significant repercussions it exerts on the international markets for animals, products and byproducts of animal origin, foot-and-mouth disease has been one of the diseases causing constant concern among the governments and sectors involved in livestock production.

The political will and decision of the countries to eradicate the disease have been stated in the RIMSA V, VI and VII and COHEFA I, II and III

meetings. Specifically, this decision have been demonstrated by the governments of Argentina, Brazil and Uruguay for the development of the River Plate Basin project and by the Andean countries which approved decision 255 through the JUNAC for the establishment of a control and eradication program in this subregion.

A sound scientific and technological methodology of control and eradication has been developed that could lead to meeting the objectives and goals of the Hemispheric Program for the Eradication of Foot-and-mouth Disease. On the basis of the epidemiological surveillance system and the risk, characterization according to ecosystems, the countries developed a more comprehensive methodology for planning and implementation of differential strategies of control and eradication. Based on this concept of regionalization, the subregional projects have been organized and very promising results are being obtained.

As indicated, the countries have developed a good field and laboratory infrastructure. Vaccines of good quality and in adequate quantity are available.

Establishment of good inter country coordination and cooperation has been possible through the RIMSA (formerly RICAZ) meetings, The South American Commission for The Control of Foot-and-Mouth Disease (COSALFA) and the border agreements promoted by PANAFTOSA/PAHO.

The approach of PAHO to provide technical cooperation to the countries has been fundamental for the success of the subregional and national programs.

Within the framework of the Hemispheric Program and the socio-economic situation of the countries, PAHO technical cooperation continues to be required and will need to address the following orientations which are considered fundamental to achieve the objectives and goals of eradication:

a) Give priority to the strengthening of the program actions in areas that have convenient epidemiologic, administrative, social and productive conditions;

b) Consider the elimination of foot-and-mouth disease in the context of subregional and regional socioeconomic development and integration;

c) Strengthen the animal health actions at the local levels with the community's widespread and effective participation;

d) Promote the mobilization of resources from national private sources and obtain international funds;

e) Administer knowledge in the function of the regional socioeconomic and political reality;

f) Promote the methodological and technical-scientific inter country cooperation.

Sources of Information

Analysis of the Proposed Program Budget of the Pan-American Foot-and-Mouth Disease Center for 1992-1993 and 1994-1995.

Hemispheric Program for the Eradication of Foot-and-Mouth Disease in South America, Plan of Action, July 1988.

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ANNEX III

FEASIBILITY OF ELIMINATION OF AMERICAN TRYPANOSOMIASIS

FEASIBILITY OF ELIMINATION OF AMERICAN TRYPANOSOMIASIS

1. Epidemiological Situation

American Trypanosomiasis or Chagas' disease, is a parasitic disease caused by the hemoflagellate protozoa, Trypanosoma cruzi. The human infection occurs only in the Americas, where it is widely distributed in the peri-urban and rural areas of the tropical or subtropical countries, from Mexico to Argentina and Chile. It is transmitted to man and other mammals mainly through insects, the triatomine bug.[1-3] As an enzootic disease, it extends from approximately latitude 42°N (northern California and Maryland) to latitude 43°S (southern Argentina and Chile). The results of several serologic surveys indicate an overall prevalence of 16-18 million infected individuals[1]. Up to 20% of those infected will develop the cardiac and/or hollow viscera signs and symptoms that characterizes Chagas' disease.[1-3]

The endemic countries can be categorized based on the following criteria: magnitude of transmission, quantity and quality of available epidemiological information, and presence or absence of coordinated actions to control this disease. The following are the four groups of countries currently identified using these criteria.[3]

Group I. Argentina, Brazil, Chile, Ecuador, Paraguay, Peru, Uruguay, and Venezuela belong to this group owing to the magnitude of the spread of the disease, which has impelled health authorities to establish control programs, either vertically or, more recently, within the context of primary health care strategies. Based on the updated data, an account of the overall epidemiological situation in these countries is given in Table I. Unfortunately, since Chagas' disease continues not to be subject to compulsory reporting in most countries, the figures included in the table were obtained in different years for the different countries, although within the period 1981-1988.

Group II. In all the countries in this group, there is evidence of domiciliary transmission. In Bolivia, Colombia, and Costa Rica, a clear association exists between infection by T. cruzi and EKG alterations, as well as other pathologies attributable to Chagas' disease. Information on Mexico's current epidemiological situation indicates a high prevalence of seropositivity to T. cruzi antigens; moreover, visceromegaly and cardiopathy associated with T. cruzi infections have been reported in certain areas. Given these facts, Mexico is included in this group. Unfortunately, despite the health authorities' awareness of the problem and increased interest in finding a solution, control program activities have not yet been implemented in these countries. The overall epidemiological situation is summarized in Table 2.

Group III. Included in this group are El Salvador, Guatemala, Honduras, Nicaragua, and Panama, in all of which there is evidence of domiciliary transmission. More accurate epidemiological data are necessary to support evidence of a clear correlation between T. cruzi infections and severe clinical pictures. In all these countries, however, the acute phase of Chagas' disease is frequently observed, and recent serologic data indicate that the prevalence of positive reactions against T. cruzi antigens is relatively high. Table 2 provides additional epidemiological information.

Group IV. The countries and territories included in this group have in common the presence of reservoirs and triatomids naturally infected with T. cruzi, that is, the disease is enzootic. In some of the countries and territories belonging to this group (Antigua and Barbuda, Aruba, Bahamas, Belize, British Virgin Islands, Cuba, Curacao, Dominican Republic, French Guiana, Grenada, Guadeloupe, Guyana, Haiti, Jamaica, Martinique, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, United States of America,

and the U.S. Virgin Islands), the only recent evidence is the presence of infected triatomids. Belize and Trinidad and Tobago have reported some human infections in the past, as has Guyana more recently (1981).

The domestic cycle of transmission, which is maintained by man and domestic animals such as dogs, cats, and domestic triatomine bugs, is the one that maintains the infections in the rural and peri-urban areas. Species such as Triatoma infestans in Argentina, Bolivia, Brazil, Chile, Paraguay, Peru and Uruguay; Triatoma sordida in Bolivia, Brazil and Paraguay; Panstrongilus megistus in Brazil; Triatoma dimidiata in Ecuador and Central America; Rhodnius pallescens in Panama and Rhodnius prolixus in Colombia, Venezuela and Central America are the most important vectors. They adapt well to human dwellings where human and animal reservoirs are in intimate contact. The poor socioeconomic condition of the population and the domestic nature of the vector plays a crucial role in maintaining the infection.

Most cases of human infection occur in the rural areas, where they are acquired through contact with contaminated feces from infected triatomine bugs. It has been demonstrated that at least half of the chronically infected individuals have parasitemia, as shown by xenodiagnosis, and it is not unexpected that they may transfer the infection if they donate blood. Today, blood transfusion is considered the second most important mechanism of transmission.

Another mode of transmission that should be taken into account is the transplacental route. From 0.5% to 2% and up to 8% of the newborns from Chagasic mothers were found to be infected.

TABLE 1

American trypanosomiasis situation in Group I countries

Countries	Total population in millions	Population at risk millions	(%)	Seropositivity (%) Serologic surveys	Blood banks	Prevalence (%) of: Congenital infections	Maternal infections
Argentina	29.6	6.9	(23)	5.7-30	2.0-22	0.75-3.5	6.0-20
Brazil	132.5	25.0	(19)	4.4	1.0-25	2.0-10.5	5.10-10
Chile	11.6	7.3	(63)	20.3	0.3-14	0.4-18.8	0.5-9.5
Ecuador	8.6	0.38	(4.4)	2.6-10	3.2	...	...
Paraguay	3.0	0.94	(31)	4-83	11.3	...	...
Peru	17.0	6.7	(39)	11.8	0.2-12	...	...
Uruguay	2.9	0.97	(33)	1-7	1.0-14	0.1-1.5	8.2
Venezuela	17.3	12.5	(72)	1.3	5.0-12	...	...

Source: Health Conditions in the Americas. PAHO Sci. Pub. 524, 1990

TABLE 2

American trypanosomiasis situation in Group II and III countries

Countries	Total population in millions	Population at risk millions	(%)	Seropositivity (%) Serologic surveys	Blood banks	Prevalence (%) of: Congenital infections	Maternal infections
Group II							
Bolivia	5.7	1.8	(32)	32.0	...	5-8	51
Colombia	26.4	3.0	(11)	33.0	6.3	...	...
Costa Rica	2.3	1.1	(48)	11.7	7.6	...	...
Mexico	80.0	-	-	3-21	...	...	...
Group III							
El Salvador	4.7	2.1	(45)	20	...	...	...
Guatemala	7.5	4.02	(54)	16.6	8.7	...	...
Honduras	3.8	1.8	(47)	36.8	7.8-11	...	...
Nicaragua	2.8	-	-	...	28.0	...	...
Panama	1.9	0.89	(47)	3-22	...	...	...

Source: Health Conditions in the Americas. PAHO Sci. Pub. 524, 1990

2. Actual Status of Control Programs

Control of natural human T. cruzi infection mainly depends on elimination of the triatomids from rural housing. The feasibility to accomplish it is higher in areas where the vector is Triatoma infestants, which is mainly intradomiciliary. Insecticides such as benzene hexacloride, dieldrin, mercaptothion, fenitrothion, metylcarbamate and synthetic pyrethroides have been widely used to kill the vector, although some problems may arise from their operational cost and availability. A more permanent solution is offered by the improvement of houses. Eight countries of the Americas have active control programs that combine insecticide spraying with health education. In a few of them, limited programs for housing improvement have also been implemented.

In large parts of the Southern Cone countries, programs have entered into the surveillance phase characterized by monitoring of house infestation, and where necessary, focal spraying. Constraints on existing control programs and resource limitations may be overcome by complementing conventional approaches with simple control and surveillance methods suitable for application following the primary health care strategy.

Two new Chagas vector control tools have been developed in recent years and are being tested--the fumigant canister and a range of slow release compounds, i.e., formulations of paints mixed with insecticides. The integration of pyrethroid spraying of the peridomicilium, the timely and well-spaced use of the canister and community-based bug monitoring using newly developed biosensor boxes are the basis for a possible alternative approach to achieving sustained and affordable vector control in areas where the conventional spraying campaigns are not feasible.

To prevent transmission through transfusion, blood is being screened by serology, and those units which are positive should be discarded. The possibility of false negative results are minimized when using at least two

serological tests and a proper systems of quality control. In some countries such as Argentina, Brazil, Honduras, Uruguay, and Venezuela, serology for T. cruzi is mandatory for blood donors. However, even when mandatory serology is strictly enforced, there is still a small possibility that T. cruzi could be transmitted through blood transfusion because of the 2-3% false negative results of the serology.

3. Feasibility of Elimination/Eradication

Being a zoonoses with a sylvatic cycle, T. cruzi infection cannot be eradicated. However, the tools for interrupting the domestic cycle of T. cruzi transmission, through chemical control, housing improvement, and health education, have been available for decades. For example, after 20 years of executing control programs in Argentina, positive serology in 18 year-old males significantly decreased since 1980, and the numbers of reported new acute cases decreased since the seventies. In Brazil, vector transmission has been interrupted in the whole State of Sao Paulo since the mid-seventies. Considering the whole country, a 73.84% reduction in the number of municipalities infested with T. infestans was observed in 1986 compared to the period from 1975 to 1983. In Venezuela, entomological, serological and case detection results showed a steady decrease through time in the house infestation rate and seropositivity.[1,4-6]

Available knowledge indicates that the most common way of transmission of human T. cruzi infection could be interrupted by: a) implementation of vector control activities in houses in order to first reduce and then eliminate the vectorial transmission of T. cruzi, and b) strengthening the capability of blood banks in order to prevent transmission of Chagas' Disease and other diseases transmitted by blood transfusion in the context of the development and implementation of a policy for human blood use.

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ANNEX IV

FEASIBILITY OF ERADICATION/ELIMINATION OF LEPROSY

FEASIBILITY OF ERADICATION/ELIMINATION OF LEPROSY

1. Epidemiological Situation

Leprosy continues to be an endemic disease and it represents a public health problem in most countries of the Americas.[1-3] However, the detailed knowledge of the leprosy epidemiology in the Region can at present be considered precarious.[4-6] Information through surveys, or research, is difficult to obtain because the disease is chronic, and also because of the involved social stigma.[4,7] In addition, the official information system has inaccuracies related to under reporting or over reporting. In the former, it is due to limited coverage of case finding, or failure in the reporting system. In the latter, inacuracies result from not eliminating the healed cases from the registry.[2,8]

The available PAHO/WHO official data indicates that the Americas have 8.1% of the leprosy cases registered in the world. This percentage corresponds to 301,704 patients with a prevalence rate of 0.42 per 1,000. The Americas average detection rate is 0.43 per 10,000. In the last two decades there has been a slight decrease in the global indicators of prevalence and detection.[9,10]

The distribution of the absolute number of cases in the Region clearly shows two extreme situations. On one side, most of the small insular Caribbean countries, have low endemic levels. On the other side is Brazil, with a total of 259,917 patients registered (that is, 86.1% of the total of patients registered in the Region) and a detection rate of around 27,000 new cases per year. Furthermore, in the last years, there has been a tendency in Brazil for the detection rates to increase (average annual increase of 5%), contrary to almost all of the American endemic countries.[9,10]

Table I shows the epidemiological situation of leprosy in all American countries and territories, classifying them according to their prevalence and detection rates for the most recent year in which there is information available.[1,9,10]

2. Actual Status of Control Programs

Incorporation of control activities of specific programs- e.g. leprosy- in the general health system, means the progressive integration of vertical control programs.[2,12,13,14] However, the maintenance of specialized technical support, especially during the present stage of implementation of multi-drug therapy (MDT), should also be taken into consideration. Multi-drug therapy, together with the early diagnosis of cases through the service system,is at present the basis of any plan aiming at leprosy elimination as a problem of public health.[3,14] It must be noted, however, that in the Americas, only 23.8% of the patients of the Region are under MDT while the average world rate is 55.7%. Brazil, for example, has only 12.2% of its cases registered under MDT.[9,15] Table 2 shows the operational situation of control programs in the American countries and territories according to MDT and the absolute number of patients registered, as a parameter for estimating the demand of the service system.[11,9,10]

3. Feasibility of Elimination *

Elimination of leprosy at regional level as a public health problem (prevalence rate less than one case per 10,000 inhabitants) is feasible with the available technology: a) Protection of a segment of the susceptible population by BCG vaccination; b) early detection, essentially clinical, depending on the quality of care; c) effective treatment (MDT); and d) prevention and treatment of possible physical disability with simple

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* Prevalence rate less than one case per 10,000 inhabitants

Table 1
EPIDEMIOLOGICAL SITUATION OF LEPROSY IN THE AMERICAS

Incidence rate 0/000	- 0 -	0,01-0,50	0,51-0,99	1,00-1,99	≥2,00	There are no data	Total No.
Prevalence rate 0/00							
-0-	Belize Chile El Salvador Virgin Islands					Cayman Montserrat	6
0,01-0,20	Barbados Canada Grenada Jamaica Panamá	Costa Rica Dominica Dominican Republic Ecuador Guayana Honduras Mexico Perú St. Vincent/ Grenadines Trinidad/ Tobago U.S.A. Uruguay				Antigua Barbuda Bahamas Bermuda Guatemala Haití Nicaragua	23
0,21-0,49	Turks & Caicos	Argentina Bolivia Colombia Cuba Venezuela	Saint Lucia				7
0,50-0,99			Martinica Paraguay	Guadeloupe	French Guyana Suriname		5
≥1,00				Brazil			1
There are no data	Anguilla St. Chris/ Nevis					Nether-land Antilles	3
Total #	12	17	3	2	2	9	45

Remarks: Puerto Rico is included in U.S.A.
Virgin Islands is considered once.
Sources: References 10 and 11

Table 2
SITUATION OF LEPROSY CONTROL PROGRAMS
IN THE AMERICAS

MDT Coverage Absolute No. of cases	>75%	31-74%	<30%	-0-	There are no data	Total No.
-0-				Belize		1
<1.000	Antig./ Barbuda Bahamas Barbados Bermuda Dominica El Salvador French Guyana Guyana Haiti Honduras Jamaica Panamá St. Lucia St. Chris/Nevis St. Vincent/ Grenadines Suriname Trinidad/ Tobago Turks/ Caicos Uruguay	Chile Costa Rica Grenada Guadalupe Martinica			Canada Guatemala Nicaragua	27
1.001-4.999	Cuba Domin. Rep. Ecuador Paraguay	Bolivia	Perú			6
>5.000	Colombia Venezuela	Argentina México U.S.A.	Brazil			6
There are no data					Anguilla Cayman Montserrat Neth. Antil. Virgin Isl.	4
Total #	25	9	2	1	8	45

Remarks: 1) Puerto Rico is included in U.S.A.
2) Virgin Islands is considered once.
Sources: References 10 and 11

Table 3
INTERVENTION MEASURES ACCORDING TO LEVEL OF CARE

	LEVEL		MEASURE
a)	Community	-	Identification of potential patients
		-	Collaboration for regular treatment
		-	Support to disabled patients
b)	Primary	-	Passive detection of cases (clinic + bacteriology)
	(Basic Health Unit)	-	Active case finding in the family risk group (intradomiciliary contacts)
		-	Application of BCG
		-	MDT provision
		-	Application of simple techniques of prevention and treatment of disabilities
		-	Participation in operational research protocols
c)	Secondary	-	Active search of cases in non-familial risk groups (extradomiciliary contacts)
	(Ambulatory or In-patient)	-	Confirmation of doubtful cases (histopathology)
		-	Management of the reactions and effects adverse to the treatment
		-	Application of more complex techniques in the prevention and treatment of disabilities
		-	Participation in the training of primary level personnel
		-	Compilation of statistical data (surveillance) and for research protocols
d)	Central	-	Definition of the control plan
		-	Financing
		-	Supply of drugs and other basic products
		-	Personnel training
		-	Massive educational activities (radio, T.V., etc.)
		-	Compilation and analysis of statistical data (surveillance) and from research protocols
		-	Preparation of research projects (especially operational research)
		-	Supervision and evaluation

techniques at primary care level. Pre-clinical detection (serology, cutaneous tests, etc.) and specific vaccination, although it shows potential for future use, it is still in the research stage. Table 3 shows the different intervention measures. They are the basis of a strategic plan according to levels of care, existing scientific knowledge, and available technology. However, it must be taken into consideration that old patients suffering from disabilities should receive adequate care from the general health service system.[3,4,8,16,17]

The sustained use of the intervention measures mentioned above provides the basis for the elimination of leprosy as a public health problem in some countries of the Region in the year 2000. However, achieving this goal will depend on the decision-making ability and coverage of the control programs, as well as the rhythm of their integration to the general health services system and the speed of implementation of the epidemiological stratification process under the epidemiological risk approach. In the case of Brazil, it will depend on the capability for the development of a special project of intersectorial cooperation.

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ANNEX V

FEASIBILITY OF ERADICATION/ELIMINATION OF NON-VENEREAL TREPONEMATOSES

FEASIBILITY OF ERADICATION/ELIMINATION OF NON-VENEREAL TREPONEMATOSES

1. Epidemiological Situation

Available statistics do little to clarify the epidemiological situation that currently prevails in the Americas regarding both yaws and autochthonous pinta. The most recent information available for the Region of the Americas, indicates that yaws has been reported sporadically in the northern part of South America (Brazil, Venezuela, Suriname, Guyana, and Colombia). Pinta has appeared to be limited to certain areas in the south of Mexico, Central America, and Colombia. As recent as 1988, some foci of endemic yaws were reported among rural populations in Haiti in the course of surveys for HIV infection. In addition, there are reports of pinta in some indigenous communities of Venezuela.[1-4]

What is notable about this reappearance of new case foci in areas that were once highly endemic is that there seems to be a change in clinical characteristics, with a prevalence of more benign, less evident cases than in the past. A preliminary assessment of the current epidemiology of non-venereal treponematoses in the Americas should take three important factors into account: a) intense urbanization of the populations; b) recrudescence and the changes in profiles of distribution (particularly by age) of sexually transmitted diseases, including venereal syphilis; and c) progressive absorption of indigenous populations that had formerly been isolated.

2. Actual Status of Control Programs

After the eradication, euphoria from penicillin's mass treatment campaigns of the 1950s and 1960s had subsided. The weaknesses and defects in this type of approach began to appear: intensive surveillance activities

(consolidation phase) by specialized personnel were not maintained, and the human resources assigned to the general health services were not trained for the performance of this function. In most countries the demographic, socioeconomic, and behavioral changes responsible for the increase in sexually transmitted diseases were not accompanied by reinforcement (and often not even the creation) of integrated control programs for these diseases--except recently for AIDS. As a result, in addition to a lack of knowledge about the epidemiological situation, today there is not even a minimum base of resources (human, physical, etc.) specifically allocated for this purpose, let alone a specialized structure that could be used initially to make an attempt at eliminating non-venereal treponematoses in the Americas.[5-10]

3. Feasibility of Elimination/Eradication

The recent resurgence of treponematoses, particularly in the countries of Central and West Africa, has prompted WHO to address the problem in the context of the available primary health care systems (PHC). The technologies available--i.e., laboratory detection that permits mass screening, but without the possibility of differential ethiological diagnoses for venereal syphilis, and effective low-cost therapy using a combined dose-- allow the conclusion that the interruption of transmission is a realistic and feasible objective for current control programs;[4,5,10-13] even though there is low level of knowledge about signs and symptoms on the part of primary health care personnel and there is virtually a nonexistence of measures for protecting susceptible individuals.

The current control (or eradication) strategy for the non-venereal treponematoses is considered in terms of its implementation through vertical programs or programs integrated into the primary health care (PHC) system.[11,12] It should be noted that areas characterized by low PHC

Table I

Interventions by Level of Care
Non-venereal Treponematoses

Level	Measure
a) Community	- Identification of suspicious cases
b) Primary (Basic Health Unit)	- Passive detection of cases (clinical and based on dark-field microscopy) - Active case-finding among contacts (clinical and using non specific serology) - Treatment (benzylpenicillin) - Participation in serological surveys (screening)
c) Secondary (Outpatient or inpatient)	- Diagnostic confirmation (specific serology for treponematoses) - Management of alternative therapies or adverse reactions - Compilation of data for statistics (surveillance) and research protocols - Serological surveys based on index cases to determine prevalence - Provide training at the primary health care level
d) Central	- Development of the control plan - Financing - Provision of equipment - Provision of drugs and reagents - Mass education campaigns (radio, television, etc.) - Personnel training - Compilation and analysis of data for statistics (surveillance) and research protocols - Formulation and design of serological surveys and research projects (especially operations research) - Supervision and evaluation

coverage and high endemicity will initially require temporary vertical programs until the level of transmission has decreased. A specialized team, together with a community health worker, could conduct an initial survey and then proceed with treatment and conduct subsequent follow-up surveys. With increasing PHC coverage, the system would gradually take on activities

involving early detection, treatment, and follow-up of cases and contacts, in addition to being responsible for educational activities.[9-12] Table I summarizes the interventions for non-venereal treponematoses, ranked according to levels of care.

In view of the lack of sufficient information available on the current epidemiological status of these diseases, there is need for an initial period of approximately three years to categorize the reported cases for the purpose of clinical, bacteriological, and serological confirmation; to carry out serological surveys based on these "index" groups in order to establish prevalence, proportion of recent/latent/delayed cases, and distribution by sex, age, urban/rural origin, etc.; and to conduct epidemiological (seroepidemiological and operational) research to establish strata and gain a better understanding of risk factors.

Subsequent stages in the areas selected, through the stratification process mentioned before, would include training primary health care personnel from ongoing related programs to assume responsibility for clinical confirmation, treatment management, and surveillance. Then, it will be possible to implement intervention measures in the endemic areas, through ongoing PHC activities .

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ANNEX VI

MULTINATIONAL STRATEGIC PLAN OF ACTION TOWARD ONCHOCERCIASIS ELIMINATION IN THE AMERICAS

CONTENTS

MULTINATIONAL STRATEGIC PLAN OF ACTION TOWARD ONCHOCERCIASIS ELIMINATION IN THE AMERICAS

I. INTRODUCTION

Onchocerciasis, a chronic parasitic disease caused by Onchocerca volvulus and transmitted by several species of blackflies of the genus Simulium, exists in six countries in the American Region: Brazil, Colombia, Ecuador, Guatemala, Mexico and Venezuela.

The endemic foci of the disease may be grouped in two well-characterized ecological areas: 1) The affected Region in Guatemala, Mexico, Venezuela and Brazil are located in mountainous areas at an altitude of 200 to 1200 meters above sea level. Three zones related to coffee growing or forest areas can be identified: dry pre-montane biome, humid pre-montane biome and very humid pre-montane biome. Most of the human population affected is native; 2) Colombia and Ecuador which have endemic foci at an altitude of 20 to 200 meters above sea level, have at the foot of the western slope of the Andes Cordillera, a transitional zone that goes from the humid tropical biome to the very humid tropical biome. Two ethnic groups (black and indigenous tribes) are affected because of their linkage with their agricultural, fishing and mining activities.

The foci of Guatemala, Venezuela and Mexico are the most important in the Region. The endemic foci in Guatemala and Mexico have remained stable. On the contrary, the endemic focus located in an area of 200,000 Km^2 in the Venezuelan-Brazilian border seems to be in expansion, as well as the small focus located in the Esmeraldas province of Ecuador.

Data available on the prevalence and intensity of infection comes from limited and descriptive epidemiological studies. However, quantitative techniques have been introduced in the epidemiological approach in Guatemala, Ecuador, Mexico and Venezuela.

Clinical manifestations of the disease (subcutaneous nodules [onchocercomata], skin and eye lesions), are similar in the different endemic areas of the Americas, with some variations mainly related to the intensity of the transmission, the bionomy and, particularly, the biting habits of the vectors (Simuliids or "blackflies") and the different strains of O. volvulus involved. In 1990, an estimated total of 105,600 well-documented cases were reported in the six affected countries from a population of 5,25 million individuals at risk.

The distribution of nodules on the body varies significantly. In Guatemala, the nodules were located in the head (25.2% in the occipital and 22.1% in the parietal regions), and 38.9% in the trunk. On the contrary, in Ecuador 81.1% of nodules were located in the trunk area (41.1% in the iliac crest), and only 13.7% in the head. In Venezuela, 85.6 were found in the trunk and limbs, and 14.4% in the head.

The main ocular manifestations of onchocerciasis in the endemic areas of the Region are corneal opacities classified as keratitis punctata, loss of visual acuity, uveitis and less frequently, sclerosing keratitis. Keratitis punctata was seen in 8.0% to 70.0% of positive individuals in several coffee plantations of Guatemala, and in approximately 90.0% of all positive patients in Ecuador.

Blindness is a sequelae of onchocerciasis that can be caused by a variety of lesions that affect different parts of the eye. At present in Guatemala and Mexico, blindness is relatively rare and usually results from anterior uveitis. There is no accurate information available on the actual blind population, based in systematic ophtalmological assessment; this is particularly notable in Brazil, Colombia and Northern Venezuela.

Onchocerciasis vectors

Several species of simuliids have been identified as vectors of O. volvulus in the Region. In Brazil, species identified among the S. amazonicum groups are: S. oyapockense s.l./S. roraimense, which is the principal vector, and S. guianense s.l., S. limbatum and S. exiguum; in Colombia, S. exiguum, and recently S. metallicum has been added in Ecuador, S. exiguum, S. quadrivitatum and S. antillarum in Guatemala and México, S. ochraceum, S. metallicum and S. callidum. S. ochraceum is the main vector in both countries. S. gonzalezi, S. veracruzanum and S. haematopotum are considered possible vectors.

S. horacioi, a new mainly zoophilic species closely related to S. metallicum has been recently identified as a potential secondary vector in

San Vicente Pacaya, Guatemala; and in Venezuela, S. metallicum, S. pintoi, S. exiguum, S. cuasisanguineum, and S. incrustatum.

CONTROL MEASURES

Mexico and Guatemala, have implemented control activities since 1930 and 1935 respectively, which were primarily oriented towards surgical extirpation of nodules (denodulization campaigns). This activity is still being implemented in both countries. In the past, it has been associated with selective chemotherapy with diethylcarbamazine (DEC). There is controversy regarding the impact of the denodulization campaign to control the disease. This is due to lack of systematic and quantitative studies designed to measure the severity of infection and disease before and/or after the generalized use of nodulectomy in endemic areas.

In Mexico, however, it is believed that control activities through denodulization has had some impact on the onchocerciasis transmission. Low prevalence rates (presence of nodules) were found in Chiapas in 1972-1978 (11.9%) and in Oaxaca (7.8%) in comparison with those rates reported in Chiapas in 1962 (35.0%), and in Oaxaca in 1949 (15.5%) and in 1962 (10.6%).

Some data from Guatemala suggest that nodulectomy is ineffective in reducing the transmission of the disease; however, it alleviates the incidence of severe ocular lesions. This finding is supported by epidemiological studies showing that the prevalence of ocular manifestations are highly correlated with that of the ocurrence of head nodules.

Both countries also have experience in vector control. In Guatemala in 1975, basic research work for onchocerciasis control including vector control and chemotherapy started in San Vicente Pacaya. The area were the pilot study was carried-out extends in proximity of 236 km^2. S. ochraceum is the principal vector. In 1979, a control trial with fortnightly applications of 3,3 ppm temephos (Abate 5% wpd) per 10 minutes flow volume was initiated in the Barretal River Basin. It was reported that a marked reduction of the vector population was achived. Nevertheless, due mainly to the high costs and logistic implications, these actions has been interrupted almost completely.

In 1982 in Ecuador, on the Rio Santiago, a hypoendemic area for onchocerciasis, all palpable nodules found in 72 persons (29%) out of 244 with mf in the skin, were removed. Additionally, since 1983 a nodulectomy programme in the hyperendemic area in Ecuador (Rio Cayapas) has been in operation. In 1988 Guderian reported that more than 1,000 surgical interventions have been performed, including removal of more than 5,000 nodules. Although there was marked reduction in the number of mf in the skin and eye with accompanying improvement in the associated pathology, new nodules develop at a greater rate than that which they can be removed. This emphasizes the need to seek a more efficient way of eliminating the adult worm and the microfilariae produced by the females in the nodules.

In Venezuela, control of onchocerciasis was based in the past on the treatment of patients with DEC as part of the integrated activities oriented towards the control and treatment of leprosy, leishmaniasis and mycoses.

The Mectizan Donation Program

In october 1987, Merck and Co. Inc. announced its plan to donate Mectizan™ (ivermectin, MSD) to treat onchocerciasis in all countries affected by the disease, as long as needed. The Company was joined in the announcement by the World Health Organization, its Regional Offices and the Pan American Health Organization. Since then WHO/PAHO serves as the technical partner in what has come to be known as the Mectizan Donation Program. Donation of Mectizan were to be made in two ways: 1) to physicians to treat their patients; and 2) to organizations able to organize and implement community-based, mass treatment programs in areas heavily infected by Onchocerca volvulus. The main objective of the program is to guarantee that all registered onchocerciasis patients in the endemic countries will receive the adequate therapeutic regime (annual single doses), at no cost. The countries through the correspondent Ministries of Health are assuming the responsibility to assure a timely and efficient distribution and administration of the tablets, as well as the proper registry and monitoring of the patients after the treatment.

Special interest has been placed on the accurate record and management of any side effects that may occur. Currently there are no actions addressed to assess the prevalence/incidence before and after the Mectizan™ administration as a part of the Donation Program. Under these circumstances it is difficult if not impossible, to asses the impact of these chemotherapeutic actions on the epidemiological situation in the affected countries of the Region.

By December 1990, the manufacturers had provided IVR free of charge to five of the endemic countries in America, through the Mectizan Expert Committee. In Section I.A additional information is provided on the current status of Mectizan™ distribution in the Americas.

More than half of the applications for community programs have come from ministries of health or other official health agencies and one-third have come from health-related non-governmental organizations (NGO's). The initial applications for donation of Mectizan have enabled 1.3 million treatments through March 1991, and applications to continue treatment programs have included almost 1 million re-treatments.

During the 3 years that the Mectizan Donation Program has been in operation, sufficient tablets for more than one half million treatments have been provided directly to physicians requesting drug distribution for patients --part of Merck's humanitarian drug distribution activity. Altogether, Mectizan has allocated more than 3 million treatments or re-treatments which have been approved for community-based, mass treatment or individual patient treatment programs since 1988.

The following Tables give details of the Mectizan Donation Program.

Table MDP-1. Number of Mectizan treatments proposed in approved initial and continuation applications, by year of application approval, 1988-1991*.

YEAR	TYPE OF APPLICATION				TOTAL TREATMENTS
	INITIAL		CONTINUATION		
	Number Applicat.	Treatments Proposed	Number Applicat.	Treatments Proposed	
1988	1	255,000	-	-	255,000
1989	16	239,220	-	-	239,220
1990	16	708,225	3	613,247	1.321,502
1991	4	138,294	4	512,901	651,195
TOTAL	37	1,340,769	7	1,126,148	2,466,917

* September 1988 through March 1991

Mectizan Expert Committee
April 1991

Table MDP-2. Countries in Africa and the Americas where community-based Mectizan mass treatment program applications have been approved, 1988-1991*.

A F R I C A (23 of 27 infected countries)

Benin	Equatorial Guinea	Nigeria
Burkina Faso	Gabon	Senegal
Burundi	Ghana	Sierra Leone
Cameroon	Guinea	Sudan
Central African Rep.	Guinea Bissau	Togo
Chad	Liberia	Uganda
Cote d'Ivoire	Mali	Zaire
Ethiopia	Niger	

A M E R I C A S (5 of 5 infected countries)

Brazil	Guatemala	Venezuela
Ecuador	Mexico	

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* September 1988 through March 1991

Mectizan Expert Committee
April 1991

Table MDP-3. Number of treatments possible with Mectizan provided through community-based, mass distribution and humanitarian donation programs, by year, 1988-1991*.

YEAR	NUMBER OF TREATMENTS**		
	Community-based***	Humanitarian***	TOTAL TREATMENTS
1988	255,000	26,000	281,000
1989	239,200	112,200	351,400
1990	1,321,500	342,500	1,664,000
1991	651,200	55,700	706,900

* Community-based data: September 1988 through March 1991
Humanitarian program data: April 1988 through March 1991

** Rounded to nearest hundred (Humanitarian program treatments based on ratio of 1.5 tablets/treatment)

*** Community-based treatments: Estimated 45% retreatments
Humanitarian program treatments: Proportion of retreatments undetermined

Mectizan Expert Committee
April 1991

Background information on Ivermectin*

Ivermectin is a semi-synthetic macrocyclic lactone which was first described about 10 years ago (Albers-Schoenbergh, et al, 1981). The basic substance is a fungal fermentation product derived from the coil-like actinomycete Streptomyces avermitilis which was first isolated from a soil sample from a Japanese golf course. Ivermectin (IVR) is derived from a chemical group of congeners, the avermectins (AVR).

As potential bacteriocidal or antifungal agents, the avermectin compounds found no real chemotherapeutic application, but, in the early eighties (Mrozik, et al, 1982a), powerful anthelminthic properties were demonstrated. In the course of pharmacological investigation of the AVR compounds many chemical alterations of the basic structure have been examined (Fisher & Mrozik, 1989) with IVR being the most active moiety against mammalian parasites.

Although IVR was initially believed to block the neuro transmitter gamma-amino acid (GABA) (Campbell et al, 1983), a recent review (Turner & Schaeffer, 1989) has postulated that in target organisms IVR may bind to specific high-affinity (of the order of 10^{-10} to 10^{-12}) sites. As the result of IVR-binding, an increased permeability to chloride ions follows, and affected nerves are depolarized. The authors add that GABA-mediated Cl-channels may also react with IVR, but at generally higher concentrations of the drug (around 10^{-7}M).

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* Information quoted from Jamison, D.T. & Mosley, W. H. Evolving Health Priorities in developing couantries. Chapter 15. The World Bank. 1990.

From field and laboratory studies, it is known that IVM profoundly affects microfilaria (mf), including those that are still developing in the female. The result is that normal larvation is halted, as dead or defective mf accumulate in the uterus. The effect of the drug is quite stage- specific, involving early ("stretched") mf in the distal uterus, and not the more mature coiled types (Albiez et al, 1988; Lok et al, 1988). Peripheral migrating mf, when observed in the anterior chamber of the human eye, showed "abnormal and reduced winding and coiling" (Sobaslay et al, 1987). In patients that have been treated with the drug, progressively fewer mf are recovered in skin snips. In one study, three days after therapy, mf were reduced to 14% of control numbers. However, mf which emerged from skin snips of treated patients, did not appear to be immobilized by IVM (Mossinger et al, 1989).

The microfilaricidal effect of a single treatment is very persistent. A reduction of dermal mf density both reduces skin pruritis and temporarily blocks transmission to the vector fly (Cupp et al, 1989). Likewise, corneal and limbic invasion of mf is decreased or halted. The field teams of Dadzie (1987), Newland (1988), and Taylor (1989) all reported that annual treatment was very helpful for patients with light to severe onchocercal eye disease.

The disadvantage of IVR is that single dose therapeutic regimens do not destroy adult filarial worms. Female O. volvulus (Greene, Brown and Taylor, 1989), Loa, and the oligo-pathologic agent Mansonella perstans (Richard-Lenoble et al, 1988), as well as Wuchereria bancrofti (Kumaraswami et al, 1988), all resume larvation within months after exposure to IVR. In the species mentioned above, the drug causes significant and long term reduction

in circulating mf. Therefore, most recent reviews conclude that IVM is superior to and safer to use than diethylcarbamazine, a drug which has been used for half a century in the treatment of filariasis (Kamaraswami et al, 1988; Albiez et al, 1988). Whether the combination of IVR with a benzimidazole (such as Albendazole) will increase the filaracidal potential remains as yet undetermined.

Activity of IVR against intestinal nematodes is striking. According to recent field reports (Nalin et al, 1987; Naquira et al, 1989), a single or double dose of IVR will remove 100% of Ascaris lumbricoides, and 70% to 85% of Strongyloides stercoralis, Enterobius vermicularis and Trichuris trichiura. Patients with hookworms were somewhat improved since egg production was decreased by approximately 60%. However, 200 ug/Kg of IVR resulted in only about 20% long term cure at three months.

Ivermectin, when its pharmacokinetics were followed in man, showed a rather complex excretion pattern. Its half life, and that of the metabolites, is about 12 hours and includes an entero-hepatic recycling pathway. Only 1% of the metabolites are found in the urine; most of the excretion is through the bile. The degradation products may be fatty-acid ester conjugates, as well as aglycone, i.e., the basic structure stripped of the two oleandroses. Some IVR may be stored in body fat, and released slowly; this might explain why microfilaracide activity persists for months after medication.

Up to now, more than 30,000 people have been treated with Ivermectin in the Region, many with more than one dose. There are few, if any, drugs at present in use for the treatment of tropical diseases that have undergone the scrutiny that IVR has endured. The drug is extremely safe. No deaths attributable to dosages of IVR have been reported.

Treatment of O. volvulus infection is associated with a mild (Mazzotti-type) reaction in approximately 10% to 30% of individuals. This occurs within the first two to three days in most cases and resolves spontaneously. The major components of this reaction include pruritus, fever, rash, oedema, lymph-node swelling and pain, muscle pain and headache.

More severe side-effects have occurred during IVR therapy, with a frequency of less than one in 1,000. These include orthostatic hypotension and asthma attacks (in known asthmatics), both occurring within 36 hours of ingestion of IVR. In addition, bullous skin lesion occurring one to two weeks post-therapy have been observed.

Exclusion criteria

At present, the following exclusion criteria apply to ivermectin distribution:

- o Pregnancy (further data forthcoming in the next one to two years may render this exclusion unnecessary).

- o Breastfeeding a child less than three months old.

- o Age less than five, or weight less than 15 kg (unless there is a clear indication for therapy).*

- o Central nervous system disorders, especially meningitis and African trypanosomiasis. Peak prevalence months for meningococcal meningitis should be avoided.

- o Severe concurrent illness.

Monitoring

Although Ivermectin appears to be an extremely safe drug, the possible adverse side-effects (e.g. hypotension, asthma) seen in onchocerciasis patients are readily managed with appropriate medical advice and simple treatment. Most cases of hypotension will resolve with bed rest and oral

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* The meeting concluded that because of the intensity of infection in children who are ineligible for treatment in Ecuador and Venezuela, MS&D, WHO/PAHO and The Mectizan Expert Committee should consider formulating ivermectin for pediatric treatment.

fluids, and the asthma attacks have responded to aminophylline. Adverse reactions are more commonly seen with heavy infection. Furthermore, the most severe adverse events have occurred after the first dose of Ivermectin. Reactions are less common and less severe with retreatment, presumably due to reduced microfilarial loads. Therefore, the following recommendations are made for monitoring after ivermectin treatment:

- o Immediately after initial treatment an experienced health-care worker (e.g. nurse or physician) within the community should be available for at least the first 36 hours following therapy.

- o The level of monitoring for succesive treatment can be determined based on the previous experience in the area.

The impact of ivermectin on disease morbidity in the treated population requires further detailed studies over a longer period, but early lesions in the anterior regions of the eye have already been known to be reversible. The substantial reduction of microfilaria from the skin (sustained for at least six months following treatment), gives relief from itching and facilitates improvement of superficial lesions.

Effect of Mectizan on adult Onchocerca volvulus.

During IAC091*, Dr Brian O. L. Duke reported that trials of ivermectin have been carried out on the following dosage regimens. Six doses at intervals of two weeks; 12 doses at intervals of one month; four

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* First Interamerican Conference on Onchocerciasis (IAC091). Guatemala City and Tapachula, Chiapas, Mexico. April 28 - 1st May, 1991.

doses at intervals of six months; up to 11 doses at intervals of three months. The effect of the drug in adult worms was investigated in histological sections of nodules and from the study of whole worms extracted by collagenase digestion. Ivermectin appears to have the following effects:

a) Internal microfilariae are either paralized and/or are unable to leave the female worm only to interfere with the usual release mechanism. Intrauterine embryos complete their development to microfilariae but then degenerate. This effect may last for three to six months.

b) Within two weeks of a dose of ivermectin many male worms disappear from the nodules, thus reducing the ratio of males to females. The missing males do not die in the nodules. They presumably move elsewhere in the body of the host and they may die in extranodular sites, although there is no direct evidence of this.

c) As a result of the paucity of male worms the proportion of live female worms that are uninseminated rises.

d) Repeated dosage with ivermectin has a lethal reaction in a proportion of the adult female worms. Three-monthly dosage with ivermectin for 3 consecutive years reduces the number of live female worms from 90% to about 50% and those which are still alive are not producing microfilariae four months after the last dose.

It is probable that three-monthly dosage is the near-optimun ivermectin schedule for killing adult worms and interrupting transmission by preventing production of new microfilariae.

Research priorities (accompanying projects in control program activities) should include determining, 1) the frequency of retreatment required in areas of differing endemicity, 2) the necessity to retain currently applied exclusion criteria, and 3) optimization of drug delivery systems to provide cost-effective methods for identifying and treating those infected with O. volvulus.

To fully evaluate the impact of ivermectin on disease transmission, it will be essential to apply new molecular identification techniques to differentiate animal Onchocerca species ocurring in the blackfly vector, and to use computer modelling techniques to predict the long-term effects of widespread use of the drug.

A. Current situation in Latin America

The more recent review of the global epidemiological situation of onchocerciasis was made in 1986 and the results reported in 1987.*

In the African Region it was estimated that over 72 million inhabitants were at risk, with more than 17 million of already infected individuals; among those there was a total of 326,600 blind as consequence of the disease. In the Eastern Mediterranean Region, over two million were at risk, with 540,000 persons infected by O. volvulus, and 8,400 people blind. In the Americas it was estimated a total population at risk of over five million, with more than 97,200 already infected and 1,400 blind individuals.

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* WHO Expert Committee on Onchocerciasis. Third Report. Technical Report Series, No. 752, 1987.

A review of the available epidemiological information on the situation of onchocerciasis in the Americas was done during the First Interamerican Conference on Onchocerciasis (IAC091), which was held in Guatemala City, Guatemala and in Tapachula, Chiapas, Mexico, from 28 April - 1 May 1991, as a border meeting within the context of a trinational agreement suscribed by Belize, Guatemala and Mexico in 1990. Difficulties to compare information from different areas were confirmed, mainly due to the heterogeneity of information, the lack of continuous and systematic studies using standardized methodologies and the differences of criteria for selecting epidemiological indicators, target populations, interventions, etc.

Nevertheless an attempt was made to summarize the more relevant information (Table 1).

Based on these findings, a proposal was made to develop a standardized protocol to comparatively assess the epidemiological characteristics of onchocerciasis in different geographical areas; to select indicators to better estimate the disease, evaluate impact of intervention measures, and to organize operative aspects (e.g. costs, coverages, drug distribution systems, health education) of intervention-related research, containing critical concepts and definitions that should be taken into consideration for the preparation of a standardized protocol (to be discussed in VI.C).

The need to improve field diagnosis of onchocerciasis, and the importance of epidemiological, clinical and ophthalmological assessment was emphasized. It should be necessary to promote in the affected countries, the adaptation of the standardized recommended procedures suitable to local conditions in order to facilitate the comparative analysis of the data.

During the IAC091, the consensus was that actualized epidemiological assessment of onchocerciasis in the Americas should be done in selected communities in a very short period of time. This assessment should be done by improving and standardizing criteria and techniques, in order to obtain and/or update information, as well as to make comparisons among different endemic areas to further evaluate impact of intervention.

The IAC091 Conference concluded that from the point of view of control program activities, the endemic areas for onchocerciasis in the Americas can be divided into four main zones (Figure 1):

- o Guatemala/Mexico zone: where onchocerciasis occurs inside the main areas due to the ecological requirements of Simulium ochraceum, the principal vector. These are the Oaxaca/Chiapas joint in Mexico and the principal endemic zone around Lake Atitlán in Guatemala. The Huehuetenango area is contiguous with Mexico and should be considered as part of that endemic area. Table 2 shows the situation in the different Regions in Guatemala.

In Mexico approximately 17,742 persons are infected, including 105 individuals who are blind and 630,000 persons at risk. The situation in Guatemala is somewhat similar with some 30,000 persons infected and approximately 500,000 at risk. The rate of blindness is not known but is estimated at approximately 0,5%. To date, baseline information has been established almost exclusively by means of clinical examination, (palpation to detect nodules) and skin biopsies. The Mazzotti reaction has also been used in Mexico. Some baseline data are still required for Huehuetenango.

In Mexico, the endemic area in Oaxaca State includes 136 localities, belonging to 29 municipalities in four districts; Ixtlan, Villa Alta, Tuxtepec and Cuicatlan, in 4,250 km^2, representing 4.2% of the total surface of Oaxaca. 25 localities are hyperendemic, 34 mesoendemic and 77 hypoendemic. In 1981 the total figure of blind persons was 59 and in 1990 only 48. In the last ten years no new cases of blindness have been detected.

In Chiapas State, there are 713 localities belonging to 23 municipalities, in an area of 12,640 km^2. with a total of 18,414 registered cases. In 1990, the population in this area was estimated in 183,634 inhabitants. The stratification process is in progress, but it has been estimated that the majority of the localities are either meso or hypoendemic, with rather few hyperendemic localities.

The total number of well-documented cases in 1990 was 19,241 and 10,444 (54.3%) were treated; 1,318 (90.4%) in Oaxaca and 9,126 (51.3%) in Chiapas. In 146 individuals in Oaxaca and 2,596 in Chiapas, the palpable nodules (onchocercomata) were surgically removed. Table 3 (this data was updated in August 1990).

In Guatemala, descriptions of the clinical manifestations of the disease indicate prevalence values as high as 10% of irreversible eye lesions in children under 10 years of age, as well as increased risk of developing irreversible ocular disease in the endemic areas.

- o Ecuador/Colombia zone: The principal focus is located in the basin of the Santiago River, constituted by the Cayapas and Ozoles Rivers and its tributaries, in the Esmeraldas Province. There are also satellite focuses in the following Rivers:, Verde, Canande, Viche, Sucio, Lojimies and Vilsa. In 1989 an epidemiological study in the Canton San Lorenzo (Esmeraldas Province) revealed that the disease had been extended to the Colombian border, where recently arrived migrants from that country were found already infected by O. volvulus.

Moreover, in the last four years as the result of the migration of infected individuals from the main focus to other provinces where the simuliids are present, there are now new focuses in three provinces: a) in the coast; Guayas and Pichincha, and b) in Eastern Ecuador, in Sucumbios. In this country, the frequency of the infection was similar in the two ethnic groups (blacks and chachilla--the indigenous tribe) even though the Chachilla showed a higher microfilarial density. This difference in the MFD between both groups is apparently related to the frequency of man-vector contact, but not to racial factors.

Nevertheless, Amerindians are more likely than blacks to have generalized atrophic changes of the skin in response to equal microfilarial densities. Guderian reported at the IAC091 Conference, that in children aged 1-12 years the infection rate had increased by 210%. Moreover, an increase of 286% was seen in the skin microfilarial density of children aged 1-4 (Guderian, 1990). Most probably, the Ecuadorian focus is at present the only well documented endemic area in expansion, at global level.

The prevalence of onchocerciasis in newborn infants suggests that intrauterine infection occurs commonly. (Proaño, et al, 1991). In one recent survey, 71% (25/35) of Ecuadorian children 0-11 months were found to have mf in the skin, and two neonates aged four and eight months respectively, demonstrated adult worm nodules in their heads.

It has been estimated that control program activities in this zone should be addressed initially to reduce morbidity.

- North Venezuela: Three foci of onchocerciasis are clustered in the northern part of the country, i.e. Sucre, Anzoategui and Monagas States.

  It is estimated that cases are found in the entire area. Intensity of infection is low and pathology is confined primarily to the skin.

  Baseline data on prevalence of infection have been determined using skin biopsies. In these focuses, were the endemicity levels seem to be low, large scale chemotherapeutic actions should start as soon as possible; especially when ivermectin in Venezuela has proven to be an effective and safe drug.

- South Venezuela/North Brazil zone: It is estimated that in the border foci in these two countries, some 900 to 1,000 persons may be infected with Onchocerca volvulus. The infection occurs primarily in the Yanomami Indians. In Venezuela, the intensity of infection exhibits a patchy distribution whereas in Brazil intensity seems to

be low. In Venezuela nodules also occur more frequently on the head. It is believed that the hyperendemic focus in Brazil is well circumscribed due to the distribution limits of simuliids. Simulium guianense o Simulium oyapockense s.l. an inefficient vector occurs at the edge of the focus. The focus in Brazil appears to be relatively stable, where the situation in Venezuela is less known because of the lack of entomological information.

Skin biopsies have been used in both Brazil and Venezuela to establish prevalence and intensity of infection. The procedure in both countries is based on "active - passive" detection process in which health professionals enter the area and wait for the Indians to appear for examination.

The approach to treatment differs between the two countries although in both situations the goal is morbidity control, where actions will be addressed mainly to providing early and adequate treatment to the infected individuals, reducing morbidity, removal of occasionally supported nodules by nodulectomy.

Current status of Mectizan Donation Program in the Americas.

By December 1990, the manufacturers had provided IVR free of charge to five of the endemic countries in America, through the Mectizan Expert Committee. Its use, distribution and evaluation The impact on the drug, in the different countries was analyzed.

In Brazil, drug distribution through civilian, military, and religious groups was accomplished, but no evaluation of results is yet available. In Ecuador, a total of 856 individuals have been treated with minimal side effects attributable to the drug.

Skin microfilaria reduction after treatment was significantly lowered by up to a year, increasing the effect when IVR was combined with nodulectomy. No anterior eye chamber lesions due to IVR were observed, but preliminary data on posterior segment alterations, one year after Tx, will be further analyzed.

In Guatemala, a total of 9,929 individuals were treated by Hospital Rodolfo Robles with a 7% of mild adverse reactions observed, particularly in hiperendemic areas. The overall cost of the program was US$2,50 per individual for the first year. Another trial conducted by the Ministry of Health indicated 67% of mild side effects after IVR (53% edema, 47% fever, side effects) related to the microfilarial density in skin beginning 24/48 hours after treatment and persist usually for five days and eventually for two weeks. Expulsion of intestinal helminths was observed in 38% of treated individuals.

The Guatemalan MOH is planning to give ivermectin to the population indicated in Tables 4 and 5 during 1991 if the Mectizan Donation Program supports their application.

In Venezuela, a total of 39 patients from the Northern focus were treated where 90% of secondary effects, including mild edema (77%) and headache (38%), were observed.

In Mexico, IVM trials reduced more than 95% the Dmf/mg skin with a significant increase on the rate of negative skin microfilariae patients after treatment. A significant drop in the number of mf in the anterior chamber of the eye was observed in the IVR treated group. A reduction in the number of punctated keratitis parasitizea positive individuals was observed one year after treatment (36.5% pre-treatment to 13.5% post-treatment). No effect attributable to the drug was observed in the cases of sclerosing keratitis, and no severe ocular changes in the posterior segment of the eye were observed.

Additionally, eighty three patients with moderate or severe onchocerciasis infection were selected from the Southeast endemic area of the state of Chiapas, to participate in a single blind, placebo controlled drug trial. Patients were randomly assigned at a rate of 3:1 to either ivermectin (IVR) (62 subjects) or placebo, (21 subjects) treatment group, to receive five semestral successive doses of IVR (150-220 mcg/Kg) or placebo tablets.

The most prominent effect of IVR treatment occured three months after each drug intake, with more than 95% of reduction in the Dmf/mg. However, reduction six months after each drug administration were less important than those at three months evaluation.

Individual analysis of IVR treatment response showed that, although microfilariae repopulation occurred in 18% of the patients six months after the administration of the first and second doses, this was less important in the subsequent retreatments than in the first two treatments.

New onchocercal nodules were detected in patients of both treatment groups. The total number of new nodules in 55 and 16 patients of the IVR and placebo treatment group were 86 and 33 respectively and the accumulated percentage of patients who developed one or more new nodules were 137.6% and 141.8%, respectively. Thus, new onchocercal infections occurred about the same rate in patients of both treatment groups, which means that IVR did not have any effect in preventing the O. volvulus development stages in the human host.

Severe ocular changes did not occur in any patient of either IVR or placebo treatment groups. The number of patients of the IVR treatment group with punctated keratitis gradually decreased from 19 cases (36.5%) prestudy detected, to 7 (13.5%) after a year of the last drug intake.

Despite the administration of five doses of IVR, five patients still showed important signs of punctated keratitis in the last ophthalmological examination. The proportion of cases with punctate keratitis in the placebo treatment group remained about the same extended along the course of the trial.

New cases of nerve optic atrophy or retinal epithelium atrophy did not occur in any patient on the trial basis.

Microfilariae in the eye of patients of the IVR treatment group significantly dropped after treatments; from 441 mf prestudy counted in the anterior chamber of 26 patients to 53 mf detected in the last ophthalmological examination in only 5 patients. The number of alive mf. the cornea was importantly reduced after treatments, from 117 mf. detected in three patients.

B. Cooperation of PAHO/WHO, USAID, River Blindness Foundation, International Eye Foundation, The Mectizan Donation Program and other International Agencies in the Elimination of Onchocerciasis in Latin America.

After informal discussions between staff members from the Communicable Diseases Program (HPT), Health Program Development (HPD), PAHO/WHO, with officers from International Agencies and Non-Governmental Organizations interested in blindness prevention, and distribution of ivermectin to the affected population by onchocerciasis, both at Regional and Global levels, it was possible to interact more closely with them during the First Interamerican Conference on Onchocerciasis (IACO91), in Guatemala City and Tapachula in April-May 1991.

The profile of actions and/or the terms of reference of each Agency/Organization is provided below:

U.S. Agency for International Development (USAID)

The Office of Health has initiated a three year pilot programme to assess the feasibility of assisting U.S. private voluntary organizations to strengthen the capabilities of indigenous health institutions to deliver the drug ivermectin (IVR) to onchocerciasis endemic areas of Africa and Latin America. The pilot program will emphasize working with host ministries of health and private groups to integrate the distribution program into primary health care services, as well as to strengthen capabilities of indigenous health institutions to provide cost effective and sustainable delivery of IVR to endemic populations. Particular emphasis will be placed on strengthening national capabilities in:

- **drug delivery**
- **epidemiological surveillance**
- **medical record keeping**

A.I.D. is also interested in addressing through this pilot program the long term issue of how the costs of IVR delivery can be sustained by national and community institutions in the absence of external assistance. Among possible options are:

- o upgrading of financial management capabilities;
- o instituting a cost recovery program based on the ability and willingness of communities to pay;
- o integration of ivermectin distribution program into complementary health programs.

Only registered U.S. PVOs are eligible for this award. It is the intent of the pilot program, however, that proposals involve both U.S. PVOs and universities. U.S. universities are expected to augment the public health capabilities of the PVOs, particularly in the areas of epidemiological surveillance, data collection, health economics, and behavioural sciences. Participants should have a proven track record working with ministries in health services development.

Recently, proposals from Guatemala and Venezuela, developed under the guidance of the International Eye Foundation (IEF) officers were submitted and preliminary reviewed by A.I.D. staff for completeness and responsiveness. Those applications considered complete and responsive were

subject to further analysis by A.I.D. staff and its senior consultants. IEF, Mectizan Donation Program and PAHO Officers were invited to participate in the final evaluating meeting, before funding was approved. The decision was made taking into consideration the criteria listed below:

- o committed to transferring to host country nationals technical skills necessary to design, implement, and monitor a long-term program of drug delivery;

- o implemented within the framework of the existing host country onchocerciasis program;

- o a demonstrated ability by the applicant to work with community and national groups

- o development of innovative models for cost effective delivery of IVR

- o reasonability of proposed costs.

THE INTERNATIONAL EYE FOUNDATION

The International Eye Foundation (IEF) is a non-profit, non-governmental organization based in the United States. It has over 30 years of experience operating and assisting programs for the prevention and cure of blindness in developing countries. Current IEF field operations provide training, equipment and medicines, clinical services and operations research and promote the development of community-based programs through

support for indigenous eye care organizations and ministries of health in twelve countries of Latin America, the Caribbean and Africa.

Beginning in Guatemala and Nigeria in 1989, IEF was one of the first non-governmental organizations in the world to develop programs for mass distribution of ivermectin for community treatment of onchocerciasis. Since 1989 five new programs have been designed and funded and are in various stages of implementation.

In Guatemala the IEF has been working in direct collaboration with the National Committee for the Blind and Deaf to implement a three year pilot program to distribute ivermectin in the municipalities of Yepocapa and Acatenango. In the first year 9,929 people were treated. The goal of the 3 year pilot program is to design a low cost sustainable mechanism for the delivery of ivermectin on a mass scale. Thirteen thousand treatments are envisioned in the second year of the program. The program has been co-founded by the IEF and has designed a new ivermectin distribution plan to be carried out in conjunction with the National Committee for the Blind and Deaf, the MOH (SNEM), the Universidad del Valle, and Tulane University. This three year project will cover most of the infected who are from the Chisolosin focus (central focus) and will serve as a model for collaboration between those institutions and agencies in Guatemala concerned with the control of onchocerciasis. Also, envisioned is the fact that this program will serve as the foundation of a national strategy to control onchocerciasis throughout the country. Funding for this program will be provided by the IEF through a grant from USAID. Project activities are scheduled to begin in July 1991.

RIVER BLINDNESS FOUNDATION

River Blindness Foundation is a non-profit foundation established in March, 1990, to encourage distribution of MECTIZAN. In the Americas RBF would like to act as a coordinator to help mobilize private and public support to distribute MECTIZAN. They are planning to locate sources of local currencies, debt-equity swaps, and corporate donations to aid the MECTIZAN program; through their River Blindness Newsletter they are planning to list projects requiring financial support and funds, equipment, or technical support. They also plan to stimulate as many educational films, articles, and radio interviews, as possible, in English and Spanish. In 1990-1991, they supported MECTIZAN distribution programs in Guatemala and Ecuador.

It is evident that there is an extraordinary concurrence of common interests and policy and strategic approaches among the several NGOs that in some way are involved in the delivery of technical and finantial cooperation to the onchocerciasis affected countries, both at global level and in Latin America. It is clear also the need to find ways to complement and to cooperate in order to avoid unnecessary duplication of actions and to increase efficiency and efficacy in our respective mandates.

This matter was preliminary discussed during IACO91 in Guatwemala and Mexico, and there was consensus in the issues listed below:

o The collaboration/cooperation among the participating agencies/ organizations should be established following the model of the Intergency Guinea Worm Group. This Inter Agency group have quarterly meetings to share information and to identify new areas of collaboration

- Multiple sources of support to one institution/organization in a country may exclude involvement of others creating division, not cooperation.

- A detailed plan will be needed to identify which agencies are working with which groups within a particular country. Ministries of Health should be kept aware of who is doing what.

- It was proposed to have a Second Interamerican Conference on Onchocerciasis in one year (IAC092), to discuss interagency/intercountry programs. PAHO should organize the meetings; each NGO would offer financial aid to get people there. The PAHO country representatives will facilitate communications between groups.

It is also contemplated in a near future the participation of Helen Keller International. Moreover, the Centers for Disease Control (CDC) U.S. Public Health Services, Atlanta, GA, USA, has been deeply involved in onchocerciasis research, through its Medical Entomology Research and Training Unit, established in the campus of the Universidad del Valle, in Guatemala, Guatemala.

Cooperation should be flexible, funds should be integrated into other programs to create awareness of medical problems (Public education for community health).

Some of the above mentioned Agencies will consider to provide support to PAHO, to deliver technical assistance for the establishment in a Latin American country a computerized data base for onchocerciasis data. Information should be shared by other countries.

II. FEASIBILITY OF ONCHOCERCIASIS ELIMINATION IN THE AMERICAS

Community-based studies with ivermectin now indicate that the drug is a safe and long-acting microfilaricide when used at single doses administered on an annual or semi-annual basis, usually provoking only a mild Mazzotti reaction when microfilaria are killed, during the first treatment.

On this grounds, the ample consultation process that takes place during the First Interamerican Conference on Onchocerciasis (IACO91), in Guatemala and Mexico recently (April 28 - May 1, 1991) resulted in the the consensus opinion that onchocerciasis, as a disease, can be eliminated as a public health problem in the Americas.

The following factors have been also taken into consideration as additional elements to support the feasibility of onchocerciasis elimination in the region:

II.1 The only confirmed reservoir for O. volvulus is the human being.

II.2 The vectorial capacity of the Simuliids involved in the transmission of the disease in the different endemic foci is very low.

II.3 The microfilaria counts (per mg. or per/sq.mm) are reduced and kept at very low levels with the annual or semi-annual administration of single doses in treated patients. The overall acceptance of this therapeutic regimen by individuals and the community has been overwhelmingly good.

II.4 The countries have obtained Mectizan™ free of charge. They in turn have devised proper systems for drug distribution, and registering and monitoring of patients.

II.5 Ivermectin's ability to interrupt transmission of O. volvulus by Simulium ochraceum has been clearly shown in a Guatemalan study, in which ivermectin was administered at six-monthly intervals in five meso-and hyper-endemic communities over a 30-month period.

II.6 Has been also demonstrated that repetitive drug treatment (eight to 12 doses with ivermectin), although did not show a clear-cut macrofilaricidal effect, when compared with controls, a reduction in the number of male worms in the nodules was achieved. Additionally there was an increase in the number of dead males and females, that was statistically significant.

II.6 There is a positive attitude and a strong political determination at country level, to strengthen the ongoing actions in order to eliminate the clinical evidence of onchocerciasis, and ultimately to interrupt the transmission of the disease.

III. PURPOSES OF THE PROGRAM

To promote the strengthening of control program activities in the onchocerciasis endemic countries, with emphasis in the improvement of the information systems and the use of standardized procedures for diagnosis, specific treatment and epidemiological surveilliance.

This actions will be complemented with improved Health Education practices, which should be planned, concerted, delivered and evaluated in a intersectoral approach.

Although this program is mainly addressed to eliminate the clinical manifestations of onchocerciasis, its is contemplated also that as a result of the strengthening of the Local Health Systems (SILOS) for the efficient distribution of the microfilaricide drug (ivermectin), an appropriate infrastructure for the delivery of other medicines/products will be available and ready to be used for other purposes.

It has been contemplated also that the Health Education Plan of Action, will promote a change in attitude/behaviour in the target population, not limmited to reduce the exposure to the vector simuliids involved in the onchocerciasis transmission. The messages to be delivered in the educational processes, will be addressed to reduce the exposure to several prioritary vector-borne diseases in the Region.

IV. OBJECTIVES OF THE PROGRAM

The main objectives for consideration towards the elimination of onchocerciasis in the Region are the following:

A. Overall objective:

To reduce morbidity and prevent blindness and other sequelae caused by Onchocerca volvulus, in the six countries were onchocerciasis is endemic (Brazil, Colombia, Ecuador, Guatemala, Mexico and Venezuela). This should result in the elimination of the pathological manifestations of the disease and, eventually in the interruption of the transmission in selected foci, by the year 2000.

B. Specific objectives:

B.1 Strengthening of the ongoing control program activities in Guatemala and Mexico, particularly at the border focus (Soconusco-Mexico/Huehuetenango-Guatemala).

B.2 Promote the unification of the Strategies and Plans of Action in both countries, particularly regarding epidemiological surveillance and information exchange.

B.3 Support the continuation and improvement of chemotherapeutic interventions using ivermectin, in Brazil, Colombia, Ecuador, Guatemala, Mexico and Venezuela. PAHO/WHO in close collaboration

with non- Governmental Organizations, will promote the use of standardized procedures, adapted to the local conditions, for the diagnosis, epidemiological surveillance and evaluation.

B.4 Develop a Multinational Plan of Action for Health Education addressed to prevent prioritary Vector-borne Diseases in the endemic countries, with emphasis in onchocerciasis. A well informed and committed community participation is envisaged.

B.5 Develop a computarized monitoring program for the improvement of the information systems, to support the epidemiological surveillance. This should include a mapping system (Atlas-Graphics and/or Mapinfo) to correlate dBase records with ecological/epidemiological variables.

B.6 To promote the establishment of a Field Research Network among the affected countries, to estimulate the activities showed in Table 4.

B.7 To develop a Strategic Plan to assure the sustainability of the chemotherapeutic interventions for a period of at least 15 years. This Plan should be based in the products of field and operational

research to be carried out in the first three-four years of the Onchocerciasis Elimination Program.

V. TARGETS

A. Immediate targets (first three years of the program)

V.A.1 Assure the continuation of the specific chemotherapy with semi-annual and/or annual doses of ivermectin to all the confirmed and eligible onchocerciasis cases (old and new), in Brazil, Ecuador, Guatemala, Mexico and Venezuela.

V.A.2 Evaluate the present epidemiological situation (endemicity levels) in selected areas of the Guatemala/Mexico zone, in the Northern Venezuela zone and the Ecuador/Colombia zone, with emphasis in the Colombia side; a standardized protocol should be developed and adapted to the local circumstances, by each country.

V.A.3 Develop a multinational computarized information system to support the monitoring process of the Plan of Action, the epidemiological surveillance with unified criteria and the impact assessment of the interventions.

V.A.4 Stop the onchocerciasis expansion in the Ecuador/Colombia zone.

V.A.5 Carry-out the necessary research to optimize the control operations, evaluate their impact and ensure their sustainability; the following research priorities were identified in IAC091:

- o development of rapid assessment methods to identify communities for large scale ivermectine treatment.
- o studies of vector efficiency and transmission dynamics in Ecuador.
- o trials to determine the additional value of nodulectomy.
- o cost-effective delivery systems.
- o epidemiological modelling of onchocerciasis in Guatemala/Mexico.
- o development of new methods to determine the impact of control, including immunodiagnostic tools for monitoring incidence of new infections, and DNA probes for monitoring infection levels in S. ochraceum
- o methods to ensure long-term compliance, including communications and health education strategies, and standardized data processing systems for monitoring control and information exchange.

V.A.6 Consolidate the Inter-agency and multinational coordination and cooperation, through the organization of annual or semi-annual

meetings (IAC092, IAC093 and IAC094), to assure cost-efficient interventions and to prevent unnecessary duplications. PAHO/WHO will organize the meetings and each agency/country will assume its own expenses.

B. Intermediate targets (fourth to eight years of the program)

V.B.1 No new cases of clinical onchocerciasis should occur in the centinel population (pre-school age children), at least in the Oaxaca focus in Mexico by the end of 1996.

V.B.2 Assess progress being made after four years of sustained chemotherapy with ivermectin, in the different endemic zones where the Plan has been conveyed, complemented or not with health education and/or other interventions (e.g. nodulectomy).

V.B.3 Develop an appropriated Plan of Action for the continuation of multinational concerted actions toward onchocerciasis elimination, capitalizing the experience gained in the initial four years of work.

V.B.4 Report the results of V.B.2 and V.B.3 to the XXVIII Pan American Sanitary Conference in 1995 seeking the ratification for the continuation of the Plan of Action toward the onchocerciasis elimination, and/or eventually its reformulation.

V.B.5 Consolidate the operationalization of the Multinational Plan of Action in all the endemic countries in the Region, particularly in those that were obliged, initially, to limmit their interventions to the early detection and individual treatment of onchocerciasis patients.

V.B.6 The computarized information system should be fully installed and in regular operation. The Field Research Network should be strengthened also.

V.B.7 By the year 2000 no new cases of the disease should appear in pre-school age children, in the Guatemala-Mexico zone, and blindness produced by O. volvulus should be prevented in all the endemic countries.

C. Final Goals (by the year 2007, 15th year of the program).

C.1 Blindness caused by O. volvulus as well as other sequelae of the disease, will be prevented, and no new cases of onchocerciasis should occur in the sentinel population (pre-school age children) in all the currently endemic countries in the Americas.

C.2 A fully operational infrastructure will be available to sustain the chemotherapeutic interventions with ivermectin or, eventually with a macrofilaricide drug, addressed now to interrupt the transmission in other selected foci by the year 2012.

C.3 By the year 2022, thirty years after the initiation of the Plan, a final assessment should be performed to certify the onchocerciasis elimination in all the endemic countries and the interruption of the transmission, at least in Guatemala, Mexico and Northern Venezuela.

VI. PROGRAM STRATEGIES

A. Health Education.

Education concerning prevailing health problems and the methods of preventing and controlling them is the first of the eight essential components of health care stated in the Declaration of Alma-Ata 1978.

As regards onchocerciasis, the current startegy of control is mainly based in specific chemotherapy, addressed to reduce morbidity. At IAC091 there was consensus in the need to strengthen health education practices in order to promote the neccesary changes in attitude/behaviour in the population at risk, in the endemic foci in the Americas. This should have a positive impact in the sustainability of the Plan of Action toward onchocerciasis elimination.

The knowledge, attitudes, and practices concerning onchocerciasis among residents in endemic areas in Guatemala showed to be a key element to promote and maintain sustained acceptance of mass therapy in the community. Specific studies on this regard suited to the different cultural groups living in endemic areas are a key element to this process.

The necessity of producing adequate communication strategies and educational materials to the different sectors of the population was stressed. The importance of developing these types of resources from an integrated point of view, in which planners and managers of the health team will work together with the target audience (community), was discussed. Pre-testing of the designed materials was shown to be also essential to obtain a sustained, community wide impact of the message.

In this regard, the modern view of planning, and the practice in many countries, therefore stresses the negotiation process, not only between the health sector and the population receiving the health services, but also between planners and beneficiaries of development plans, and between the initiating ministry and other ministries. This leads to an expanded view of a particular project cycle, as shown in Figure 2.

In the particular area of vector-borne diseases, it was stressed the need to improve Health Education practices, which should be planned, concerted, delivered and evaluated in a intersectoral approach.

Figure 3 shows the need to establish a system for information disemination, that should start at the school, continued at the family/community level with the committed participation of the school children (which should play a important role in the information dissemination process for the benefit of school age children that do not attend the school), and re-inforced at the community level by the health

& development officers/promoters. The basic idea behind this, is the need to promote a change in attitude/behaviour in the population, through specific actions inside the formal education system. It is clear that this endeavour should be a shared responsability between the Ministries of Education and Health.

Social communication has also a very important role. Some people live and work under the impression that "media alone can do the job" in development and/or control program activities. Experience shows that this is not true. Used in isolation media have a limited, if any effect at all.

Under this circumstances one of the immediate targets of this Plan of Action is to develop a Multinational Plan also, addressed to improve the Health Education, if possible in a intersectoral approach. IAC091 make the following recommendations:

- Involvement of the community is essential for building a sustainable onchocerciasis program.

- A thorough analysis needs to be done of target groups ffor the program, the information neeeded to be communicated to each group, and the channels through which this communication should take place.

- As onchocerciasis may be perceived in the community as a low priority, efforts should be made to incorporate the onchocerciasis into other PHC programmes, i.e. a multi- purpose approach.

- o Target groups for receiving information about onchocerciasis should not be limited to the health sector, but also include teachers, schools, NGO's and other community institutions and groups, i.e. a multi- sectoral approach.

The overall goal is to promote community acceptance of ivermectin and immediate or eventual participation in the actual delivery of the drug through local health workers or volunteers.

In the particular case of Ecuador, where the infected indigenous communities with onchocerciasis already have a "working knowledge" of the disease and its control with ivermectin, it was suggested at IAC091, to use the national health leaders.

The rational behind this is that 98% of the population in the endemic zone is illiterate, there is no governmental education system and the indigenous populations are quite dispersed in the area. After carefull selection of the community leaders, a training program should be established.

It has been estimated that through the finantial participation of several NGO's, PAHO/WHO should assume the responsability to produce the indispensable audio-visual aides to support this and other health education activities.

IAC091 concluded that such a Plan of Action for Health Education may be developed in one year (October 91-September 92)

Whenever possible, the activities included in the Plan of Action, will be conducted in a multisectoral approach within the context of the Local Health Systems (SILOS).

B. Resource mobilization

This Plan of Action has been concerted with the collaboration of several NGO's and PVO's, as well as with the national authorities of five of the six endemic countries in the Americas. It is contemplated to sustain and improve the cooperative efforts in order to achieve the established objectives/targets/goals. To assure that this is going to happen, periodical meetings have been contemplated which will involve the participation of all the parties.

This should imply an important mobilization of resources, both financial and human, as has been the situation in the last three years of operation of the Mectizan Donation Program, but now with more coordination/cooperation, we hope to improve efficiency and efficacy. These are the more relevant lines of action:

- PAHO/WHO will assure the mobilization of resources necessary to continue delivering technical assistance on onchocerciasis control to the endemic countries. PAHO/WHO will also collaborate in the obtention of extrabudgetary resources to support the Plan.

- The Mectizan Donation Program and Merck and Co., Inc., assured that they will sustain the donation of MectizanTM to treat onchocerciasis in all the countries affected, as long as needed.

- International Eye Foundation (IEF) will continue offering technical and financial assistance for the prevention of blindness, and in some instances will collaborate with the countries in the preparation of proposals, in close collaboration with the national institutions, to eventually obtain financial resources to support the distribution of ivermectin.

- River Blindness Foundation is well prepared to support initiatives regarding information dissemination and health education plans; there is special interest to support the production of audiovisual aids and the strengthening of the information systems at country level.

- U.S.A.I.D is providing technical and financial assistance to selected countries for the strengthening of health services, to improve the delivery of ivermectin to the affected population. Through the Vector Biology and Control Project, experienced advisory in health education has been and will continue to be obtained.

- o UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR), has indicated its willingness to support well-designed and scientifically sound projects, within the context of Field Research Network activities in the Americas (both field and operational research).

C. Strengthening of the information systems and dissemination of information

- o Epidemiological assessment should be divided into activities that 1) allow rapid baseline classification of communities to be treated (the so-called "permanent baseline", that will be referred to for at least a decade once broad ivermectin treatment has begun), and 2) provide detailed information in sentinal areas on epidemiological and morbidity variables.

- o Epidemiological assessment of the situation should be done without interfering with ongoing programs, and the strategies to implement the control plan could vary in different areas.

- o The evaluation of epidemiological indicators should be done using a standardized protocol that will include the use of interventional (skin snips) and non interventional (physical examinations, nodules detection, etc.)

- The necessity to standardize the indices currently in use for measuring community microfilarial densities and other epidemiological surveillance parameters was stressed in IAC091, particularly to compare data from different endemic areas at the regional level. The utility and necessity of computer applications in the study and control of onchocerciasis was shown in Guatemala, particularly to develop data bases to organize and handle large volumes of information from surveillance analysis.

  The operational applications of epidemiological modelling in filariasis research and control were discussed, particularly to asses the impact of intervention (e.g. IVR treatment) on transmission and morbidity.

After consultation with officers of the NGO's and PVO's that participated in IAC091 it was agreed that the possibility to launch a cooperative plan of action to support the organization and operation of a computarized system to improve the monitoring and epidemiological surveillance activities within the Multinational Plan be discussed in the next IAC092.

D. Manpower training

The following are the principal lines of action in the area of human resources development:

- o Training of human resources to support the different stages of mass chemotherapy within the context of PHC activities and, whenever possible, with optimal use of Local Health Systems (SILOS).

- o Training of the individuals involved in the epidemiological surveillance using the computarized information system.

- o Training of the officers/promoters/teachers/community leaders involved in the Health Education Plan conceived in a multi/intersectoral approach.

E. Development of standards, plans, and policies

- Promote and support the review of national health policies on the control of onchocerciasis, mainly addressed to guarantee the use of standardized procedures, to assure the feasibility of a comparative analysis at different moments in the execution of the Plan.

- Establishment of a Field Research Network to promote the activities indicated in Table 6. Emphasis should be placed in the standardization of diagnostic procedures and quality control inside a multipurpose laboratory network.

- Organization of a Multinational and Inter-Agency annual Conference (IAC092, IAC093, etc.) to review progress being made in the execution of the Multinational Plan of action toward onchocerciasis elimination in the Americas, as well as to discuss policies and strategic approaches. These coordinated meetings will also permit the discussion of budgetary matters and the setting of priorities.

  The role and status of each organization/agency/research group will also be reviewed, for a precise identification of the responsibilities that they will assume within the overall Plan of Action.

F. Research Promotion

o Relevant research to support the efficient execution of the Plan of Action, will be secured within the context of the Field Research Network mentioned several times in this document. The proper organization and establishment of this interinstitutional and intercountry system will assure the permanent interaction among the scientist/officers involved in the Plan.

This specific action should contribute to fill the gap between the research institutions (Universities, Research Institutes and/or Centers), and the Ministry of Health officers in charge of the execution of control program activities. The planning process will also be improved, as a result of an early involvement in such a process of all the potential participants in the envisaged actions.

IACO91 recommended the following research priorities:

- o Development of rapid assessment methods to identify communities for a large scale ivermectin treatment.

- o Studies of vector efficiency and transmission dynamics in Ecuador.

- o Trials to determine the additional value of nodulectomy.

- o Cost-effective delivery systems.

- o Epidemiological modelling of onchocerciasis in Guatemala/ Mexico.

- o Development of new methods to determine the impact of control, including immunodiagnostic tools for monitoring incidence of new infections, and DNA probes for monitoring infection levels in S. ochraceum.

- o Methods to ensure long-term compliance, including communications and health education strategies, and standardized data processing systems for monitoring control and information exchange.

We would like to emphasize that in IAC091 a number of operational research issues were raised. The first concerned the desirability of developing less expensive, less intensive techniques than skin snips for assessing the communities requiring mass ivermectin therapy, and for monitoring the impact of the intervention. The second issue concerned compliance. Given the life span of the adult worms, control based on ivermectin will require high levels of commitment over more than a decade, yet traditionally patient compliance tends to fall over time, especially if people no longer feel symptoms, or no longer see obvious signs that the treatment is having a beneficial effect.

Programs will require the capacity to monitor program coverage and compliance, to analyse the reasons for non-compliance, and to develop strategies for encouraging continued high compliance. Communications and health education packages can play an important role not just in ensuring patient compliance, but also in attempting to prevent donors, governments and health care providers from loosing enthusiasm over time.

The final topic concerned the cost-effectiveness of different delivery strategies. A number of design options were discussed. Each decision involves trade-offs between costs and benefits, and the careful enumeration of these costs and benefits would help programs choose the strategy which will result in the greatest benefit for the resources available.

Although some of these decisions must be made before an ivermectin delivery program begins, the need to ensure sustainability over time requires experimentation and research into alternative delivery strategies which may reduce cost or increase effectiveness.

It was suggested that such options as integration with the primary health care system where it exists, with other control programs, or even with the private sector, could be considered among other options.

The UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR) expressed interest in supporting this type of research in the Americas.

G. Direct Advisory Services to the Countries

In close coordination with PAHO/WHO, TDR, RBF, IEF and U.S.A.I.D., the Mectizan Donation Program and Hellen Keller International, (based on the experience gained in the First Interamerican Conference on Onchocerciasis (IAC091)), indicated that there will be collaboration with the countries in the following areas:

- Guidelines development for the planning, implementation and evaluation of rapid epidemiological assessment to define prioritary areas for intervention, as well as to monitor the evolution of the Plan of Action.

- Promotion of intersectoral collaboration especially regarding health education practices.

- Formulation, implementation and evaluation of a Manpower Development Plan addressed to satisfy the more urgent needs of the endemic countries in well-trained human resources to support the sustainability of the onchocerciasis elimination program.

- Improvement of the information systems for the proper epidemiological surveillance and evaluation processes.

- o Direct technical assistance to establish a multipurpose laboratory network for the standardization of diagnostic procedures and quality control practices.

- o Production of audiovisual aides to support health education and information dissemination practices.

VII. PROGRAM DESCRIPTION

This program was developed based on information presented, discussed and reviewed during the First Interamerican Conference on Onchocerciasis (IACO91), held in Guatemala and Mexico from April 28 to May 1, 1991, as a border meeting within the context of a trinational agreement suscribed by Belize, Guatemala and Mexico in 1990. Most of the recommendations produced during the Plenary discussions or during the Working Groups have been incorporated in this Multinational/Inter-Agency Plan of Action toward onchocerciasis elimination in the Americas.

The Plan will be implemented with the participation of all the parties indicated in section I.B. and the correspondent Ministries of Health of the countries where onchocerciasis is endemic. Initially, the already ongoing chemotherapeutic actions with ivermectin will continue with resources allocated by the countries and by some of the NGO's and PVO's mentioned above. The Mectizan Donation Program will sustain the MectizanTM donation, following the principles established since 1988.

The PAHO/WHO country representatives will make the appropriate contacts for promoting the plan within each country and will program in close collaboration with the Area Director of Health Programs Development (HPD), the Communicable Diseases Program (HPT) and the Program of Blindness Prevention/Health for Adults (HPA), joint visits to support the preparation of the specific plans and its adequation to the local circumstances in each country.

The PAHO/WHO Collaborative Research Center for Studies on Onchocerciasis established in San Cristobal de las Casas, Chiapas, Mexico (Centro de Investigaciones Ecológicas del Sureste (CIES)), will participate mainly in the establishment of the Field Research Network, particularly in reference to standardization procedures and quality control activities. The Participation in the preparation of the Manpower Development Plan and in the offering of selected training courses/workshops is also envisaged. Before the initiation of IACO91, a Course/Workshop on Epidemiological Stratification Applied to Communicable Diseases, was carried out at CIES. Among ten national participants, two were officers from the onchocerciasis control program, MOH. MOH officers from Brazil and Guatemala also participated. This Course/Workshop will be replicated in the second half of 1991 in Mexico City for the benefit of other professionals involved in control program activities.

The Plan for October 1991 - September 1992 will include the following prioritary activities:

VII.1 Establishment of a Regional Data Bank with the baseline data provided in IACO91.

VII.2 Establishment of a Field Research Network.

VII.3 Develop an updated Standardized Protocol for Rapid Epidemiological Assessment.

VII.4 Strengthen the control program activities in the Guatemala/Mexico zone, with emphasis in the Oaxaca focus.

VII.5 Develop an urgent plan of action addressed to halt the expansion of the onchocerciasis problem in Ecuador in collaboration with CTD/FIL and TDR WHO Hq. and selected researchers and MOH representatives.

VII.6 Develop a Multinational/Intersectoral Plan of Action to strengthen Health Education on Vector-Borne Diseases with emphasis in onchocerciasis.

VIII. BUDGET FOR 1991-1992 (October-September)

It was decided that a preliminary budget estimation be prepared to support the prioritary activities that should be carried out at the initiation of the Plan. The budget for the first four years of activities will be discussed at IAC092, tentatively scheduled for April or June, 1992, most probably in Ecuador.

1. Task Force Group to review and develop the standardized protocol for Rapid Epidemiological assessment.....US$ 7,500.00
2. Preliminary discussions toward the establishment of a Regional Data Bank.....US$ 7,500.00
3. Establishment of a Field Research Network (Regional Meeting among scientists/officers of institutions/MOH involved in the Plan).....US$10,000.00
4. Task Force Group on Health Education (at least two meetings; one in WDC and the other in a endemic country)...US$15,000.00

TOTAL.....US$40,000.00

IX. EVALUATION

This should be conducted along the different stages of the Plan, with annual, formal assessments as part of the Interamerican/Inter-Agency Conferences (IAC092, IAC093, etc.)

Evaluation should be perceived as a process. This means that in all the activities included in the Plan of Action, evaluating activities, as a part of the monitoring system, should always be included.

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TABLES AND FIGURES

Table 1. Epidemiological situation of onchocerciasis in the Americas - Onchocerciasis endemic areas per country

Item	Brazil	Colomb.	Ecuador	Guat.	México Chiapas	México Oaxaca	Venez. Northeast	Venezuela Southern
Date data collected	70-76	65-71	86-88	89	89	90	75	90
Estimated extension endemic area (km2)	n.a.	n.a.	n.a.	4,708	12,406	4,250	+-150,000	178,095
Percentage of country area	n.a.	n.a.	5	7	n.a.	n.a.	20	30
No. affected villages	n.a.	1	82	390	713	90	50	43
Population in area	6,000	524	14,140	442,279	183,634	64,687	387,000	82,064
Percentage of total population	0.004	0.0		5			2	0.4
Total registered population	6,000	524	14,140	n.a.	105,804	60,345	n.a.	10,489
Total examined	1,400	524	12,726	24,587	91,000	44,314	n.a.	1,061
Percent with biopsy	100	100	100	50	2	24	n.a.	668
Registered cases	600	51	4,683	+/-30,000	18,414	2,082	45,989	2,200
Percentage male cases	51	n.a.	37	65	n.a.	50	n.a.	50
New cases in children under 9 years	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.3
Prevalence nodules (%)	7.8	2.1	10	9.6	4.5	0.5	n.a.	32
No. nodules per person	n.a.	1.5	n.a.	n.a.	1.3	1	n.a.	1.5
Prevalence microfilariae in the skin (%)	10.5	11.2	7	22.3	n.a.	9.7	n.a.	63
Community microfilariae load	n.a.	21.2	n.a.	n.a.	n.a.	5.7	n.a.	20.9
Prevalence dermal lesions	n.a.	n.a.	70	n.a.	n.a.	n.a.	n.a.	74
Average age onset of dermal lesions	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	13
Prevalence eye lesions	2.6	2.4	38	n.a.	n.a.	n.a.	n.a.	28
Average age onset eye lesions	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6
No. blind people	n.a.	n.a.		n.a.	62	48	n.a.	3
Percent of all cases	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.14
Routine control measures	None	None	Nodul.	Nodul. Ivmct.	Nodul. Ivmct. DEC	Nodul. Ivmct. DEC	None	Nodul.
Percent people rejecting any control measures	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	None
Source of information	Moraes81 Rassi76	D'Aless. -83	Guderian -86,88	MOH -89	MOH -89	MOH -90	MOH -86	CAICET-91

Table 2

ONCHOCERCIASIS IN GUATEMALA BY REGION

REGION	Total Population	Examined	With Nodules	Percentage	No. of Biopsed	With Positive Skin Snips	Percentage	Department
REGION No. 1	286	97	2	2.1	97	4	4.1	Guatemala
REGION No. 4	880	377	0	0.0	377	0	0.0	Santa Rosa
REGION No. 5	50,278	15,568	1,161	7.5	5,140	944	18.4	Chimaltenango
								Escuintla
REGION No. 6	29,770	8,545	1,188	13.9	7,212	1,914	26.5	Suchitepequez
								Solola
GRAN TOTAL	81,214	24,587	2,351	9.6	12,826	2,862	22.3	----------

Source MOH Guatemala

Table 3

ONCHOCERCIASIS CONTROL PROGRAM IN MEXICO
1988 - 1990

ITEM	CHIAPAS			OAXACA			TOTALS		
	1988	1989	1990	1988	1989	1990	1988	1989	1990
Population (state)+	3,401,032	3,553,378	3,203,915	2,586,885	2,669,120	3,095,915	5,987,917	6,222,498	6,299,830
Municipalities	23	23	23	29	29	29	52	52	52
Localities	713	713	713	136	138	136	849	851	849
Inhabitants (census)	183,634	183,634	183,634	54,615	64,993	238,687	238,249	248,627	248,321
Persons examined	111,378	105,804	93,856	40,087	61,743	60,750	151,465	167,547	154,606
Registered cases	16,369	17,302	18,414	1,346	1,458	2,048	17,715	18,760	20,462
New cases	1,361	1,059	930	70	75	148	1,431	1,134	1,078
Re-infected	1,603	1,384	853	151	160	467	1,754	1,544	1,320
With nodules	4,973	4,799	3,722	217	313	185	5,190	5,112	3,907
Surgically treated	4,750	4,636	3,686	195	310	176	4,945	4,946	3,862
Removed nodules	5,937	6,028	4,616	231	330	184	6,168	6,358	4,800
No. DEC treated	6,246	2,212	384	638	222	76	6,884	2,434	460
No. Ivermectin		11,290	13,681		1,236	1,892		12,526	15,573
No. Mazzoti tests	376,405	269,708	86,872	++	++	++	376,405	269,708	86,872
Blinded by Oncho	66	68	62	54	52	48	120	120	110
Working cycles	6	6	6	6	6	6	12	12	12
Incidence*	1,614.08	1,330.36	970.95	404.65	361.58	950.73	1,336.84	1,077.12	965.69
Prevalence**	8.9	9.4	10.0	2.5	2.2	3.2	7.4	7.5	8.2
Blindness prevalence	0.04	0.04	0.03	0.10	0.08	0.07	0.05	0.05	0.04
% DEC treated	100.00	16.38	2.73	100.00	15.23	3.86	100.00	16.27	2.87
% IVR treated	0.00	83.62	97.27	0.00	84.77	96.14	0.00	83.73	97.13
% Total ind. treated	38.16	78.04	76.38	47.40	100.00	96.09	38.86	79.74	78.35
Total nodulectomies	95.52	96.60	99.03	89.86	99.04	95.14	95.28	96.75	98.85
No. nodules/ind.	1.2	1.3	1.3	1.18	1.06	1.04	1.25	1.29	1.24

\+ Census. Population National Council (CONAPO)
++ No data available

* Rate per 100,000 inhabitants
** Rate per 100 inhabitants

Note: Ivermectin treatment started in March 1989

Table 4

FARMS TO BE TREATED WITH MECTIZAN IN 1991

GUATEMALA

AREA "A"

MUNICIPALITY OF PATULUL, SUCHITEPEQUEZ

FARM	% of MF	% + NODULE
Palmira	17.9	4.5
La Vega	15.9	9.5
Santa Fé	66.7	33.3
San Julián	5.8	4.6
Santa Cecilia	6.1	3.0
El Ingenio	74.5	53.2
San Lázaro	70.4	44.4
San Jerónimo Miramar	15.4	17.7
Veracruz	22.2	4.5
Trinidad San Rafael	56.3	27.5
Ermita	5.8	21.5
Santa Cristina	29.6	16.7
Monte María	28.6	4.0
San Agustín	31.0	26.0

MUNICIPALITY SANTA BARBARA SUCHITEPEQUEZ

Plaza de Toros	57.9	26.3
Santa Adelaida	35.1	24.3
Panamá	17.7	9.6
San Francisco Miramar	19.6	3.57
La Zona	N.E.	6.0

MUNICIPALITY OF SAN LUCAS TOLIMAN SOLOLA

Quixayá	57.1	14.3
Colonia Quizayá	35.1	21.9
Cacahuate	22.9	11.9
Santa Teresa	27.5	34.8
Porvenir	18.1	11.1
Providencia	58.5	43.9
Santo Tomás Perdido	37.0	17.0
Pampojilá	13.8	2.1
Colonia Pampojilá	4.6	2.5
San Antonio Panimaquín	60.4	81.1
Chicap	33.3	50.0
San José Panimaché	76.9	92.3
San Joaquín	62.5	87.5

Table 5. Total Number of Tablets MECTIZAN DONATION PROGRAM 1991

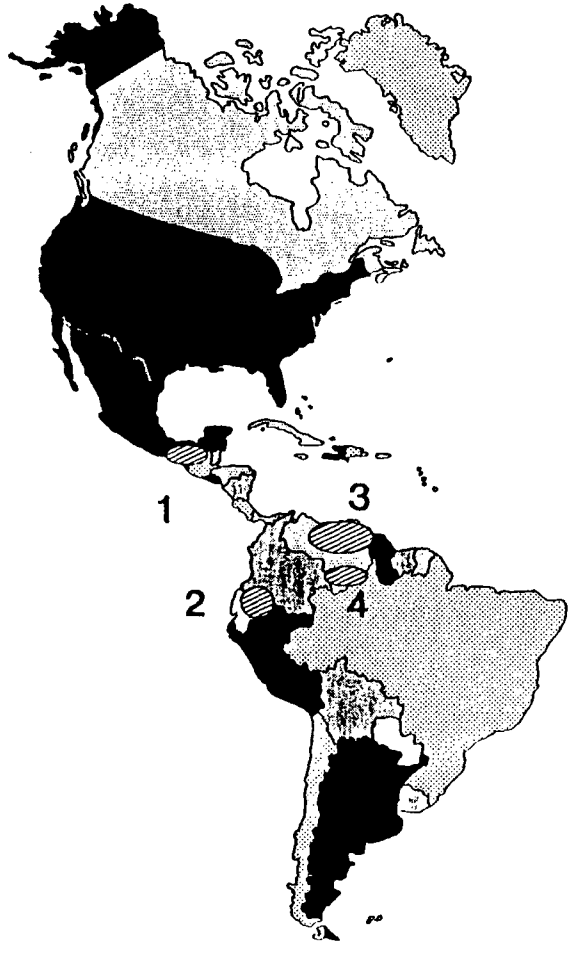
Application from MOH GUATEMALA			No. of Tablets		
Estimated number weighing 15 - 25 Kg:	500	X	.5	=	250
Estimated number weighing 26 - 44 Kg:	3,500	X	1	=	3,500
Estimated number weighing 45 - 64 Kg:	5,000	X	1.5	=	7,500
Estimated number weighing 65 - 84 Kg:	1,000	X	2	=	7,500
					13,250
			(Treatment every 6 months)		x2
			Total number of tablets requested:		26,500

Table 6. Functions of Field Research Networks

1.	To facilitate communication between field researchers in the endemic areas in order to strengthen their capacity to conduct multidisciplinary field studies.
2.	To facilitate continuing training in field research, through regular workshops and short training courses organized at regional centers.
3.	To serve as a focus for collaborative research studies and to provide a mechanism by which protocols would be developed for high-priority field studies.
4.	To foster the links between field researchers and national disease control programs.
5.	To disseminate information through the network on new advances in field research methods and tools.
6.	To provide a focus for the strengthening of regional resource centers so that they could provide assistance or advice for individual researchers on special aspects of field studies.
7.	To promote further field research studies by appropriate expansion of the network to include additional researchers and institutions.
8.	To link field researchers in the endemic areas with those in developed countries, with the objective of transfer of skills.

Source: Smith, P.C.: in Science and the Third World:Under the Volcano Annals of the New York Academy of Sciences. 1989.

ONCHOCERCIASIS IN THE AMERICAS



1991

Endemic Foci

1 Mexico-Guatemala

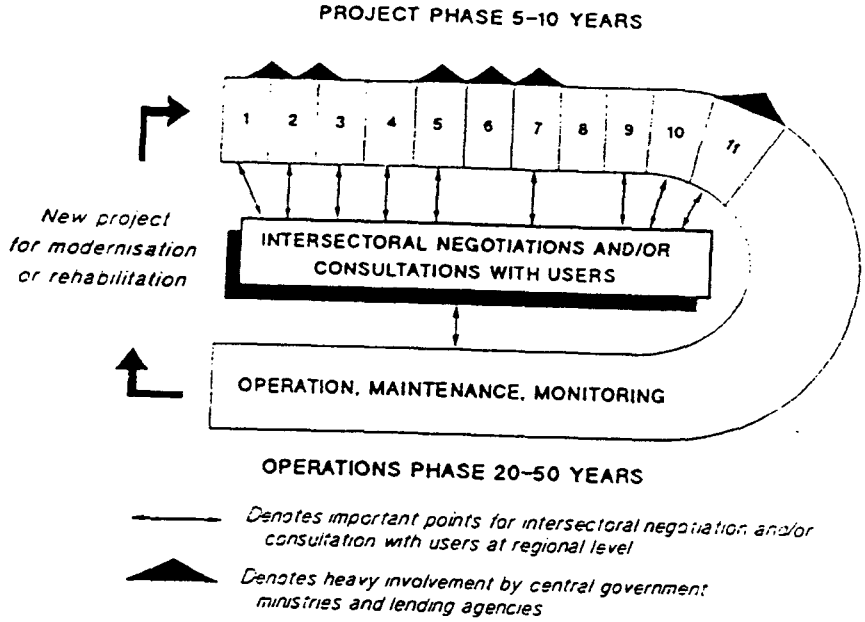
2 Ecuador-Colombia

3 North-Venezuela

4 South Venezuela-North Brazil

HPT-HPA / HPD PAHO / FIL-CTD TDR WHO Hq.

Figure 2

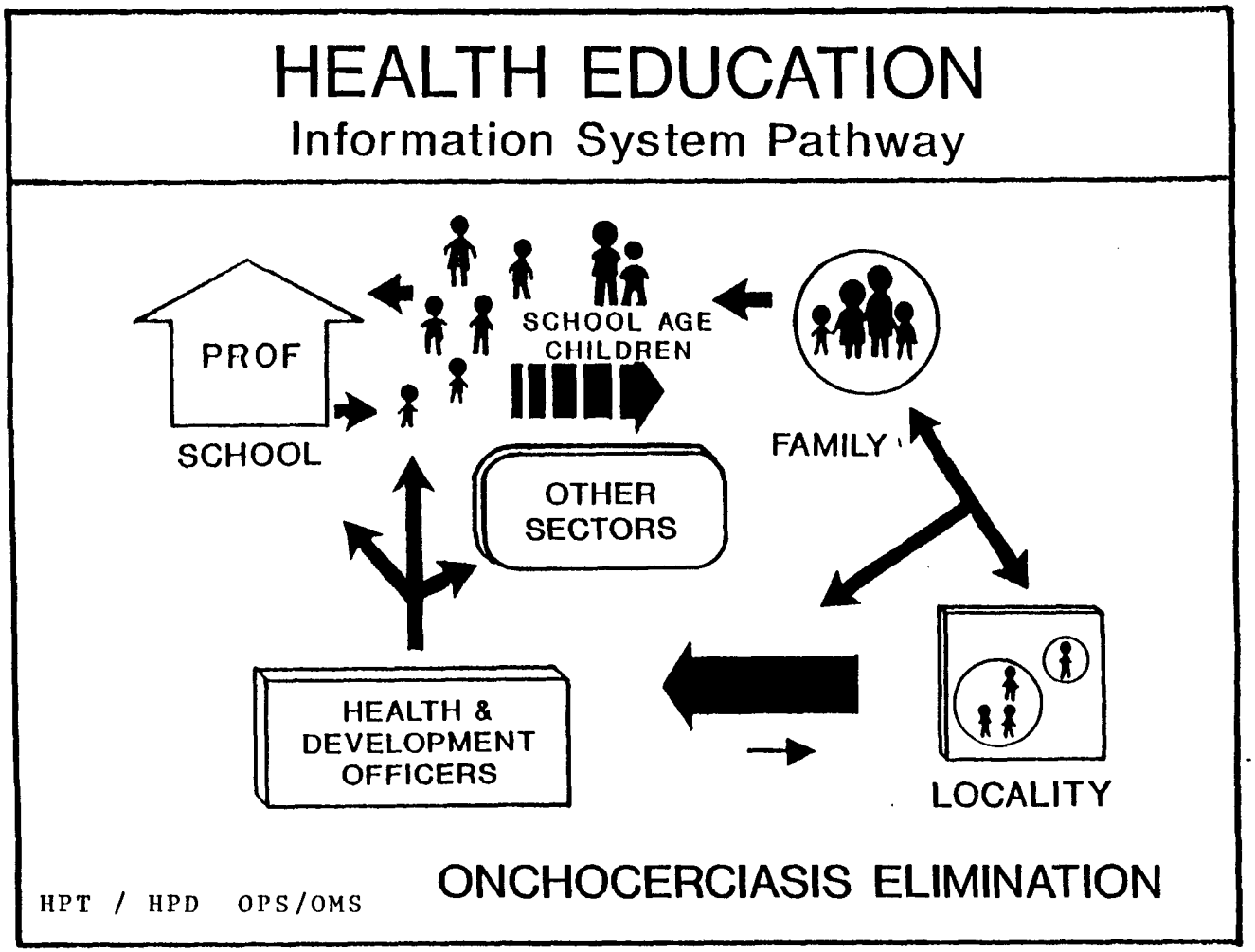


1 *Identification*
2 *T.O.R. / pre-feasibility study*
3 *Data collection and analysis*
4 *Feasibility study and design*
5 *Appraisal*
6 *Project selection negotiations*
7 *Adjustment and approval*
8 *Activation start-up*
9 *Implementation monitoring*
10 *Integration and hand-over to normal administration*
11 *Evaluation*

The expanded and updated view of the project cycle concept

Source: VBC/89.5 PEEM Guidelines Series 1.

Figure 3


HEALTH EDUCATION
Information System Pathway
PROF
SCHOOL
SCHOOL AGE CHILDREN
FAMILY
OTHER SECTORS
HEALTH & DEVELOPMENT OFFICERS
LOCALITY
HPT / HPD OPS/OMS
ONCHOCERCIASIS ELIMINATION

ANNEX VII

EXPANDED PROGRAM FOR THE CONTROL OF IODINE DEFICIENCY DISORDERS IN LATIN AMERICA

CONTENTS

EXPANDED PROGRAM FOR THE CONTROL OF IODINE DEFICIENCY DISORDERS IN LATIN AMERICA

I. INTRODUCTION

Goiter and endemic cretinism are the most frequently studied and well-known manifestations of iodine-deficiency disorders, but the effects of this deficiency is more far-reaching. Research over the past 20 years has revealed a broad range of other problems that constitute a serious threat to the genetic potential of millions of people who live in areas where iodine is in short supply (1).

These problems include neonatal mortality, abortions, birth defects, deaf-mutism, and varying degrees of neurological defects, with endemic cretinism having the most severe effect on cerebral function (1). Even mild degrees of iodine deficiency may produce hypothyroidism and moderate forms of myxedema along with significantly lowered mental development (2). The prevalence of neoplastic alterations of the thyroid gland and autonomous hyperfunctioning nodes is also greater in persons with long-standing endemic goiter (3.4). Thus, both the health consequences and social and economic repercussions of iodine deficiency are obvious, and they can constitute a serious obstacle to development in the affected communities (5).

Despite scientific and technological progress in the control of iodine-deficiency disorders over the past two decades, endemic goiter and its consequences remain a serious health problem in several Latin America countries (6). Even those that have been successful in reducing the prevalence of these disorders still have important foci, and in some countries the problem threatens to recur if follow-up and control measures are not adequately carried out (7). Recent estimates indicate that in the region 60 million people are at risk of disorders due to iodine defficiency, 30 million have goiter, and three million have marked cretinism (8).

The most important cause of this problem is low iodine content in foods. Although various goitrogenic factors have been identified, both environmental and dietary, which can cause goiter under certain conditions (9, 10, 11, 12), for practical purposes the basic etiological factor is a deficiency of iodine in the diet (13).

Geographically the prevalence of iodine deficiency disorders is most severe in the western ranges of the Andes, and extends from México to Chile.

The most effective and economical method of preventing endemic goiter is through the fortification of salt with iodine (iodination), utilizing either sodium or potassium iodide or iodate (NAI, $NAIO_3$, KI, KIO_3) (2, 6, 14). A determined amount of the compound is added in such a way that it is mixed uniformly and permanently with the salt, to provide not less than 150 mcg and not more than 1000 mcg/person/day. Based on periodic evaluations, the necessary adjustments should be made to optimize the effectiveness of the iodination (14).

To establish effective salt iodination programs it is necessary to have appropriate legislation and regulations, adequate financing, and the political, administrative, technical and operational support required for the production and marketing of iodized salt, for mass education, and for the establishment of efficient control systems at various levels of the process.

Legislation on iodination should cover salt for both human and animal consumption, because it is common in rural areas to consume salt designated for animal use. Moreover, iodine deficiency also causes problems in livestock.

In communities where general consumption of iodized salt is difficult because of inaccessibility, the administration of iodized oil is an alternative measure. Although experience on large-scale iodized oil programs in the Western Hemisphere is still limited, results so far have been successful (2, 6, 15, 16). A single injection of 475 mgrs of iodine in oil protects an adult for a period of three to four years, without complications. Recent studies suggest that oral administration of iodized oil, which is easier for large-scale programs, can provide adequate levels of iodine for 18 to 24 months without any adverse side-effects (17).

Other measures of proven effectiveness should not be ruled out in certain populations, such as weekly administration of one drop per person of strong Lugol's solution diluted in water (6, 14). In areas where goitrogens in foods represent a problem additional measures may be necessary (9, 11).

With the present knowledge, technology and experience it is possible to control iodine deficiency disorders in the Western Hemisphere before the year 2,000 provided there is the political will to implement measures of proven effectiveness.

Current knowledge and technology, together with lengthy experience in programs for the prevention and control of iodine deficiency, makes it possible to state that the Western Hemisphere can effectively control the problem over the short or medium term if there is a political decision to implement measures of proven effectiveness.

A. Current Situation in Latin America

In 1983 the Pan American Health Organization (PAHO) carried out an "Evaluation of the Current Status of Endemic Goiter and Programs for its Control in Latin America" (7), which was presented at the V Meeting of the PAHO/WHO Technical Group on Endemic Goiter, Cretinism, and Iodine Deficiency and included in PAHO Scientific Publication 502, Towards the Eradication of Endemic Goiter, Cretinism, and Iodine Deficiency. Some of the more significant results obtained from this evaluation are given below. In cases where more recent information is available, it has been updated and the references appear in the bibliography.

1. Legal Framework for the Control of Endemic Goiter

Table 1 presents information on the promulgation of legal provisions for compulsory salt iodination and indicates when iodination began and whether the legislation also covers salt for animal consumption.

Sixteen of the 19 countries that provided information have legal provisions in effect which make salt iodination compulsory and in nine of them iodination is also compulsory in salt for animal consumption. With the exception of Uruguay, where the law refers only to endemic areas, legislation in the rest of the countries covers the entire nation. However, the mere existence of legislation does not guarantee that salt iodination will actually be carried out. There are numerous infractions, including clandestine exploitation of deposits and illegal trade in noniodized salt between countries, along with difficulties in obtaining iodine compounds, and complacency or lack of knowledge about the effects of iodination on the part of high-level staff members of legally incorporated industries.

2. National Studies on Iodine-Deficiency Disorders

2.1 Prevalence of endemic goiter

Table 2 shows the results of the most important studies on goiter prevalence in Latin America. The latest available figures indicate that only in Colombia, Costa Rica, Cuba and Uruguay the prevalence is under 10%. However, the information is less than 10 years old in less than half of the countries (Bolivia, Costa Rica, Ecuador, Guatemala, Nicaragua, Paraguay, Perú and Venezuela). In the Dominican Republic there have not been any studies representative of the entire population. In Argentina, Colombia, El Salvador and México, 11 to 20 years have elapsed since the impact of iodination was last evaluated. It is evident the need to carry out rapid but representative surveys to reveal the current situation and provide orientation for future actions.

2.2. Urinary excretion of iodine

Table 3 shows the figures on urinary excretion of iodine from studies conducted in 11 countries, along with the figures on goiter prevalence.

3. National Programs to Control Iodine Deficiency

3.1 Salt iodination: costs and consumption

Table 4 indicates that the legal level of iodination ranged from 15 to 100 pmm iodine/salt in the 16 countries with legislation.

In Ecuador and Colombia the salt is fortified with potassium iodide, in all the others, potassium iodate is utilized. The methods used are: the dry-mix method, utilizing a premix with an antihumectant and an antiagglutinat; the aspersion method, utilizing the aqueous solution of an oidine compound, alone or with other chemicals; and the drip method, using an aqueous solution of potassium iodate.

The average cost of one kilogram of salt to the consumer is US$0.20 with a broad range from US$0.12 to US$0.30 related to the fortification method, the production and the marketing system of the country. Reportedly none iodinated salt is cheaper and frequently produced and sold under unsanitary conditions.

The average cost of salt iodination per person per year is of US$0.015; the highest cost is in Nicaragua, (US$0.06.) This figure was based on a complete study of all the expenditures incurred in iodination. With the exception of Brazil, the cost of iodination is borne by the consumer. Clearly, the costs of salt iodination do not constitute a valid impediment for failure to carry it out.

Some countries may have difficulties obtaining the foreign currency needed to purchase the potassium iodide or iodate, machinery and implements required for iodination. The establishment of a regional or subregional rotating fund should be considered.

Twelve out of 19 countries are self sufficient in salt, five import a certain amount, and two are wholly dependent on imports.

The average salt consumption per person per day in 14 countries is 9.76 grams with the range from 5 to 14 grams.

3.2 Control of the level of iodination of the salt

Most of the countries do not have effective mechanisms for the control of the iodination of the salt (Table 5). Usually the personnel responsible for this activity either do not have adequate training or lack the appropriate means of performing such analyses.

Of the nine countries studied, only one, Brazil, performs qualitative tests. Brazil, Colombia, Costa Rica, and Venezuela leave analysis up to the companies (Table 5) and usually, control within the plants is only done in large industries. Only the first one performs cualitative tests.

In Bolivia there is a pilot control system which will shortly be extended to cover the entire country (20).

Although in some countries the salt industry is nationalized, it does not mean compliance with the legislation since actions are frequently based on strictly commercial considerations. When control is deficient, significant quantities of noniodized salt may be sold as iodized and the population not only pays for a benefit that it does not receive, but also suffers the negative effects of iodine deficiency.

3.3 Administration of iodized oil

Within the JNSP in the countries of the Andean subregion, iodized oil by injection is being utilized as an alternative measure where there is serious endemic disease and immediate use of iodized salt is not possible. In Bolivia, between 1986 and 1987 doses were administered to 338,000 persons, and in Ecuador 700 were given during 1986 (20). Perú

has programmed the administration of doses to 500,000 persons by 1988 (21). In Bolivia the administration of iodized oil is carried out in coordination with nongovernmental agencies.

Recent studies indicate advantages of oral administration of oil. In Bolivia iodized oil is being administered by mouth to people under 45 years of age in isolated communities where iodized salt is expected to be unavailable within the next two or three years. The program will cover one and a half million persons.

3.4 Epidemiological surveillance of iodine deficiency

The four countries that currently maintain epidemiological surveillance of endemic goiter are Bolivia, Brazil, Ecuador, and Nicaragua. Nicaragua has carried out surveillance for seven years, while Bolivia and Ecuador are in the initial phases of implementation (Table 6). Brazil initiated a system in 1984, chosing the group 9-14 year old as an indicator of new cases, and selecting 17 index cities. Perú will be initiating a surveillance system in the near future.

4. Status of Iodine-Deficiency Control Programs in Countries of Latin America

ARGENTINA

Although no national studies have been conducted since 1970, indirect evidence indicates that the problem is under control in many areas of Argentina. In a study carried out in Salta (1980-1983), goiter prevalence in the capital was shown to be 5.1%. In ten of the most developed departments with more than half of the population resides, the prevalences were lower than 10%, while in the others, especially in the mountainous region, the endemicity level was higher. Surveys of salt consumption have demonstrated that in areas of moderate

development almost half the population consumes iodized salt, while in areas of difficult access, only 4% do so (20).

BOLIVIA

In terms of magnitude and severity, Bolivia is the Latin American Country that presents the most serious endemic goiter problem in the Region. The iodination of salt for human consumption has not been enforced at the national level in large measure because there are natural salt deposits in many parts of the country and this makes it difficult to ensure compliance with the regulations.

The current prevention program of prophylaxis, a component of JNSP, is being successfully developed throughout Bolivia (20, 22, 23).

BRAZIL

In 1983 the Brazilian Ministry of Health undertook a reformulation of its iodination program which included, among other components, government assistance in obtaining equipment for the dosification of iodine compounds and distributing it to small-scale producers, reactivation of the laboratory network for the control of iodination, education programs to producers, distribution of potassium iodate to plants, and the reinforcement of supervision of the salt industry. There is evidence that this reformulation helped to alleviate the problem (24).

CHILE

There is high goiter prevalence in certain areas, in some of which there seem to be natural goitrogens as well as iodine deficiency. The principal difficulties confronting the program are lack of legislation for compulsory salt iodination, failure to evaluate the program at the

national level, and failure to fully inform the community about the causes and effects of endemic goiter (25, 26, 27, 28).

COLOMBIA

Salt iodination has been effective in reducing endemic goiter. In recent years, however, the quantities of iodine in salt samples have been inadequate, while noniodized salt has become increasingly accessible. It is necessary to evaluate the iodination, marketing, and control of salt, and a new study should be conducted, possibly at the national level, to determine the magnitude of the problem.

COSTA RICA

Costa Rica is one of the countries of Latin America which, thanks to an efficient iodination program, has succeeded in controlling the problem.

CUBA

A goiter problem has been detected in some areas of Cuba (Baracoa). The high calcium carbonate content of the water may be a contributing factor.

DOMINICAN REPUBLIC

There is no compulsory salt iodination legislation. The salt that is produced is not iodized. Studies on prevalence have been carried out on samples that are not representative of the entire population. There is a need to undertake diagnosis of the situation and to initiate a program of prophylaxis (19).

ECUADOR

The goiter problem has been observed in the Andean region for many years, but there have been recent advances in salt iodination. A technical cooperation agreement with the Government of Belgium for strengthening the control of iodine deficiency has been productive (20).

EL SALVADOR

Since iodination began in 1972, no studies have been carried out to evaluate its effect until 1988 when the Ministry of Health, with the support of INCAP, initiated an evaluation of salt iodination. Sampling of commercial salt suggests that salt iodination is practically non-existent (29).

GUATEMALA

Guatemala was the first country in Central America to reduce goiter prevalence to levels where it no longer constituted a significant health problem. However, this success has not been maintained during recent years. Problems with production have created a dependency on improperly iodized contraband salt. In 1987, a study of preschool children revealed a goiter prevalence of 21% (29). The Ministry of Health initiated salt iodination control in 1988 (30).

HONDURAS

Despite the rudimentary technology employed in salt iodination in Honduras, analyses have indicated that the iodine concentration levels are satisfactory (37). However, a recent evaluation revealed a goiter prevalence of 10%, and it would appear that salt iodination is not being carried out consistently (29).

MEXICO

There is insufficient information on actual levels of iodination or the marketing of iodized salt in México. The information on endemic goiter prevalence needs to be updated.

NICARAGUA

A national survey conducted in Nicaragua in 1981, three years after iodination started, revealed an average goiter prevalence of 20%, with lower values among school children. The program in Nicaragua includes an epidemiological surveillance system that covers the following variables, among others: hypertrophy of the thyroid, ioduria, and (quality) control of iodine in salt at the consumer level. Since 1984 the program has deteriorated, however, and there are no recent data on goiter prevalence or the level of iodination (29).

PANAMA

Research carried out in 1975 indicated that the salt iodination program had been effective. Goiter prevalence was at 6%. However, in recent visits to several salt processing plants it was found that the salt was not being iodized (29).

PARAGUAY

Paraguay is a nonproducer of salt and depends on imports in order to meet consumer demand. Moderately severe prevalence of endemic goiter has been present for many years, because of inadequate or nonexistent controls on imported salt (32). The basic components of a control program would be an evaluation of the situation, the supplying of iodized oil of the population as a temporary measure, and control of imported salt.

PERU

Perú is a country with high prevalence in the mountains and the Amazonic region because of problems with the production and marketing of iodized salt. Currently the program, a component of JNSP, is being developed within the established timetables (33, 34).

URUGUAY

The information available indicates that Uruguay has been able to control goiter in its endemic areas.

VENEZUELA

Thanks to the program of salt iodination, goitrous endemic disease has been reduced in Venezuela, especially in the Andean region. It appears that in some areas of the country there are goitrogens (lithium) which are causing goiter to persist (18).

B. Cooperation of PAHO/WHO, UNICEF, and other International Agencies in the control of Iodine-Deficiency Disorders in Latin America

1. PAHO/WHO and UNICEF Cooperation with the Governments of Latin America in the prevention and control of iodine-deficiency disorders has included support for the diagnosis and surveillance of endemic goiter, salt iodination, and the use of iodized oil (35). In addition, these agencies have helped with the preparation of international recommendations, an endemic goiter classification, and techniques for chemical, biochemical, and salt iodination analyses as well as the development of training courses and information campaigns (35).

The V Meeting of the PAHO/WHO Technical Group on the Control of Endemic Goiter, Cretinism, and Iodine Deficiency, held in Lima, Perú in 1983,

was the starting point for the initiation of activities to control endemic goiter in Bolivia, Ecuador, and Perú, as components of the PAHO/WHO-UNICEF Joint Nutrition Support Program (JNSP) under the financial support from the Government of Italy (35). A regional workshop on "National Strategies for the Eradication of Endemic Goiter and Cretinism" was held in Sucre, Bolivia, in October 1986 for representatives of the three countries and Argentina. The purpose of the workshop was to evaluate the strategies and interventions utilized, to identify the factors that limit the success of the programs, and to analyze possible changes in or reformulations of the activities (20).

2. In 1985 the International Council for the Control of Iodine-Deficiency Disorders (ICC/IDD) was created to promote a multidisciplinary approach and research. A quarterly publication, IDD Newsletter, disseminates current information on the subject (35). ICC/IDD has been useful in Latin America, through technical advise and cooperation, as well as facilitating exchange of experiences with other regions.

II. JUSTIFICATION OF THE PROGRAM

The fact that iodine-deficiency disorders still constitute a significant health problem in Latin America exemplifies the slow application of scientific knowledge to the solution of a specific problem which could be resolved in a short time, given that an effective technology easy to apply, low in cost, and well-accepted by society exits.

The World Health Assembly (May 1980), in its resolution WHA39.31, encouraged all Member States to give high priority to preventing and fighting iodine-deficiency disorders wherever they might occur, through appropriate nutrition programs integrated within primary health care (36).

Resolution VI of RESSCAP (Meeting of Central American Ministers for Health) and Resolution IV of INCAP's Directing Council called "To support

implementation of the preventive measures necessary to control diseases caused by specific nutritional deficiencies, including anemia, endemic goiter, and Vitamin A deficiency" (37).

Countries in the Latin Caribbean, Central America, Panamá, and South America have demonstrated an interest in initiating or reactivating programs to control endemic goiter (19, 38). Furthermore the XXXIII PAHO's Directing Council Meeting requested from the Director that emphasis should be given to the technical cooperation for the control of specific nutritional deficiencies: iodine, iron and Vitamin A. Time is appropriate therefore to extend the initiative which during the past five years was limited to three countries in the Andean area.

III. PURPOSES OF THE PROGRAM

To promote and support the introduction or implementation of policies, plans, and projects in the countries of Latin America aimed at reducing the prevalence of iodine-deficiency disorders to levels where they no longer constitute a public health problem, or to maintain the prevalence at these levels in countries where this has already been achieved.

IV. OBJECTIVES OF THE PROGRAM

A. Overall Objective

To eradicate endemic goiter and cretinism in Latin America by the year 2000.*

(*) In the present document eradication is understood to be the reduction of endemic goiter prevalence to levels lower than those established by the World Health Organization as having public health significance (1) and the absence of new cases of cretinism due to iodine deficiency.

B. Specific Objectives

1. To inform the health authorities and population of Latin America on the causes of endemic goiter and cretinism, and its effect on the health and well-being.

2. To make the authorities aware of the need to implement effective national control programs, especially to control the iodination of salt.

3. To promote and support surveys to update the goiter prevalence data so that control programs can be formulated or strengthened.

4. To promote and support the establishment or implementation of adequate systems of salt iodination for human and animal consumption, epidemiological surveillance of endemic goiter and cretinism, quality control of iodized salt, and programs for the administration of iodized oil in those countries where necessary.

5. To support relevant research to resolve specific problems related to the four previous objectives.

V. TARGETS

A. Immediate Targets (first two years of the program)

- In all those countries of the Region where may be a problem.

  1) To evaluate the present situation regarding endemic goiter and cretinism.

  2) To formulate or reformulate dispositions providing the legal basis for specific activities.

  3) To reorganize the salt iodination systems whenever necessary.

4) To initiate salt iodination control.

5) To initiate the process to organize salt producers.

6) To initiate projects to motivate the community to set its cooperation for the different components of the program.

7) To initiate the training of personnel in charge of national programs for salt iodination, epidemiological surveillance, and quality control of iodine-fortified salt.

8) To initiate operational research for the solution or relevant problems.

9) To identify areas where iodized oil should be administered and to begin administration.

- To establish a Technical Cooperation Program among the countries of the region.

- For PAHO/WHO and UNICEF to start a program to disseminate scientific and technical information on oidine deficiency.

B. Intermediate Targets (second to fourth year of the program)

1. To keep the programs of endemic goiter control in operation in all the countries.

2. To implement systems of epidemiological surveillance of endemic goiter and cretinism in all the countries and to have integrated them into the health surveillance systems.

3. To maintain iodized oil administration in those areas that require it.

4. To continue in-service training programs for the relevant personnel.

5. To establish reference laboratories to perform the biochemical analyses that are necessary for program development.

6. To continue relevant research.

7. To establish and make fully operational a network for the dissemination of scientific and technical information on the subject.

8. To keep the Program of Technical Cooperation among Countries fully operational in the area of oidine deficiency.

C. Final Goals (by the fifth year of the program)

1. To keep goiter prevalence in each country at less than 10% in children 6-12 years old.

2. To ensure more than 80% coverage through the consumption of iodized salt and the administration of iodized oil in high-risk populations.

3. To achieve in all countries compliance with the legal mandates and technical standards for the control of endemic goiter and cretinism.

4. To have uniform criteria at the regional level for the evaluation of the eradication programs.

VI. PROGRAM STRATEGIES

According to the information presented above (Chapters 3 and 4) and for purposes of the Lines of Action under the present Program, the countries of Latin America have been grouped into four categories (39), which may change as new information is obtained.

1. Countries with significant problems and effective programs underway: Bolivia, Brazil, Ecuador, and Perú.

2. Countries with an endemic goiter problem, in which there is a need to update information and evaluate interventions in order to initiate or strengthen programs: Colombia, Chile, the Dominican Republic, El Salvador, Guatemala, Nicaragua, Paraguay, and Venezuela.

3. Countries with problems in certain geographical areas, where specific studies are need so that interventions can be defined: Cuba, Argentina and México.

4. Countries with no endemic goiter problem, in which the interventions would be oriented toward strengthening salt iodination and its control and establishing an epidemiological surveillance system: Honduras, Costa Rica, Panamá, and Uruguay.

To attain the stated objectives, this program will apply the following strategies:

A. Resource Mobilization

1. Strengthening the institutional capacity of the PAHO Regional Food and Nutrition Program and its Specialized Centers (CFNI and INCAP) as well as the Regional Office of UNICEF to provide support for the regional and national iodine deficiency control programs.

2. Strengthening the institutional capacity of the Ministries of Health, the national nutrition institutes and relevant agencies, to ensure adequate planning, development, and evaluation of the country programs.

3. Establisment of an Inter-Country Technical Cooperation Program in the Region for the control of iodine-deficiency disorders.

4. Conduction as part of Intercountry Technical Cooperation, an analysis of the institutional capacity of research centers, universities, institutes, and other agencies of the public and private sectors in the area of iodine deficiency that will provide information on the Region's actual and potential capacity for the execution of the Program.

5. Encouragement of the main salt-producing companies in each country to participate in the Program.

6. Promotion and stimulation, when the particular conditions of a country so require, of different forms of social organization for small-scale salt producers, trying to achieve greater efficiency in production and productivity as well as more socioeconomic benefits while at the same time involving them as promoters of iodine deficiency control.

B. Dissemination of information

1. Establishment of a Regional data base on iodine-deficiency disorders that includes information on the evolution of the different programs and their impact on the affected communities as well as on the results of the operational research that is carried out.

2. Compilation, classification, translation, reproduction, dissemination, and distribution to the countries of Latin America, in an organized and systematic fashion, scientific and technical as well as community-based information that focuses on the prevention and control of iodine-deficiency disorders.

3. Preparation of audiovisuals and videotapes to share the knowledge and experiences of the countries and serve as instructional materials for manpower training.

C. Manpower training

1. Strengthening of the national and subregional manpower training centers to engage in training activities, such as short courses, workshops and seminars in:

   a) The use and standardization of analysis techniques and methods to determine the iodine content in salt and biological samples.

   b) Setting up systems for the quality control of iodized salt.

   c) The use of alternative technologies for salt fortification.

   d) The standarization of criteria for control the marketing of iodized salt at the interregional level.

2. Organization of a regional meeting among national managers of control programs and cooperation agencies to analyze, discuss, and evaluate the process and impact of the programs in the Region.

3. Organization of a regional meeting to establish uniform criteria for the development of clinical, epidemiological, and biochemical studies of iodine deficiency.

4. Training in the design and development of:

   a) Epidemiological studies on iodine deficiency.
   b) Analytical techniques used in nutritional biochemistry:

      - Instruments.
      - The taking, processing, transportation, storage, analysis, and interpretation of results of biological samples (urine, serum, blood, etc.).

c) Analytical techniques for quality control of salt fortified with iodine and other nutrients.

d) Data processing and statistical analysis involved in epidemiological studies of iodine deficiency.

5. In-service training for the personnel at the technical and policy-making levels who are responsible for program administration.

6. Revision of the educational objectives and curriculum content related to iodine deficiency for health personnel.

D. Development of Standards, Plans, and Policies

1. Promotion and support the review of national health policies on the control of iodine-deficiency disorders as well as of the legal instruments needed to fulfill the objectives of the programs for the prevention and control of these disorders.

2. Establishment of a Regional reference laboratory for standardizing techniques and procedures.

3. Establishment of uniform standards for the clinical, biochemical, and epidemiological assessment of iodine deficiencies.

4. Preparation, testing or updating of manuals on the procedures and technical and administrative standards in programs for the control of goiter caused by iodine deficiency.

E. Research Promotion

1. Development, validation, and application of technologies for the fortification of salt with iodine.

2. Promotion of studies on the production, marketing, and use of salt.

3. Conduction of studies to ascertain the technical and economic feasibility of fortifying salt with iodine and other nutrients.

4. Promotion of research aimed at using inputs and equipment that are currently produced or that might be produced in Latin America and utilizing them in the fortification of salt with iodine and in the production of iodized oil.

5. Promotion of studies to determine the biological impact of interventions for the prevention of endemic goiter, particularly the impact of the administration of iodized oil to high-risk groups: women of reproductive age and preschool and school-age children.

6. Promotion and support of other action-oriented research in areas that require additional scientific information on the control of iodine deficiency.

F. Direct Advisory Services to the Countries

In close coordination of PAHO/WHO and UNICEF, based on the experience gained through the Joint Nutrition Support Program (JNSP), there will be collaboration with the countries in the following areas:

1. Formulation, implementation, and evaluation of epidemiological studies to assess the magnitude, significance, and nature of iodine deficiency and to gauge the impact of the interventions.

2. Formulation of plans and programs to prevent or control endemic goiter and cretinism.

3. Promotion of intersectoral coordination and community participation in the different stages of the program.

4. Establishment or strengthening of effective systems for salt iodination and quality control.

5. Establishment of epidemiological surveillance systems for iodine deficiency as part of the overall epidemiological surveillance systems in the health services.

VII. PROGRAM DESCRIPTION

Based on information about the status of iodine deficiency and the programs for its control in Latin America, PAHO and UNICEF have formulated a program proposal that identifies the interventions that are common in the countries and shows how they can strengthen their national programs within a framework of regional exchange and cooperation, thus helping to attain the goal of Health for All by the Year 2000.

The program will be implemented jointly by PAHO and UNICEF during the period from 1989-1993. They will work together with the national authorities to prepare a detailed plan of action, based on an analysis of the situation in each country, which will specify the objectives of each program, the roles of PAHO and of UNICEF, and the operational mechanisms for implementation of the program. The Regional Offices of PAHO and UNICEF will make the appropriate contacts for promoting the program within each country and will program joint visits to support the preparatory phase, during which the national programs will be formulated.

The regional or subregional activities to carry out will be:

a) Establishment of a Regional Data Bank on issues related to iodine deficiency (prevalence, resources, bibliography, etc.).
b) Strengthening a center to act as Regional Training Center.
c) Stengthening a laboratory to act as Regional Reference Laboratory.
d) Regional meetings related to strategies C.2 and 3. (Pg. 20).

VIII. PROGRAM COORDINATION

A physician specialized in nutrition, assigned to the PAHO Regional Food and Nutrition Program and having working at headquarters in either Bogotá or Caracas, will be responsible for assisting the governments and coordinating the activities of PAHO, UNICEF, ICC/IDD and relevant agencies.

In addition, a PAHO/WHO-UNICEF Coordinating Committee will be set up to handle regional coordination of the areas of action of PAHO and UNICEF, the five-year plan, the plans of action, and the annual proposal budget. This Committee will work in special coordination with the International Council for the Control of Iodine Deficiency Disorders for the purpose of extending the wide experience and extensive knowledge of its members to the efficient provision of direct advisory services to the countries.

In addition, PAHO-UNICEF-COUNTRY National Coordination Committees will be created to assume responsibility for preparing the draft five-year plan, the yearly plan for each country, and the corresponding budgets, as well as for performing follow-up and coordination during the implementation of the operational plan. In addition, these committees will work in coordination with other international or bilateral agencies in each country that are associated with the Joint Program.

IX. RESOURCES REQUIRED

It is estimated that the following resources will be needed for the Program:

1. Personnel

   a) A medical officer specialized in nutrition within the food and nutrition program of PAHO (Project Manager, P.4).

b) Short-term consultants in the areas of industrial engineering (iodination equipment and methods), economics (salt marketing research), organization of cooperatives (small-scale salt producers), nutrition, and evaluation.

c) National personnel on contractual basis to carry out specific assignments.

d) Technical officer, experienced in project administration (P.3).

e) Secretary (one).

2. Travel

a) Visits by regular staff from PAHO and UNICEF to support the program in the countries.
b) Exchange visits of technical cooperation between countries.

3. Equipment and materials

Small-scale iodination plants, laboratory equipment, iodized compounds (iodide, iodate, and iodized oil); educational materials (audiovisuals, pamphlets, etc.) and other materials for information dissemination (printing, distribution, and other expenditures). The economic resources allocated in this chapter are considered to be contributions to the national program and not the complete funding for the activity.

4. Training

Personnel will be trained in the fields and areas described in the section on manpower training.

5. Research

The financing of short-term research proposals is expected to be in accordance with what is described in the section on research promotion.

6. Surveillance

Establishment of institutionalized systems of endemic goiter surveillance and control of compliance with legislation.

7. Demonstration Projects

Case studies of selected projects will be prepared to serve as examples.

X. PLAN OF ACTION FOR 1989

A. Assessment of the present situation

It has been shown that very few countries have recent reliable data on goiter prevalence and the status of salt iodination. This information is needed as baseline data to prepare plans of operations for each country.

The following activities are proposed for the first six months of 1989:

1. Rapid but representative goiter surveys among children in statistically selected schools in Argentina, Belize, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, México, Nicaragua, Panamá, Paraguay, Uruguay and Venezuela.

2. Study of the production and marketing of salt in Argentina, Belize, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, México, Nicaragua, Panamá, Uruguay and Venezuela.

3. Study of the present legislation and regulations regarding iodinated salt in the countries mentioned in 2 above.

B. Activities during the second half of 1989

A regional meeting to formulate a "Strategy and Plan of Action to erradicate the IDD in the Americas" will be organized.

On the basis of the information obtaining on these activities and the results of the meeting, detailed plans of operations will be drawn for each country.

Activities A and B are identified in section X. Budget for 1989.

XI. BUDGET

Category	In thousands of US$						
	1989	1990	1991	1992	1993	1994	TOTAL
A. Situation analysis							
IDD prevalence	300.0						300.0
Salt production and marketing	100.0						100.0
Existing legislation	30.0						30.0
B. Planning							
Preparation of national plans of operations	60.0						60.0
C. Personnel							
Project manager	75.0	80.0	85.0	90.0	95.0	100.0	525.0
Technical officer	60.0	65.0	70.0	75.0	80.0	85.0	435.0
STC's & contractual personnel	85.0	115.0	95.0	80.0	75.0	60.0	510.0
Executive Secretary	25.0	30.0	32.0	34.0	36.0	38.0	198.0
D. Travel							
Consultants	75.0	75.0	75.0	75.0	75.0	75.0	450.0
E. Inter country activities							
Travel	50.0	50.0	50.0	50.0	50.0	50.0	300.0
Regional/subregional meetings	60.0	60.0	60.0	60.0	60.0	60.0	360.0
F. Equipment and materials							
Iodination plants	200.0	500.0	500.0	500.0			1,700.0
Laboratories	150.0	150.0	150.0	150.0	50.0	150.0	800.0
Iodized compounds	50.0	150.0	150.0	150.0	150.0	150.0	800.0
G. Vehicles							
Used in the countries		300.0		300.0			600.0

H. Community mobilization							
Educational material	100.0	200.0	200.0	200.0	200.0	200.0	1,100.0
Information campaigns	100.0	200.0	200.0	200.0	200.0	200.0	1,100.0
I. Training							
Training of national staff	100.0	200.0	200.0	200.0	200.0	200.0	1,100.0
J. Research							
Support for action oriented to operational research and case studies	100.0	100.0	150.0	150.0	150.0	150.0	800.0
K. Special programs							
Campaigns iodized oil administration (oral or injectable)	100.0	350.0	350.0	350.0	350.0	250.0	1,750.0
L. Epidemiological Surveillance and control							
Establishment IDD surveillance and monitoring systems	150.0	150.0	150.0	150.0	150.0	150.0	900.0
SUB-TOTAL	1,973.0	2,775.0	2,517.0	2,814.0	2,021.0	1,818.0	13,918.0
M. P.S.C. (13%)*	257.0	361.0	327.0	366.0	263.0	236.0	1,810.0
GRAND TOTAL	2,230.0	3,136.0	2,844.0	3,180.0	2,284.0	2,054.0	15,728.0

* Rounded up to the nearest thousand

(Note: budget updated april/89 according to HPN/89.2)

XII. EVALUATION OF THE PROGRAM

Period's evaluations of the Five-year Program will be made. The final evaluation will include both the activities carried out and the end result expressed in terms of the prevalence of endemic goiter and cretinism in the Region. For this reason it is necessary to establish goiter surveillance systems in each country. In addition, specific surveys and sentinel sites will be an effective contribution to the evaluation of the overall program.

The operational evaluation will quantify the coverage achieved at regular intervals and at the conclusion of the five-year period based on figures for the following:

a) Person-months of short-term consultantships provided to the countries.

b) The amount of pertinent legislation that is passed or improved and effectively promoted and implemented.

c) The number of countries with effective salt iodination programs and any increase in the population consuming iodized salt.

d) The number of countries with effective systems for endemic goiter surveillance and salt iodination control.

e) The number of programs for iodized oil that are operating efficiently, and the population they cover.

f) The number and quality of the research proposals that are successfully carried out, and the practical applications of their results.

The final achievements of the program will be evaluated in terms of the extent to which endemic goiter prevalence has been reduced and the number of countries where goiter no longer constitutes a public health problem.

Table 1. National legislation on compulsory salt iodination in countries of Latin America.

Country	Date of promulgation of Law	Date of enabling legislation	Year iodination began	Includes salt for animals: Yes	No
Argentina	1967	1967	1970	X	---
Bolivia	April 1968	December 1968	1977	X	---
Brazil	March 1953	1953-1977	1957	---	X
Chile	1959; repealed 1982	----------	----	---	---
Colombia	December 1947	March 1955	1959	X	---
Costa Rica	April 1941	November 1970	1972	---	X
Cuba	No legislation	----------	----	---	---
Dominican Rep.	No legislation	----------	----	---	---
Ecuador	November 1968	June 1969	1973	---	X
El Salvador	February 1961	June 1967	1972	---	X
Guatemala	October 1954	March 1955	1959	X	---
Honduras	May 1960	September 1961	1971	X	---
Mexico	May 1963	1963-1974	1963	---	X
Nicaragua	January 1969	September 1977	1978	X	---
Panama	January 1965	November 1969	1970	---	X
Paraguay	April 1958*	1966-1980	1966	X	---
Peru	January 1969	November 1971	1972	X	---
Uruguay	November 1961*	1963-1975	1963	---	X
Venezuela	November 1966	January 1968	1968	X	---

* All salt is imported.

Table 2. Studies on endemic goiter prevalence in countries of Latin America

Country	Year	Type of population studied	Population from which sample was drawn	Sample size	Method of goiter classification	Prevalence (%)	Observations
Argentina	1967	Schoolchildren	Departmental	4,431	Pérez & Scrimshaw	49.8	Range: 12% to 62%
	1967	Adults over 20	Departmental	47,679	Pérez & Scrimshaw	15.6	Range: 4% to 54%
Bolivia	1976	Schoolchildren	La Paz	4,200	WHO modified	68	WHO classification
	1979	Schoolchildren	Pando	680	WHO modified	77	adapted locally.
	1981	Schoolchildren	National	38,500	WHO adapted	60.8	
Brazil	1966	Schoolchildren	45 municipalities	45,924		27.2	
	1967	Schoolchildren	41 municipalities	48,443		21.9	*Only the inspection
	1975	Schoolchildren	National	421,752	WHO adapted*	14.1	criterion was used.
Chile	1972	General	Community	8,407	Pérez & Scrimshaw	24.8	
Colombia	1945	Schoolchildren	National	183,243	Old classification	53	385 municipalities examined
	1945	Schoolchildren	Departmental	8,062	Old classification	83.1	8 municipalities*
	1952	Schoolchildren	Departmental	6,511	Old classification	33.9	*Same municipalities
	1965	Schoolchildren	Departmental	12,166	Old classification	1.8	*Same municipalities
Costa Rica	1966	General	National	4,065	Pérez & Scrimshaw	18.0	
	1979	Schoolchildren	National	5,061	Pérez & Scrimshaw	3.5	
Cuba	1974	6-20 years	Baracoa	2,664	Pérez & Scrimshaw	30	
	1976	General	Havana	6,149	Pérez & Scrimshaw	3.4	
Dominican Rep.	1972	General	4 inland provinces		Means & Strawberry		Maximum limit 60%
	1988	General	1 province		Means & Strawberry		Nonrepresentative samples
Ecuador	1970	Schoolchildren	Sierra	28,639	Pérez & Scrimshaw	28.0	Same schools examined
	1977	Schoolchildren	Sierra	36,962	Pérez & Scrimshaw	13.8	in 1970 and 1977.
	1983	Schoolchildren	Sierra		WHO	36.5	
El Salvador	1966	General	National	3,231	Pérez & Scrimshaw	48.0	

Table 2 (cont.). Studies on enemic goiter prevalence in countries of Latin America

Country	Year	Type of population studied	Population from which sample was drawn	Sample size	Method of goiter classification	Overall prevalence (%)	Observations
Guatemala	1949	General	National		Old classification	38	
	1965	General	National	4,113	Pérez & Scrimshaw (Orig.)	5.2	
	1979	Schoolchildren	National	2,995	Pérez & Scrimshaw	10.5	
Honduras	1966	General	National	3,654	Pérez & Scrimshaw	17.0	
Mexico	1950	General	8 states	1,000,000	-	5-46	
Nicaragua	1966	General	National	3,477	Pérez & Scrimshaw	32.0	
	1977	General	National	13,814	Pérez & Scrimshaw	33.0	
	1981	General	National	6,252	Pérez & Scrimshaw	20.0	
Panama	1967	General	National	3,071	Pérez & Scrimshaw	16.5	
	1975	General	National	4,084	Pérez & Scrimshaw	6.0	
Paraguay	1976	General	National	4,078	Pérez & Scrimshaw	18.1	
	1980	Maternal/child	3 communities	343	WHO modified	23.6	
	1982	Schoolchildren	6 communities	420	WHO modified	16 - 40	
Peru	1968	Schoolchildren	National	181,118	Pérez & Scrimshaw	22	*Average prevalence mountains, jungle, and coast
	1976	General	National	9,293	WHO modified	15*	
	1986	Schoolchildren (1)	Mountains and jungle	43,385	WHO	26.5**	**Average prevalence: Mountains, 34%; Jungle, 19%
Uruguay	1973	Schoolchildren	Departmental	2,515	Pérez & Scrimshaw	9	
	1980	Schoolchildren	Departmental	1,254	Pérez & Scrimshaw	2	
Venezuela	1966	Schoolchildren	National	470,207	Pérez & Scrimshaw	13	
	1981	Schoolchildren and adolescents	National	14,709	WHO modified	21.37	

(1) See Reference 21

Table 3. Studies on urinary excretion of iodine in countries of Latin America

Country	Year	Type of population studied	Population from which sample was drawn	Sample size	Iodine excretion (mcg, average)
Bolivia	1962	General	Altiplano-Valle-Llano	251	40-108/g creatinine*
Costa Rica	1966	General	National	879	25/day
	1979	Schoolchild	National	1,064	557/g creatinine
Cuba	1974	6-20 years	Baracoa	520	15-46/g creatinine*
	1976	General	Havana	-	90/g creatinine
Ecuador	1979	Schoolchild.	6 communities at different levels	2,276	38-91/0.9 g creatinine*
El Salvador	1966	General	National	600	25/day
Guatemala	1965	General	National	835	400/day
	1979	Schoolchild.	National	684	70/g creatinine
Honduras	1966	General	National	599	25/day
Nicaragua	1966	General	National	479	25/day
	1977	General	National	1,488	51/g creatinine
	1979	General	National	252	82/g creatinine
	1981	General	National	751	99/g creatinine
Panama	1967	General	National	559	25/day
Paraguay	1965	General	National	262	16-38/g creatinine*
Peru	1969	General	4 cities (endemic and nonendemic)	179	13-115/day
	1986	Schoolchild.	6 departments		**

* Upper and lower limits

** Ioduria prevalence less than 100 mg/gC.: Amazonas, 69.6%; Cuzco: 52.7%; Piura, 48.7%; Cajamarca, 47%; Lambayeque (Mountains), 70%.

Table 4. Salt iodination systems and utilization of installed capacity.

Country	Iodization plant (location)	Legal level of iodization (PPM) 1-/salt	Iodization method	Production capacity (M.T.)	Actual Production (M.T.)	% of utilization
Argentina	-	30	Dry-mix	-	699,500	-
Bolivia	Quimbabol-Uyunense	50	Dry-mix-drip	-	4,000	-
Brazil	-	10 (15-30)*	Drip	-	-	-
Colombia	Cajicá & Cartagena	70-100	Aspersion	225,000	184,000	82
Costa Rica	-	30-50	Aspersion	21,000	7,000	33
			Dry-mix	6,000	500	8
Ecuador	Guayaquil - Sta. Elena	50	Drip-dry-mix	87,000	50,000	57
El Salvador	-	60-100	Dry-mix	20,000	4,000	20
Guatemala	Salinas CAPAN	60-100	Dry-mix	5,000	5,000	100
Honduras	-	60-100	Dry-mix	34,090	34,090	100
Mexico	-	-	-	-	-	-
Nicaragua	-	30-50	Dry-mix	46,719	17,115	37
			Aspersion	4,992	2,404	48
Panama	-	30-50	Dry-mix	73,920	9,000	12
Paraguay	-	60-80	-	-	-	-
Peru	Lima-Ica-Puno-Monquegua	30-40	Dry-mix	141,696	82,520	58
Uruguay	-	30	Dry-mix	-	-	-
Venezuela	Araya-Cumaná-Olivitos-Cumaraguas	20-30	Aspersion	235,000	152,000	65

*New levels proposed by the National Institute of Food and Nutrition

Table 5. Iodination control measures (August 1982-July 1983).

Country	Year	In the plants		In the markets		At the consumer level		
		No. Samples	X 1-PPM	No. Samples	X 1-PPM	No. Samples	X 1-PPM	% iod./% no-iod.
Brazil	1983	252	19-31	-	-	-	-	-
Colombia	1983	720	86-106	83	50	-	-	-
Ecuador	1981	339	9-67	-	-	-	-	-
El Salvador	1982	303	-	-	-	-	-	10/90
Honduras	1982	267	60	1,576	60	-	-	-
Nicaragua	1981	438	40	3,090	-	-	-	99/1
Panama	1983	36	-	-	-	-	-	47/53
Paraguay	1983	-	-	77	14	-	-	-
Venezuela	1981	24	20	-	-	-	-	-

Table 6. Systems for epidemiological surveillance of endemic goiter in Latin America

Country	Responsible agency	Date initiated	Population studied	Variables observed	Frequency
Bolivia	Ministry of Health	December 1982	General	Goiter	Not determined
Brazil	Ministry of Health (INAN-SUCAM)	January 1984	Schoolchildren	Goiter	Biannual
Ecuador	Ministry of Health/NIMS	January 1983	Schoolchildren	Goiter & ioduria	To be defined
Nicaragua	Ministry of Health	January 1977	General	Goiter & ioduria	Every five years

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