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Lymphatic Filariasis Elimination in the Americas: Report



(First Regional Program Managers Meeting,
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REGIONAL LYMPHATIC FILARIASIS PROGRAM MANAGERS MEETING

OPENING CEREMONY

CHAIRMAN: Dr. GUILLERMO GONZÁLVEZ

Dr. Guillermo González, General Director, Director General, of the National Center for Control of Tropical Diseases.

Dr. González opened the meeting by warmly welcoming his colleagues from Brazil, Costa Rica, Guyana, Suriname, Trinidad & Tobago, Haiti, the Centers for Disease Control (CDC), SmithKline Beecham, the Inter American Development Bank (IDB) and other organizations supporting the efforts towards elimination of lymphatic filariasis (LF).

He noted that with advancements in the field of LF, there are now more ways to fight this disease. With the decision of the 52nd Assembly of the World Health Organization (WHO), it was decided that lymphatic filariasis was a disease that could be eliminated. Ten years ago it was not clear the magnitude of the problem, since at that time an easy, rapid testing method was not available. Two years later, with the collaboration of the local and national office of the Pan American Health Organization (PAHO) and the CDC, the understanding of the disease has advanced dramatically. He expressed confidence and certainty that, through the development of suitable, country specific action plans, and the development of strategic alliances with the public and private section, the region will meet the goal of LF elimination by the year 2010.

Dr. Socorro Gross, Representative; Pan American Health Organization, Regional Office in the Dominican Republic

Dr. Gross welcomed the attendees and expressed pleasure and a sense of a great honor that the Dominican Republic was selected to host this event. She explained that from an epidemiologic point of view, filariasis behaves like a chronic disease. Serious signs and symptoms appear in the later stages of the infection leading to considerable disabilities, a characteristic which is similar to that of a chronic disease. In addition, the most affected people are also the most vulnerable. She noted that LF has not received the attention it deserves.

Dr. Gross talked about the regional collaboration expressing her optimism on the joint commitment made by the countries of the Region to support each

other in order to accomplish things which have not been accomplished in other regions. All countries belonging to this region have a contribution to make, as lessons can be learned from either achievements or failures. For this regional LF elimination plan to become a reality, the countries of the region must cooperate with each other as they have done previously.

She addressed the issue of alliances and how these are necessary to achieve the goal of LF elimination. Understanding the problem and sharing goals is critical to establishing and maximizing contributions by donor agencies. Another extremely important element for accomplishing the goal of LF elimination, is the commitment from the private sector, such as SmithKline Beecham. Dr. Gross noted the commitment of the non-governmental organizations (NGOs) and community organizations and expressed the commitment of PAHO to work toward the elimination of LF in the Americas. She concluded by congratulating Haiti and the Dominican Republic for their joint efforts in pursuit of the goal to eliminate LF in the entire island.

Dr. Brian Bagnall, Director LF Program, GlaxoSmithKline

Dr. Bagnall expressed GlaxoSmithKline's (GSK) commitment, a member of the private sector, to participate in this elimination program. He explained how the collaboration between GlaxoSmithKline and WHO on the LF elimination program began, beginning of 1998. The public/private sector alliance that has developed is a global one that includes 80 countries and more than 30 organizations. GlaxoSmithKline has decided not only to be a donor of a pharmaceutical drug, but also to provide financial and human resources. The Company wants to get involved as a partner and recognizes that this requires more than just donating drugs; it means getting involved and being active and taking an interest in what takes place. He emphasized that SmithKline Beecham would do everything to help the region achieve the goal.

Lymphatic Filariasis (LF) in the Americas: a General Overview, Absence vs. Certification of Elimination of LF

Dr. John P. Ehrenberg, Regional Advisor in Communicable Disease, Pan American Health Organization

Dr. Ehrenberg provided a general overview of the problem of LF in the Americas and spoke about the regional capacity. He began by acknowledging the enormous work that has been conducted in the region by most of the endemic countries. The excellent scientific and technical resources in the region have helped advance our knowledge on LF in the Region. He acknowledged the efforts made by the four endemic countries with the heaviest burden of disease, Guyana, Haiti, the Dominican Republic and Brazil, all of which face shortages or lack of human resources, financial constraints, and logistic difficulties.

The CDC has been a key player in the LF elimination initiative, and has served and continues to do so as a WHO collaborating center. Regular meetings have taken place between the CDC, WHO and other experts in an attempt to re assess the current status of LF. Based on available information, all of the countries in the Americas have been classified according as to whether they have never been endemic, post endemic or currently endemic. The seven countries represented here are all of the endemic countries in the Region.

Following key definitions were presented:

- ? Endemic filariasis: prevalence greater or equal to 1 (locally acquired) case/ 1,000 population.
- ? Countries are classified as :
 - Never Endemic: no history of (or evidence for) endemic filariasis.
 - Post-endemic: past history of filariasis, but no evidence of transmission or new clinical disease since 1980.
 - Endemic: filariasis since 1980 or current filariasis.
- ? The target for elimination is a cumulative incidence rate over five years of less than 1 new case per 1000 susceptible individuals.

There are 25 countries in the region where there have been no reports of active transmissions, although at least three countries, Mexico, Canada, and Belize,

have had reports of imported cases. This group of countries are ready to apply for the official certification of the absence of the disease.

Transmission has been reported in another group of 21 countries although there is no longer evidence of active transmission in this group of countries since 1980. These post-endemic countries are ready to apply for the certification of elimination.

Among the third group of countries are the seven endemic countries where active transmission of LF is believed to be taking place. This group includes Brazil, Costa Rica, Dominican Republic, Guyana, Haiti, Suriname, Trinidad & Tobago. Work conducted during the last year by several groups calls for the need to re-assess the situation. The new findings were discussed at a meeting which took place last year at the CDC in Atlanta with the participation of WHO and other experts. It soon became clear that WHO's figures might have been underestimated in some countries. The population at risk is currently estimated at approximately 6,631,000 people while the estimated number of infected individuals is 421,700 (see table on LF in the Americas). It appears that the magnitude of the problem may have been particularly underestimated in the cases of the Dominican Republic and Haiti. These numbers are expected to continue to change as mapping activities proceed.

Certifying elimination is one of the pillars of the elimination program. The focalised nature of the infection and the availability of tools, suggest LF could be eliminated in the Americas prior to the year 2020. Recent findings suggest that three of the endemic countries, Trinidad & Tobago, Suriname and Costa Rica might be approaching the elimination goal. Additional mapping activities and residual morbidity assessments will confirm the status of these countries. WHO's guidelines on certification of elimination should be consulted for more information on the subject (WHO/FIL/99/197).

Lymphatic Filariasis in the Americas

Country	Population	Population at risk	% total population at risk	Estimated # of infected individuals
Brazil	165,473,000	3,000,000	1.8	49,000
Dominican Republic	8,232,000	1,500,000	18.2	100,000
Haiti	7,637,000	1,000,000	13.1	200,000
Guyana	770,000	650,000	84.4	59,000
Suriname	442,000	400,000	90.5	2,000
Trinidad & Tobago	1,318,000	40,000	3.0	8,000
Costa Rica	3,649,000	41,000	1.1	3,700
TOTAL	187,521,000	6,631,000	3.5	421,700

LF Elimination and the Global Initiative

Dr. ERIC OTTESSEN

Dr. Ottessen, Project leader, Filariasis Elimination, World Health Organization

Dr. Ottessen gave a brief overview of the key program goals. He spoke of the rationale for the program strategy, international coordination and support, and other country program activities. He pointed out that the concept is elimination of LF as a public health problem. The idea is to implement the program in a cost-effective, socially responsible manner, such that there are links with other programs and health systems. The essential approach should be filariasis elimination as the focal point of a broadly beneficial public health intervention that is organized through existing or strengthened national health structures. The key program goals of LF elimination are as follows:

- 1) To stop the spread of infection (transmission interrupted), and
- 2) To alleviate/prevent patient suffering (disability prevention, rehabilitation).

Recent breakthroughs in the field of LF, such as drug interventions, new techniques in clinical management, new diagnostic techniques, recognition of LF as a disease of childhood, and the development of new partnerships will help ensure the success of efforts to eliminate the disease. Dr. Ottessen discussed each of these breakthroughs.

Drug Interventions:

Of critical importance is the success of single-dose treatment regimens using Diethylcarbamazine (DEC).

- ? After one year, the blood microfilaria (MF) levels were found to be less than at one year following a 14-day dose.
- ? 2-drug regimens (Albendazole and Ivermectin or Albendazole and DEC) are more effective than single drug regimens. Ivermectin and DEC dramatically decreased the MF percent in positive individuals more so than Ivermectin or DEC alone, and for a more sustained period; at 12 months post treatment the MF level was close to 0%.
- ? In addition, Albendazole has broad anti-parasitic effectiveness.
- ? Another important drug intervention, is the use of fortified DEC salt. Studies in China and Tanzania showed dramatic effects within 3 months after implementation of fortified DEC salt distribution.
- ? Therefore, transmission can be interrupted by:
 - Mass treatment to all endemic populations using either single dose, or a yearly 2-drug regimen for 4-6 years.
 - Mass distribution of DEC fortified table/cooking salt for 1 year.

LF in children:

An important breakthrough was the recent recognition of the significance of LF in children. In the past, LF has been under appreciated and incompletely documented in children. Children have been under-represented in surveys. In addition, there is a long latency period before visible disease occurs making it difficult to detect during childhood. Until

recently, the sensitivity of the diagnostic assay was limited and required night bloods, which are difficult to get on children. The development of the antigen assay has made it possible to accurately determine the presence of MF in children. Infection occurs in children as young as 2 years of age. Studies that have looked at early incidence using the MF assay and the antigen test indicate that the antigen test is far more sensitive for detecting MF in children. Among children 2 years of age, 6% were found to be infected with the antigen test compared to 0% with the MF assay; among 4 year olds, 26.4% were infected by the antigen test compared to 6% with the MF assay. In summary, there is a high prevalence of infection among children, especially in endemic areas. Onset of infection is early and morbidity begins at an early age.

Partnerships:

One of the most important components of the LF elimination program is the partnerships and alliances that have evolved. There is an ongoing collaboration between SmithKline Beecham and WHO for the global elimination of LF. As part of this alliance, SmithKline Beecham will donate all the Albendazole necessary for LF elimination, will support operational research, and will help provide funds/or human resources in support of program activities.

There is a global alliance for the elimination of LF that is a free, non-restrictive partnership for the exchange of ideas and the coordination of activities. There is also a technical advisory group (TAG), with WHO serving as the secretariat for the partnership.

Activities at the global level will involve:

- Global strategic planning.
- Overall program communication (e.g., communication, drug supplies, drug safety, training materials, advocacy and technical information, program progress/problems, funding sources).
- Technical/scientific oversight.

COUNTRY PRESENTATIONS:

The following are summaries and highlights of each country presentation.

DOMINICAN REPUBLIC

Dr. Guillermo González, General Director, Director General, of the National Center for Control of Tropical Diseases

Dr. Guillermo González talked about the magnitude of the problem and the status of LF elimination in the host country, the Dominican Republic. The Dominican Republic covers two-thirds of the Caribbean Island of Hispaniola and is located to the west of Puerto Rico. Its border with Haiti extends 48,400 km², and its population is estimated at 8.3 million inhabitants. The country's geographical location, tropical climate, intense tourism, migration, and poverty make it highly vulnerable to the introduction and dissemination of infectious agents. National authorities have stated that communicable diseases, along with nutritional deficiencies, are the country's leading health priority.

The Dominican Ministry of Public Health and Social Welfare (SESPAS) regulates health services. A presidential decree in 1998 institutionalized a health structure comprised of 34 Provincial and Municipal Health Bureaus (DPS/DMS). There is one bureau for every province and for each municipal district of the capital city. There are three levels of care for the uninsured: urban and rural clinics and health offices; outpatient and inpatient facilities (includes municipal and local hospitals), and; general and specialized hospitals. Other institutions that provide medical care include the Dominican Social Security Institute (IDSS) and the Hotel Social Fund. The following chart shows the health services available in four provinces in the Dominican Republic.

Health Services

Item	Provinces	Hospital	Subcenters	Rural Clin.	Physicians	Nurses	Bioanalysts	Dentists
1	Barahona	1	4	16	151	43	38	10
2	Bahoruco	1	3	9	55	17	24	14
3	Pedernales	1	-	3	21	3	2	1
4	Independencia	1	2	14	43	5	11	3

Magnitude of the problem:

- ? A national survey is currently being conducted to determine which areas of the country have a 1% or more prevalence of filariasis. The survey has already been conducted in 63 of the 154 existing municipalities. Results to date show that 11 municipalities meet this criterion (17.5%). The data below correspond to the detected foci.
- ? The survey is not an attempt to establish levels of prevalence, only to detect levels of 1% or more. Therefore, it is not possible to predict specific numbers of cases. However, a significant number of chronic cases (hydrocele and elephantiasis) have been detected when these patients visit medical offices or contact workers in the field. In the southwest, more than 100 chronic cases have been documented, many of them cases of hydrocele.

Population at Risk of Contracting Filariasis

Provinces	Population ¹	At-Risk Population ²
Bahoruco	101,742	40,096
Independencia	38,185	13,201
Barahona	157,772	125,808
Santo Domingo	2,677,483	600,00 ¹

References

- ¹ Population estimated by ONE based on the 1993 census.
- ² Population of positive municipalities in school surveys, 1999.

Plan of action:

- ? Designate a Program Coordinator and form the National Commission for the Elimination of Lymphatic Filariasis and Control of Intestinal Helminth Infections.
- ? Prepare a plan of action under the guidance of the Program Coordinator and in collaboration with the National Commission.
- ? Train field personnel and conduct passive and active surveys to: detect new foci, define known foci and determine more precisely the existing magnitude of the problem.

- ? Update information on LF disease prevalence and morbidity in the Dominican Republic.
- ? Initiate testing with the immunochromatographic card test (ICT) in order to complete the mapping of LF in the country.
- ? Determine the importance of cross-border migration in the epidemiological pattern of LF in the country.
- ? Develop a plan to integrate LF control into a strategy applicable to multiple diseases.
- ? Conduct a situational analysis on the epidemiological surveillance capacity, deficiencies, and needs (human resources, equipment, and financial resources).
- ? Establish a surveillance system to adequately

meet program monitoring needs (including urology and dermatology offices, medical dispensaries, etc.).
 ? Authorities will submit an application for the

donation of Albendazole to the Program Review Commission at WHO in Geneva.

- ? Analyze needs and adapt existing training and education support materials (e.g., for morbidity control, patient management of lymphedema, treatment manual, promotional and educational material for the community, and training), including the Generic Manual for Program Directors.
- ? Design programs that integrate treatment of both LF and intestinal helminth infections.
- ? Develop a draft plan to solicit community participation for implementing the plan to eliminate LF.
- ? Establish annual treatment objectives based on the availability of human and financial resources

in order to provide coverage to the entire at-risk population.

- ? Design a morbidity control strategy and establish standards of care.
- ? Seek out support from local agencies and NGOs in the Dominican Republic.
- ? Implement program over the five-year period and conduct ongoing program monitoring and evaluation.
- ? Request the *Certification of LF Elimination in the Dominican Republic* at the conclusion of treatment activities.

HAITI

Dr. Elda Nicholas, Chief of Vector Control, MSPP & Coordinator of the LFEP, and Dr. Denise Milord, Director of the Research Section, Hospital St. Croix

Drs. Nicolas and Milord presented a summary of the magnitude of the LF problem and status of LF elimination in Haiti. Haiti, with a population of 7.9 million, is part of the Island of Hispaniola and covers an area of 27,000 km². Two thirds of the country is mountainous and one third is occupied by fertile valleys.

The health sector consists of the Ministry of Health, hospitals, health centers and dispensaries. There are 217 health centers and 317 dispensaries; there are 2.7 physicians per 10,000 inhabitants.

Magnitude of the problem:

- ? A survey in the northern department using the ICT test found a prevalence rate of 20% among 1169 persons tested.
- ? Given the high infection rate, a community based LF elimination initiative was instituted through the Hospital Ste. Croix, Leogane Haiti in collaboration with Dr. Thomas Streit of Notre Dame University. The initiative consisted of the following activities:
 - Mass treatment via oral chemotherapy and mass household distribution of DEC-fortified household salt.
 - Treatment of lymphedema.
- ? The occurrence of side effects and the efficacy of the program were monitored. Other aspects which were monitored included:
 - Nutritional benefit of treatment strategies among children.
 - The rate of intestinal helminth infections.
 - The rate of infection in the mosquito vector as a marker of the dynamics of transmission.

- Ultrasonographic detection of filarial nests in positive individuals.
- ? Results after one year of the chemotherapy and DEC fortified salt distribution indicated the following:
 - A decrease in the rate of MF infection from 20% to less than 10%.
 - A decrease in the infection rates in vectors.
 - Men were willing to take the treatment.
 - It was difficult to involve other organizations in the initiative.

Plan of action:

Combating morbidity:

- ? Set up a system to register the patients.
- ? Improve infrastructure in terms of hygiene.
- ? Set up at least 30 treatment centers for referral of patients with associated LF morbidity.
- ? Train trainers to manage morbidity and then train personnel in selected departments and institutions using these trainers.
- ? Develop and implement community-based education program to educate patients and their families on self-care of the clinical manifestations of the disease.

Main lines of action of the national program 2000-2005:

General issues:

- ? Determine the most effective/efficient methods for implementation.
- ? Detail behavioral change objectives and communication modalities for community mobilization.
- ? Conduct planning meetings, conferences and training workshops.
- ? Prepare for mass treatment distribution.
- ? Develop an integrated program to combat the vector, one that is moderate, but sufficient, to reduce vector density and reduce contact between humans and the vector.

Specific issues:

- ? Implement prevalence studies to create district maps, establish prevalence and associated morbidity of LF over a two-year period.
- ? Mass treatment initiative to continue throughout the five-year period as follows:
 - To begin 6-12 months after mapping.
 - Implement intensive education initiative to secure community participation in the distribution and taking of medication. This will continue throughout the five years.

- Drugs of choice: DEC + ABZ; contraindications will be carefully established.
- Expected results:
 - One case of filariasis per 1,000 population.
 - 100% of exposed subjects treated in infested districts (criterion: 1 school-age child found positive).

BRAZIL

Dr. Mario Castellani, Coordinator of the National Program on Lymphatic Filariasis, National Foundation of Health, Brazil

Dr. Castellani presented the status of the LF problem and LF elimination for Brazil. Brazil is a large country with an area of 8,547,000km² located in the northeastern section of the South America continent. The population of 164.1 million inhabitants suffers from pronounced socio-economic inequalities.

At the central level, health programs are coordinated by a National Coordination Office under the National Epidemiological Center (CENEPI) of the National Health Foundation (FUNASA). A National Technical Advisory Committee is attached to the National Coordination Office. There are state oversight committees at the local level which are attached to the health secretariats in each of the states, and municipal coordination offices in the municipal health secretariats.

Magnitude of the problem:

- ? Filariasis came to be known in Brazil in the 19th century through the work of investigators such as John Patterson, José Silva Lima, Silva Araújo, and Otto Wucherer.
- ? In 1868, Wucherer identified MF in patients with hematochyluria, and in 1877, Araújo Silva described the genus

Wuchereria bancrofti.

- ? In the 1950s, Renê Rachou conducted a national survey covering 852 localities in 24 states, in which 811,361 persons were examined.
- ? In an entomological survey conducted in 12 states, 120,399 mosquito specimens were examined.
- ? In 1983, data revealed a significant drop in the rates from 6.9% in 1954 to 1.5% in Recife and from 8.5% in 1957 to 0.2% in Belém.
- ? In 1985 the Ministry of Health regarded Recife and Belém as residual foci.
- ? This situation was re-analysed at a meeting in Recife. Prevalence was found to have increased to 3.7% in 1990.

Dr. Castellani talked about the three main areas where LF has historically been a problem in the States of Pará, Bahía and Pernambuco. He addressed the magnitude of the problem in each of these States and then summarized the national plan.

- ? **Pará:** The data suggests that transmission has been interrupted in Pará.

Magnitude of the problem

- The capital is Belém, with an area of 736,000 km² and an estimated population of 1,200,000.
- The war on filariasis in the state began in the 1940s. In the 1950s it took on the features of a program because of the high prevalence (19%) and the high density of the vector.
- In 1988, 33/26953 (1.2%) persons examined

were positive for filariasis in the city of Belém, Pará. LF surveys conducted in Pará showed an increase in prevalence between 1975 and 1977 followed by a gradual decline, reaching 0% in 1999.

MUNICIPALITIES WITH AUTOCHTHONOUS CASES OF FILARIASIS AND PREVALENCE RATES IN THE 1950's, BRAZIL

POSITIVE MUNICIPALITIES	PREVALENCE
Belém, Pará	9.8%
Ponta Grossa, Santa Catarina	14.5%
Barra da Laguna, Santa Catarina	9.4%
Recife, Pernambuco	6.9%
Castro Alves, Bahía	5.9%
Florianópolis, Santa Catarina	1.4%
São Luis, Maranhão	0.6%
Salvador, Bahía	0.4%
Maceió, Alagoas	0.3%
Manaus, Amazonas	0.2%
Porto Alegre, Rio Grande do Sul	0.1%

- ? **Alagoas:** The data shows a sharp decrease in transmission in the state of Alagoas, but positive

cases are still identified, suggesting the need for continued efforts to eliminate LF in Alagoas.

Magnitude of the problem

- The detection of 3 cases of *W. bancrofti* in Maceió, Alagoas, in 1990 led to an initiative to re-evaluate the status of LF in the state.
- The state has an area of 29,106 km² and a population of 2,514,000.
- Maceió has a population of 555,421 in 33 neighborhoods.
- Results of a survey conducted from 1993 to 1996 in 10 municipalities are summarized:
- No cases of bancroftian filariasis were detected in 20,103 individuals who were examined in the interior of the State.
- Four neighborhoods were studied in Maceió examining 10,973 individuals, 226 of whom were found to be MF positive.
- The number of positive individuals decreased dramatically in 1999 to 4 persons, suggesting a sharp decrease in transmission.

- ? **Bahía:** The data suggests that transmission of LF has been interrupted in Bahía. The next steps should concentrate on morbidity control and on the process of certification of elimination.

Magnitude of the problem:

- It was in Bahía that the first cases of filariasis were detected in Brazil during the last century.
- The number of positive cases in Bahía was 19/2391 (.79%) in 1977 and gradually decreased to 0% in 1981, suggesting that transmission was interrupted.

Proposals to be implemented in Bahía:

- Designation of a State Committee to support the Program.
- Selection of a strategic area for assessment by the ICT test.
- Implementation of morbidity control program.
- Work towards the certification of elimination.

- ? **Pernambuco:** The data shows that LF transmission is still occurring in Pernambuco and elimination efforts need to be implemented.

Magnitude of the problem:

- Biological control by means of *Bacillus sphaericus*, produced at low cost by the “Empresa Pernambucana de Pesquisa Agropecuária”, is being successfully implemented to control *Culex*, the vector of the disease in the state.
- Ongoing research on filariasis morbidity control is taking place.

- The Hope Club (Clube da Esperança) aims to restore motivation and enthusiasm among patients with lymphedema so that they become self-sufficient again, as well as provide proper treatment for the disease.
- The percent of positive cases has declined since 1975, but remains high. In 1975, 6.1% of the persons examined were positive for MF and in 1999, 2.2% of persons examined were positive.

Conclusions:

- ? The foci persist in the Metropolitan Region of Recife (Pernambuco); Belém (Pará) and Maceió (Alagoas).
- ? Of greatest concern is the situation of the Pernambuco focus, with high prevalence rates in some neighborhoods of Recife and a significant numbers of cases in Olinda and Jaboatão.
- ? The focus in Pará, seems to be approaching elimination as the rate of positive smears has been steadily falling with 33 confirmed cases in 1998 and none in 1999.
- ? The Alagoas focus in the city of Maceió was “rediscovered” in the 1990s, reporting 104 cases in 1991, 175 in 1994, and 21 in 1999. This focus is confined to 3 neighborhoods of the capital, and is thus considered to be subject to elimination.

National plan of action, summary:

- ? Creation of a National Committee and designation of members. This Committee will monitor the National Program for the Elimination of Bancroftian Filariasis.
- ? Preparation/adaptation of an Elimination of Bancroftian Filariasis Program Manual.
- ? Epidemiologic surveys to determine prevalence & morbidity.
- ? Mapping of the infection and of the vector breeding sites.
- ? Design and implementation of a reporting system.
- ? Training of personnel.
- ? Development of diagnostic capabilities, treatment and morbidity control plan.
- ? Development of educational materials to encourage community participation.
- ? Integrate health measures.
- ? Upgrading of the National Program to conform to the international standards for the elimination of bancroftian filariasis.
- ? Present a proposal for the creation of a Committee for the Elimination of Bancroftian Filariasis in the Americas.

SURINAME

Dr. Baltus Oostburg, Professor; Advisor to the Minister of Health.

Dr. Oostburg made a presentation on the status of the LF problem and LF elimination efforts in Suriname. Suriname lies on the north-eastern coast of South America with three regions, the northern coastal region, the more southern savannah region and the hilly, sparsely populated tropical rainforest in the interior. Of the 450,000 inhabitants of Suriname, the majority live in or around the capital Paramaribo. The population is ethnically diverse and consists of Hindustani's (37%), Creoles (30.7%), Javanese (15.3%), Maroons (10.3%), Amerindians (1.3%) and others (5.4%).

There is a planning division within the Ministry of Health, a health inspection division, the Bureau of Public Health, the Central Laboratory and Regional Health Service. The Bureau of Public Health is responsible for health promotion, epidemiology and all kinds of functions related to preventive medicine. The Regional Health Service is responsible for primary health care in the coastal and in the savannah regions. There are 5 general hospitals in Paramaribo, (1 University Hospital, 1 government general hospital, 1 military hospital and 2 private general hospitals). There is a government hospital in Paramaribo. There are two government general hospitals near both the western and eastern borders, one in each border area. Primary health care in the interior is delegated to the "Medical Mission" and is subsidized by the Suriname government. These missions consist of three religious organizations that work in the interior and savannah regions.

Magnitude of the problem:

The magnitude of the problem has been clearly identified through four periodic mass surveys. *See table.*

- ? Preliminary surveys in the 1940's found indices of 22-30% in specific target population groups.
- ? A systematic filariae control program was started in 1949 in Paramaribo as a result of these preliminary results. It consisted of mass blood

surveys, taking night blood samples of the population followed by treatment of all the positive cases with Diethylcarbamazine (DEC). This was repeated every 10 years, an action which is believed to have led to the successful elimination of lymphatic filariasis in Suriname. Mention should be made of the fact that no specific mosquito control measures were included other than some limited efforts carried out during an *Aedes aegypti* control program.

- ? A mass survey conducted in Paramaribo during the period of 1969-1971 reported a dramatic decrease in the MF index.
- ? A MF index of 1.5% was reported as a result of another mass blood survey conducted during the same period covering 31% of the population from all of the districts of Suriname.
- ? A further decline, 0.6%, in the MF index was recorded as a result of the most recent survey (1979-1981), providing evidence of the successful control of the problem.
- ? In one of the surveys (survey number 4), 27 out of the 33 positive cases were found to be Guyanese. A decision was made to conduct additional surveys targeting Guyanese nationals. The MF rate was 1.7% among the Guyanese living in Paramaribo, using the thick smear technique and 7.6% with the membrane filter technique. Spot surveys showing that the majority of employees were of Guyanese and Haitian origin, yielded rates of 2.9% to 9.4%.

See table below.

Mass-surveys for Filaria in Paramaribo from 1949-1981

Survey No.	Period	Number examined	MF index		Elephantiasis	Lymphagitis
			Thick smear	Mem. Filter		
I	1949-1951	50861	17.4%	-	5.3%	7.7%
II	1959-1961	39167	9.0%	-	1.1%	-
III	1969-1971	79613	2.1%	-	1.0%	0.6%
IV	1979-1981	51097	0.06%	0.5%	0.6%	0.5%

Conclusion:

- ? The results of the four mass blood surveys in Paramaribo suggest that LF may have been eliminated in Suriname. Health education was a crucial component of this success. It was

important to educate the community about why health care workers had to visit them at night. The importance of the education component was apparent as the percentage of persons who refused to participate in the survey dropped from 23% during survey number 1 to 0% during survey number four.

- ? The data on the Guyanese sub population suggests that while transmission was interrupted in Suriname, laborers coming from countries where LF is endemic, such as Guayana, may serve as an important source of infection.
- ? With the development of new techniques, rapid, simple ICT testing can be done during the daytime which is more convenient. Surveys can now be conducted in population groups which were not studied previously, particularly children. The ICT test was applied in 1998 on a sample of primary school children with negative results.

Plan of action:

- ? A project has been prepared for submission to WHO/PAHO. The proposal is to conduct a final survey using the ICT rapid test. Results are expected to provide definitive evidence of elimination. The country will then be able to apply for the certification of elimination of lymphatic filariasis in Suriname.

GUYANA

Dr. Shamdeo Persaud, Medical Officer of Health with the Department of Disease Control of the Guyanese Ministry of Health.

Dr. Persaud summarized the magnitude of the LF problem and the status of the elimination program in Guyana. Guyana is located on the North Atlantic shore of South America and shares a border with Suriname. The country has four ecological zones, the

coastal plane, the hilly sand and clay belt region, the tropical rainforest and the hinterland savannah. The population is 774,296 persons, 51% of whom are females, 60% of the population is below 35 years if age.

The Guyanese Health Services consists of the Ministry of Health which oversees the Georgetown Hospital, the vertical health programs, the regional democratic council, the private and public health services (e.g., health posts, health centers, district centers, regional centers and specialists hospitals).

Magnitude of the problem:

- ? Regional surveys found an average MF prevalence of 20%, with a range of 1.7% to 31.4%. See table below of LF prevalence and persons at risk by region in Guyana.

Plan of action:

- ? Given the extent of the problem, an intersectorial task force was established and a plan of action developed.
- ? Plan of action for year 1:
 - Establish of a central unit within the Ministry of Health (focal point).
 - Conduct analysis of present situation.
 - Continue mapping activities.
 - Develop a data base.
 - Develop training modules and start training.
 - Procure and distribute drugs and supplies.
 - Implement mass treatment initiative.
- ? Plan of action over 5 years:
 - Establish and maintain the involvement and commitment of the program secretariat.
 - Evaluate and monitor program outcomes.

LF prevalence and persons at risk by region in Guyana

Region	Population	Percent of total Population	Prevalence	Estimated Percent at risk
I	18,755	2.59	-	80
II	43,149	5.96	-	95
III	92,139	12.72	29.2	99
IV	299,800	41.41	31.4	99
V	48,937	6.89	1.7	98
VI	144,107	19.9	26.0	99
VII	15,478	2.13	-	80
VIII	5,788	0.79	-	75
IX	15,221	2.10	-	89
X	39,453	3.45	9.5	92

Total	723,827	100	20	90
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COSTA RICA

Dr. Francisco Paniagua; Unidad Vigilancia de Salud; Ministerio de Salud.

Dr. Francisco Paniagua, of the Health Surveillance Unit, Department of Health, presented the magnitude of LF and the status of the elimination program in Costa Rica. Costa Rica lies in Central America and has a surface area of 51,100 km². Costa Rica has a population of 3,768,900 (1998), with 44.5% living in

As a result of socioeconomic development in recent decades, Costa Rica presents three epidemiological situations: the predominance of degenerative diseases; environmental threats to health; and infectious diseases. These factors affect not only the population, but also the organization of the health services designed to address these problems.

In addition, the health sector is being reformed as part of the state reform plan. This reform has implied

Lymphatic filariasis infection rates in various neighborhoods of Puerto Limón Costa Rica, 1976-1980

NEIGHBORHOOD	NUMBER OF SLIDES	POSITIVE	
		No.	%
Roosevelt	406	14	3.4
Cuartel	275	3	1.1
Cementerio	159	3	1.9
Pueblo Nuevo	302	5	1.7
Cristóbal Colón	743	26	3.5
Santa Eduvigis	533	12	2.2
Limón Centro	914	8	0.9
Barrio Quinto	689	7	1.0
Volunteers (various neighborhoods)	938	16	1.7
Census of Blocks Testing Positive	1196	39	3.2
Total	6155	133	2.2

Source: Reference 1

urban areas and 55.5% in rural areas.

Administratively, it is divided into seven provinces and 81 cantons, and for planning purposes, into nine regions. The country has experienced sustained economic growth and has a stable political system. Because it has not had an army for over 50 years, it has been able to make major social progress.

In Costa Rica, the public sector has played the leading role in financing and providing health services, a trend that continues to the present day. The Costa Rican population enjoys nearly universal health coverage. The country has an extensive network of health facilities. In addition to hospitals and clinics, it has a reformed health care model comprised of Basic Comprehensive Health Care Teams (EBAIS) and Health Areas.

transferring a series of programs (primary health care, tuberculosis, dermatology, dentistry, control of sexually transmitted diseases and AIDS, and the Expanded Program on Immunization) to the Costa Rican Social Security Fund. The steering role of the Ministry of Health implies guiding, regulating, and controlling the various processes related to the social production of health. This will be accomplished through the following strategic functions: policy management and supervision; health surveillance; health regulation and development; and research and technical development.

Magnitude of the problem:

- ? In Central America, Puerto Limón, Costa Rica is the only known location of *Wuchereria bancrofti*.
- ? Surveys that were conducted from 1946-1974 on a small number of people reported MF

prevalence rates which ranged between 1.0 -15.3 %. The actual magnitude of this health problem was unknown in Puerto Limón and its surrounding communities. In 1976, a study was launched to assess the magnitude of the problem.

- ? Results are shown in the table below. The overall infection rate was 2.2%, with a range of 0.9% to 3.5%.
- ? The microfilaremia rate varied with the age group. The lowest rate was found in children under 9 (0.2%), and the highest among the 10-19 age group (3.5%). Infection rate in the 40-49 age group was 2.7%, and 2.9% in the 60 and over age group.
- ? The rate of infection was greater for men (2.5%) than for women (1.5%) and greater among the black population (4.4%) than among the white population (0.8%) of Puerto Limón.
- ? After a series of studies had been conducted in Puerto Limón, 13 rural communities with ethnic and ecological characteristics similar to the city of Limón were studied in 1976. A total of 3,448 people (27.0% of the population) were studied; only three (0.1%) of the cases showed MF, and they came from the city of Limón.

Conclusions:

- ? The absence of cases in the rural communities examined led to the conclusion that Bancroftian filariasis was restricted to the city of Limón.
- ? *Culex quinquefasciatus* was identified as the principal vector for transmission of the disease.
- ? It was determined that the index of infection was 0.1%.
- ? It was determined that the periodicity of *W. bancrofti* in the city of Limón is strictly nocturnal.

Summary:

- ? The rate of infection decreased from 10.0% among 1,006 people examined in the neighborhoods of Roosevelt and Cieneguita in Limón in 1946 to 0.1% in 1976.
- ? Population growth also plays a role in the epidemiology of LF as a dilution factor of MF positive carriers. This is believed to be one of the factors which accounted for a decrease in the prevalence of the infection.
- ? Once the epidemiological surveys were completed, a decision was taken to conduct environmental sanitation to control the vector. The activities involved the community and other social players in Cristóbal Colón.
- ? In conclusion, the endemic focus of lymphatic filariasis in Costa Rica is characterized by a low

prevalence, low densities of MF in carriers, a low index of infective forms in mosquitoes, and a gradual decline in the infection index.

Plan of action:

- ? A methodological study made it possible to quantify the filariasis problem in the city of Limón. Results of this will be used for selecting and orienting interventions to eliminate LF in Costa Rica.
- ? The plan of action should begin by conducting a study to demonstrate current status of LF in Costa Rica.

Reference

1. Paniagua. F., Garces, J.L., Granados. C., Zuñiga. A., Ramirez. M. Jimenez. L. 1983. Prevalence of bancroftian filariasis in the city of Puerto Limon and the Province of Limon, Costa Rica. *Am. J. Trop. Med. & Hyg.* 32 (6):1294-1297.

TRINIDAD & TOBAGO

Dr. Violet Duke; Principal Medical Officer; Ministry of Health.

Dr. Violet Duke, Principal Epidemiology Medical Officer with the Ministry of Health, talked about the magnitude of the LF problem and the status of elimination for Trinidad and Tobago. The Island of Trinidad is the southernmost of the Caribbean Islands with a total area of four thousand eight hundred and twenty-eight (4828) km². The Gulf of Paria and the narrow channels of the Bocas separate it from the Venezuelan coastline, which is about eleven (11) kms at its closest point. The island of Tobago is situated northeast of Trinidad from which it is separated by a channel which is about thirty-one (31) kms wide.

The twin-island Republic has a tropical climate and because of its closeness to the Equator, there is not much variation in temperature during the year. There are two seasons - the dry, which runs from January to May, and the wet from June to December. During September there is usually a short dry spell known as "Petit Careme."

Magnitude of the problem:

- ? A 1928 a report of the Surgeon General of Trinidad and Tobago stated that "the disease (filariasis) occurs but is not an important cause of sickness".
- ? Annual reports from the Surgeon General from

1893 to 1937 showed an average of 24 person with elephantiasis and 54 with hydrocele all of whom received hospital treatment.

- ? Daytime surveys were conducted in 1976 and 1979 in the north coast of Trinidad to assess the prevalence of MF and the prevalence of signs and symptoms typical of lymphatic filarial disease. The results indicated LF was a public health problem in the country:
 - *Wuchereria bancrofti* was found to be present in 5 of the villages examined (total population of 650 persons).
 - Prevalence of *W. bancrofti* was estimated at 19% in males while 12% of the females were found to be positive.
 - No evidence of MF was found in children less than 5 years old, however prevalence was 12% in the 5-9 years age group.
 - Maximum rates of 34% and 21% were found in males and females in the 40-49 year age group.
 - Males had a higher prevalence rate than females in all age groups.
- ? Studies conducted in 1982 in the same northern coast area reported 15% prevalence rates for *W. bancrofti*.
- ? A community control program was implemented following this 1982 survey; diethylcarbamazine citrate (DEC-C) was administered in a single dose of 6 mg/kg at monthly intervals over 12 months (except in children less than 5 years of age who were found free of MF).
- ? After six months, 79% of the individuals who were previously found to be microfilaremic were now found to be negative and after 12 months, this figure rose to 90%. The MF reservoir seemed to have been effectively reduced on a community basis by this method of mass treatment. It should be noted also that no infected *Culex quinquefasciatus* were found during the survey.
- ? A follow up survey conducted in 1992 on 348 (104 were treated) persons detected a MF index of 0.
- ? In 1999 a limited survey was conducted by CAREC/PAHO in selected communities in Trinidad, Guyana and Suriname among adults and school aged children using the ICT test to assess circulating *W. bancrofti* antigen. Results were as follows:
 - In Guyana the prevalence ranged from 1.7% to 33.2%.
 - In Suriname the prevalence was 0.22%.
 - In Trinidad the prevalence was 0 %.

Conclusion:

- ? The MF reservoir had been effectively reduced in Suriname on a community basis relying on mass administration of DEC in monthly spaced doses during a 1982 control campaign.
- ? The results of a follow up survey conducted 12 years later suggest there was no further transmission of *W. bancrofti* since the last treatment based intervention.
- ? The 1999 data raises the question about the current status of LF in Trinidad and Tobago and whether WHO should continue to consider the country as endemic. There is a need to systematically assess the presence of LF in the country and to certify its absence.
- ? Trinidad and Tobago could be classified as a country in which filariasis was endemic or possibly endemic before 1980, but has not been recognized since then (i.e., post endemic).

Plan of action:

- ? Implementation of an efficient local surveillance system for the disease.
- ? Begin process for certification of elimination of disease.

PANEL: "KEY ISSUES: CHEMOTHERAPY

Chairman: Dr. Eric Ottessen, Project Leader, Filariasis Elimination Program, WHO

Rapporteur: Dr. Michael Beach, Investigator, CDC

Treatment Regimens, Pilot Studies and the Chinese Experience

Dr. David Addiss, Medical Epidemiologist at the CDC

Dr. David Addiss discussed treatment strategies for interrupting transmission. Successful strategies for interrupting transmission include economic development, mass screening, and selective treatment with DEC. He discussed reasons for successes and failures that have occurred using both mass and selective treatment strategies with DEC. He also addressed a very important discussion on monitoring outcomes of filariasis elimination.

Advantages & Disadvantages of different treatment strategies:

- ? Success of mass screening initiatives and selective treatment strategies are associated with the following:
 - There is sufficient economic benefit.

- There is a limited number of cases in select foci.
 - A high percentage of the population has been screened.
 - Observed treatment of all MF positive persons is possible as is an aggressive follow up and re-treatment of those who remain MF positive.
- ? Characteristics of selective screening and mass treatment initiatives:

Successes are associated with the following:

- There was extensive governmental commitment.
- Drug coverage was complete.
- LF foci were limited and easy to access.

Failures are associated with the following:

- Program duration was too short.
- Drug coverage was incomplete.
- Adverse reactions were handled poorly, resulting in lack of community support and cooperation (inadequate community education and involvement).

Drug delivery strategies for filariasis elimination:

Drug delivery strategies include, tablets (e.g., repeated “full course” treatments, spaced doses, single annual dose) and DEC-fortified salt. The drug options include DEC, Ivermectin, Albendazole and DEC-fortified salt. The following section discusses pro and cons of the different options.

The role of DEC and Ivermectin for drug treatment of LF

- ? DEC
- The annual dose is 6 mg/kg.
 - It has microfilaricidal action; it kills the young worm.
 - It is only partially macrofilaricidal- only 40% of adult worm nests are undetectable following DEC treatment.
 - The effectiveness of a single dose is the same as that of a 14-day course at 1 year.
- ? Ivermectin
- Annual, 400 microgram / kg dose.
 - It has microfilaricidal action; it kills the young worm.
 - *It is Not* macrofilaricidal; it does not kill the adult worm.
- ? DEC + Ivermectin more effective than Ivermectin alone.
- ? Merck’s Ivermectin donation policy is as follows:
- For onchocerciasis, no other drugs are safe and effective.
 - In terms of LF, the donation of Ivermectin is done only for countries with co-existing

- loiasis and onchocerciasis in which case DEC is not safe to use in mass treatment.
- ? What options are left?
- Annual mass treatment with DEC, or annual mass treatment with DEC + Albendazole.
 - Using DEC fortified salt in mass distribution.
 - *The above are NOT mutually exclusive options, both initiatives can be done simultaneously.*

Role of single-dose Albendazole in LF elimination:

- ? Single 400 mg dose alone:
- Acts as a broad-spectrum intestinal deworming.
 - However, this is not microfilaricidal.
 - It is apparently not macrofilaricidal.
- ? Given together with DEC:
- The combination of DEC and Albendazole has broader public health impact as it decreases both the MF and the intestinal heminth burdens.
 - The combination may enhance microfilarial suppression of DEC.

Adverse reactions: DEC with or without Albendazole: It is important to be aware of the possibility of adverse drug reaction and plan a strategy to adequately deal with the occurrence of adverse reactions.

- ? Systemic reactions include: headache, myalgia, fever, chills.
- ? The severity of the reactions is associated with MF density.
- ? Local reactions include scrotal nodules and “drug-induced”, clinically apparent disease as a result of the death of adult worms.
- ? Adverse reactions can affect drug coverage in subsequent years and require appropriate management which includes the following activities:
- Education about adverse reactions.
 - An ongoing surveillance system to monitor the occurrence of adverse reactions.
 - An existing referral system to manage adverse reactions.
 - Train personnel to educate the patient about adverse reactions.
 - Train personnel to manage adverse reactions.
 - Report all adverse reactions to a central source.
 - Patient education on management of chronic disease (morbidity).

Elimination of LF: Elimination of LF requires initial assessment, monitoring and certification of elimination.

- ? When developing a system to monitor LF elimination, the following issues should be considered:
 - There is a long interval between infection and clinical manifestations.
 - Many infected persons have no symptoms or outward signs of disease.
 - A population-based sampling strategy is required.
 - The quality (and size) of sample should be representative of the distribution of the disease in the population.
 - Review the performance of laboratory testing to ensure quality of results.
- ? The scientific goals of LF elimination are:
 - Evaluating the effectiveness of the program in terms of interrupting transmission.
 - Troubleshooting problems.
 - Identifying programmatic areas in need of improvement.
 - Identifying ongoing and future research needs.
- ? The political goals are focused on demonstrating success to stakeholders.
- ? Options for monitoring outcomes includes the following systems:
 - Longitudinal monitoring; baseline (pre-intervention) data in sentinel sites.
 - Conducting “spot checks” in other sites (cross-sectional).
 - Auxiliary “passive” or “background” surveillance.
- ? Monitoring tools to consider other than MF assessment include the following:
 - Monitoring mosquito infection rates which are good indicators of transmission and have good sensitivity in low-prevalence areas.
 - Monitoring the prevalence of circulating filarial antigen. It is important to remember that the decay after treatment is unclear, so this is not useful as an early monitoring tool.

Certification of elimination:

- ? The goal is the elimination of transmission, not extinction of the parasite.
- ? There is no single epidemiologic or laboratory tool currently available that can adequately

demonstrate elimination. To do so requires several different testing methods to minimize the problem of false positive tests results.

- ? Additional research is needed to elucidate the best methods for demonstrating elimination.

Experience in China: China implemented mass treatment programs and successfully eliminated LF transmission.

- ? Filariasis elimination began in 1950’s as an agricultural / economic issue.
- ? The success of the program relied on a sustained government commitment to the elimination of LF.
- ? Interventions included mass distribution of a mix of DEC tablets and DEC salt.
- ? Intensive surveillance was conducted to measure the prevalence of infection. This intensive effort allowed China to reach the elimination goal, specifically, the 1% prevalence “threshold”.

Future research needs include the following areas key:

- ? Continued evaluation of how much drug coverage is needed to meet the elimination goal and how to improve the distribution and acceptance of the treatment.
- ? Evaluate how long the treatment initiative should continue to sustain the interrupted transmission.

Albendazole in LF, Benefits of a Multi-disease Approach and Issues Related to Safety of Drug Combination, GlaxoSmithKline’s Commitment, Applications

Dr. Mark Bradley, Science Coordinator of the LF Program of GlaxoSmithKline

Dr. Bradley discussed the benefits and safety of Albendazole and the commitment of GlaxoSmithKline.

Benefits of Albendazole: Albendazole is an exceptionally well tolerated, broad-spectrum antihelminthic, effective against a wide variety of intestinal and tissue dwelling parasites.

- ? Early studies showed that the drug has a powerful filariacidal effect against various species of Brugian filariasis in animal models-- *Brugia pahangi* and *Brugia malayi*.
- ? Multiple high dose regimens have a marked effect on adult filaria in man. Whether complete

resolution of infection can be achieved is unknown.

- ? Early studies were terminated due to intense inflammatory reactions from dying adult worms.
- ? Single dose regimens produce less inflammatory reaction.
- ? Field trials do show a slow decline in MF, which is consistent with a sterilising effect on adult worms.
- ? Field trials show that Albendazole enhances the effect of first line anti-filarial drugs.

Characteristics of the target population:

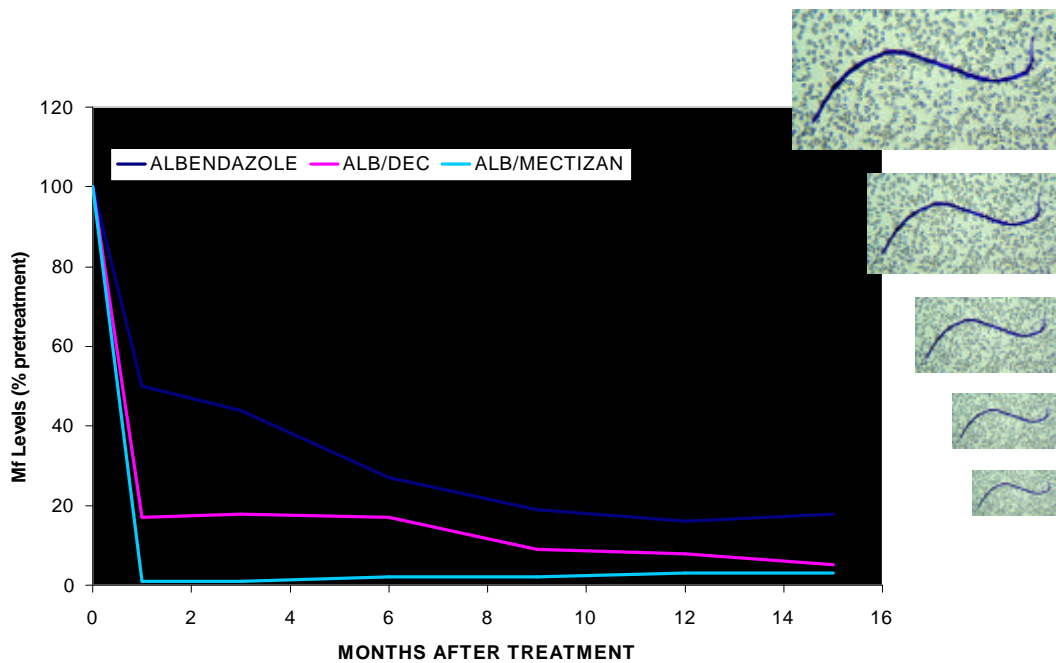
- ? 1200 million people of all ages living in roughly 80 tropical countries ? 1/5th of world population.
- ? Population age structure suggests that more than 40% of this population will be children below 15 years of age.
- ? Children living in tropical regions invariably suffer multiple health insults from a variety of macro-parasitic infections.
- ? Parasitic infections adversely effect children's growth and cognitive development.
- ? In the absence of an effective intervention, the cycle of infection and poverty, which characterise areas where LF and other macro-

parasitic infections are co-endemic, will be perpetuated.

Benefits of a multi disease approach to LF elimination:

- ? Community wide treatment with Albendazole in combination with Ivermectin or DEC will target both MF and all the common intestinal helminths.
- ? Significantly reduced MF levels result in a reduced vectorial capacity and, ultimately, a significantly lower disease burden in the host population.
- ? Annual treatment of intestinal worms will result in significant improvements in growth velocities and cognitive development in children.
- ? Albendazole therapy in adults will reduce levels of hookworm associated anaemia improving productivity and the health status of women, childbearing potential and birth outcome.
- ? Sustained, high levels of coverage will ensure the eventual success of the elimination initiative.

COMPARING THE ANTI-FILARIAL EFFECT OF ALBENDAZOLE AND THE COMBINATION THERAPIES



In summary, by adopting a combination therapy approach, the LF programme can strive to achieve a world, which is free from LF transmission, and prevent pain and suffering for millions of people. In addition, helminth control programs can significantly improve the health and educational status of millions of children. Significant improvements in health status are likely to result in increased productivity. This combination of events will ultimately result in an overall increase in community prosperity, and the cycle of poverty can hopefully be broken.

Safety of drug combination therapy: Studies designed to examine the safety of drug combinations for the treatment of LF were first initiated in 1993. The geographical distribution of the study locations mirrors that of LF in general. These studies include a balance of men and women, excluding pregnant women.

- ? Anthelmintic drug therapy was associated with no adverse clinical events and no adverse effects on laboratory hematological or liver function parameters.
- ? The occurrence of daily side effects in 239 hospitalized patients revealed no serious adverse events up to 7 days post treatment.
- ? Few side effects experienced in the first 24 hours after therapy.
- ? Between 48-72 hrs post treatment, side effects reached a peak for all regimens and include fever, headache, lethargy and weakness. All side effects were associated with destruction of MF.
- ? After 72 hours, the frequency of reported side effects declined and by day 4 through to day 7, very few events were reported.
- ? Among 214 patients studied for haematology values, all values remained within the normal ranges.
- ? No unusual liver function values were noted and marginal changes observed in all treatment regimens had normalised by day 14-post treatment.
- ? Active surveillance of MF-positive patients indicated that the frequency and intensity of adverse events appears to be correlated to levels of microfilaremia. The addition of Aldendazole to other anthelmintic regimens did not increase the frequency of adverse events.
- ? Active surveillance of MF-negative patients found very few experienced adverse events and all events were mild and transient, an important issue for sustainability of mass treatment control

strategies; 4.2% reported an adverse event and 1.4% reported more than one event.

- ? Passive surveillance of a large number of patients (9000 cases to date) also indicates that clinical events are mild, of short duration and rarely requires any intervention.
- ? The use of Albendazole is teratogenic and not recommended for pregnant women. The implications for this in practical terms when administering mass treatment are as follows:
- ? Women missed during a treatment cycle due to pregnancy will be captured during the subsequent cycle.
- ? Experience has shown that personal recall is just as sensitive as other costly and time-consuming methods for determining parity status.
- ? We recommend that women are simply questioned about their parity status and excluded from therapy if the answer is affirmative.
- ? Albendazole is not contraindicated for use during lactation. However, we recommend that breast-feeding mothers are advised to inform health personnel or the person responsible for therapy if any unusual effects occur.
- ? Case histories that involved multiple high dose regimens of Albendazole administered during the first trimester of pregnancy report no adverse birth outcomes associated directly with therapy. Data on Albedazole in combination with other drugs are very limited. Further research is required to clarify the use of Albendazole in pregnant women.

DEC/Salt

Dr. Robyn Houston, Consultant

Dr. Houston presented an overview of the use of DEC fortified salt for mass treatment. Dr. Houston reviewed adding small amounts of DEC to salt as a strategy for interrupting LF transmission. He noted that this was an under utilized intervention and could be of value to some of the endemic countries in the Americas.

The role of salt in the elimination of LF:

- ? A powerful intervention that is effective, safe, acceptable and relatively simple to implement, particularly in countries with successful salt iodization or fluoridation programs.
- ? It can be a very useful vehicle for public health interventions.
- ? It is not yet clear just what coverage a mass treatment program must achieve to reduce transmission below the point where LF can

maintain itself in a population. In some instances, it may be difficult to achieve this level, and Dec fortified salt may be a useful additional intervention to ensure elimination.

- ? Important to remember that salt is universal in the diet.

Salt iodization- a brief history:

- ? It is an extraordinary success over the past decade.
- ? To talk about salt iodization, one must talk about iodine deficiency.
- ? There are some interesting parallels with the evolution of interventions for LF.
- ? In highly endemic areas, the clinical expressions of iodine deficiency, goiter and cretinism, have been considered normal.
- ? Introduction of iodized salt in Switzerland and later in other countries accompanied a reduction in both goiter and cretinism. Interest then declined as iodine deficiency declined in the West and Europe. Interest was renewed in the 60's with reports from China, India, Indonesia, New Guinea, Brazil, Argentina and other countries with high prevalence of cretinism and goiter.
- ? It was not until the 1970s that it became generally accepted that iodine deficiency caused retardation in the development of fetal brain and that there was a reduction in the IQ potential. This stimulated the global effort to address iodine through universal salt iodization.
- ? Cretinism, now hopefully almost a disease of the past, was similar to LF as a hidden disease that causes immense suffering.

Two interesting points relate to DEC-salt:

- ? First, it took a long time to move from the recognition of the problem with development and understanding of an intervention, to application of that knowledge. We are now at the stage where we have the information and tools necessary for LF elimination, and the global momentum for the elimination effort is building.
- ? Second, the overwhelming success of salt iodization over the past decade has created an opportunity to capitalize on that success in the use of DEC-salt.

How DEC-salt might fit into the evolution of country LF elimination programs:

- ? We know the particulars of LF, the clinical manifestations, the human suffering, and the economic impact.

- ? We know a great deal of technical information that is critical to transmission and establishing the disease, such as the immunology, mosquitoes as vectors of the disease, the larval stages of the parasite, the adult worm and production of MF.
- ? We have the tools as well, the means to identify the distribution of the disease in population groups, which will allow for effective program monitoring and evaluation.
- ? DEC-salt provides an additional intervention that may be the perfect complement to mass treatment, or may in some instances serve as the primary intervention, depending on the situation with salt production and distribution, and the success of the national salt iodization effort.

Is DEC salt effective?

- ? For a study in Tanzania, a small amount of DEC added to normal table salt for household use offered the same if not better results than the other strategies.
- ? Households were surveyed at 3 and 6 months after starting the intervention, and again at 1, 2 and 4 years following the one-year intervention.
- ? A number of variables were determined for households for each intervention. Prevalence of microfilaremia and geometric mean intensity (GMI) of microfilaremia was calculated for individuals who were microfilaremic at the onset of the study. The effect of the interventions at the community level was calculated using a community MF index, which was determined as a product of microfilaremia prevalence and GMI for the community.
- ? The results were similar for various intervention strategies, though DEC-salt perhaps fared slightly better than the other interventions.

Results

- ? For DEC-salt, maximal MF clearance was achieved at 1 year, with prevalence of MF dropping to near zero before 6 months.
- ? Community measures were also good, with DEC-salt achieving maximal prevalence reduction at 1 year, and along with the low monthly dose intervention, showing a reduction in community MF index of 93% from the pre-intervention rate.
- ? The DEC-salt intervention also showed the lowest incidence of MF among those who were not microfilaremic at the start of the study. Only 1% of those who were amicrofilaremic became microfilaremic after 4 years with DEC-salt, compared to 3.8% with semi-annual single dose treatment.

Summary

- ? The Tanzanian data illustrate quite clearly that DEC-salt is effective.
- ? In fact, studies in India, China, Tanzania, and Brazil have all shown that DEC-salt will rapidly reduce the prevalence of microfilaremia in a population.
- ? DEC-salt has been substituted for table salt for between 6 and 12 months in most studies, with a demonstration of effectiveness within a month in most.
- ? There has also been well-controlled work in Haiti
- ? In addition, DEC-salt has been used widely in China, both alone and in combination with mass treatment. China reports that LF has been eliminated in several provinces, and this is attributed, in part, to use of DEC-salt.

Safety and the development of resistance:

- ? WHO considers DEC to have “low toxicity and to be safe for large-scale use in LF.” DEC does not accumulate in the body, and there is no evidence for chronic toxicity.
- ? DEC-salt has been used extensively in large populations in several countries, mostly China, with no concerns raised about its safety.
- ? Resistance to DEC for LF has not been demonstrated, although some individuals may require several treatment courses to show evidence of destruction of all the adult worms.
- ? In theory, a chronic low dose of an antimicrobial could increase the risk of the development of resistance. However, this has not been demonstrated with the experience with DEC salt to date. The current feeling among expert groups is that development of resistance to DEC and other drugs used for LF is not a major concern.

Are there adverse reactions?

- ? There are significant adverse reactions to the larger dose of DEC used for mass treatment. The most common systemic adverse reactions are headache, dizziness, pain in muscles and joints, and nausea, with or without fever.
- ? In addition, there are local adverse reactions that include pain and tenderness of lymph glands or of the scrotal area in men, and occasional abscess.
- ? These adverse reactions appear to be related entirely to the destruction and death of the MF

and adult worms respectively and as such, are almost unavoidable with drug treatment doses.

- ? The situation for DEC salt is different in that this intervention provides a very low dose of DEC over a longer period. With the lower drug dose in DEC salt interventions, adverse reactions are rarely reported.

Is it difficult to produce?

- ? While most studies and national efforts describe the desired concentration of DEC (usually between 0.1% and 0.6% w/w), only brief descriptions of monitoring methods are included in the available reports.
- ? In one study in India, samples were collected during production and from over 2000 households and tested for DEC content. In this study, 31% of households had less than 40% of the stipulated concentration of DEC, suggesting that the mixing process was not adequate to avoid such variability in DEC content. Interestingly, the study did demonstrate excellent reduction in MF positivity rates in spite of such variation. Another study in India describes determining the mixing duration based on analysis of DEC content, followed by regular monitoring of samples from the mixing unit, households, and vendors. In this study, only 85 samples out of 1063 showed a variation greater than 50%.

Two methods have been briefly mentioned in the literature for testing salt for DEC concentration.

- ? One is a colorimetric method using titration or gas chromatography analytic methodology.
- ? A second method uses a thymol solution that produces a color change in the presence of DEC in salt, similar to the commonly used field test for iodine in salt.

There is very little written on the larger scale use of these methods in countries where there has been large-scale use of DEC salt for filariasis.

Is it economical?

- ? DEC is available in powder form from a limited number of manufacturers, and currently costs approximately \$32/kg, thus adding approximately \$0.08 per kg. of salt fortified at 0.25% w/w, external of equipment and labor costs.

In essence, DEC-salt can benefit from the established salt iodization programs existing in nearly all countries in a number of ways:

- ? The normal salt productions and distribution channels have been defined--governments have

not attempted to produce or distribute iodized salt as a separate medical product.

- ? Salt industry representatives have been included in discussions on salt as a vehicle for a public health endeavor, including discussions establishing the regulatory environment.
- ? High-level advocacy efforts have been done, and salt iodization is now well accepted—a process that can be applied to DEC-salt.
- ? Equipment capitalization costs have been completed, often subsidized (by governments and donor agencies) to limit price increases to the consumer. This equipment can be used for DEC salt with minor modifications.
- ? Governments have assisted with education efforts to help increase demand for iodized salt, and could help promote DEC salt in a similar fashion.
- ? Simple monitoring methods have been developed and are being used for iodized salt, and these can be expanded to accommodate DEC-salt.
- ? Regional meetings have helped establish cooperation among neighboring countries and helped address border issues, and again these could address similar issues for LF.

Next Steps:

- ? Over the next few years, countries will be reviewing the various interventions and combinations of interventions and determining which is most feasible and economical for their country context. With regard to DEC-salt, some of this work is done.
- ? In nearly all countries, as salt iodization was started, there was a careful review of salt production and marketing, and a good working relationship developed with salt producers. In countries where DEC-salt is considered, this information will be useful in determining what steps are needed, and what resources will be required.

Conclusion:

- ? In summary, DEC-salt has been a somewhat overlooked intervention, overlooked because of the perception that the management of a commodity such as salt was beyond the capacity of the health ministry. The success of salt iodization has altered the context in which DEC-salt interventions can be launched.
- ? DEC-salt is as effective as mass treatment regimens, in fact perhaps more effective. It is safe, and to date, is not accompanied by the side effects common with mass treatment. It is

technologically simple, and with the establishment of salt iodization programs, the equipment is in place for adding DEC to salt.

- ? DEC-salt should have a serious role to play in the elimination of LF. In countries with mass treatment programs, DEC-salt may be useful to extend the elimination effort, helping in situations where coverage with mass treatment is too low.
- ? In some countries DEC-salt may be easy to implement as the primary intervention, covering all of the population at risk.

Success of Salt Fluoridation in the Americas After a Decade

Dr. Saskia Estupiñan and Mr. Trevor Milner, Regional Advisors for Oral Health Program, PAHO

Dr. Estupiñan and Mr. Milner presented a comprehensive review of salt fluoridation in the Americas. PAHO, the Regional Office of the WHO, along with the Ministries of Health in 16 countries in the Region of the Americas have developed strategies to implement programs of salt fluoridation in the Region. These include assessments and measurement of the national oral health status, development of a fluoride surveillance system, assessment of the salt industry's capacity to fluoridate salt, cost-benefit analysis of the proposed programs, and the legal mechanisms that would be needed to ensure program compliance. Utilizing data from the region, Dr. Estupiñan presented a framework and protocol for regional or national program design, implementation and management of a micronutrient program involving the salt industry. It is believed that it can serve as a model for other micronutrient programs such as salt iodination, or other programs that would consider using salt as a carrier.

Case-control studies and longitudinal studies confirm the association between untreated caries, periodontal infections, and systemic health. It now appears that oral health infections may play an important role in cardiovascular diseases, respiratory diseases, diabetes, and some complications of pregnancy. Dr. Estupiñan explained how these data underscore the importance of disease prevention as the cornerstone of PAHO's oral health policy in the Region. This policy, as outlined in PAHO's Regional Oral Health Plan, emphasizes caries prevention. It ensures that any fluoride deficiency in the population of the region is compensated by ingesting fluoride, either through the traditional means of water or more recently salt. It is the intention of PAHO, along with

its member governments, to pursue national programs of salt fluoridation for the majority of the 35 member countries in the region. Argentina, Brazil, Canada, Chile, Puerto Rico and the United States of America, are already fluoridating water. At present, 16 countries have already begun a program of salt fluoridation and are at various stages in the program.

Dr. Estupiñan provided the background on the initiation of fluoridation. Following the development of an oral health disease classification system, PAHO initiated a strategy in 1994 for improving the oral health status of the region of the Americas. A multi-year plan was developed to support the implementation of salt and water fluoridation programs. The operating principles for this regional plan include prevention, capacity building, and sustainability. Salt fluoridation programs are now projected for El Salvador, Haiti, Guyana and Suriname. Salt fluoridation programs are in progress in Belize, Guatemala, Nicaragua, Honduras Panama and Dominican Republic, and already established programs can be seen in Bolivia, Colombia, Ecuador, Venezuela, Costa Rica, Jamaica, Mexico, Peru, and Uruguay. Water fluoridation systems continue to expand in Argentina, Chile and Puerto Rico. Already established programs are reaching more than 65% of the population in the United States, 40% in Canada and more than 80% in San Paulo, Brazil. Altogether, over 350 million individuals have access to fluoridation programs in the Americas. It is projected that more than 430 million individuals will have access to fluoridation programs as we enter the new millennium.

The LF control programs should consider working in collaboration with the ongoing salt-fluoridation programs to add DEC to the process. Mass distribution of DEC fortified salt could then be one element of the LF control program.

Program components

- ? From the overall strategies, national salt fluoridation programs were developed and implemented. Although tailored to the specifics of each country, the major components include the following steps:
 1. Country baseline studies to assess magnitude of problem and potential exposure to fortified salt.

2. Salt fluoridation cost-benefit analysis.
 3. Epidemiological surveillance systems for salt fluoridation, including biological and chemical monitoring of all fluorides, and quality control.
 4. Salt Industry assessments.
 5. Evaluation and tracking systems to determine effectiveness of national fluoridation programs.
 6. Regular monitoring of fluoridation programs to prevent the risk of developing fluorosis.
- ? PAHO's technical cooperation has centered on providing technical expertise to countries to guide and carry-out the program components. Based on a team approach, PAHO assembled various consultants who specialized in a particular component of the program. Local expertise in each country was identified and developed such that each country in any given sub-region would become self-sufficient.

Assessment of the magnitude of the LF problem and potential benefit of using DEC fortified salt:

As discussed in the country presentations, such tools as mapping and periodic surveys can be used to assess the magnitude of the problem.

Salt industry assessments:

- ? An important program component was the assessment of the capability and willingness of the salt industry to manufacture a fluoridated salt product. Although this is relatively simple from a technological point of view, the monitoring and surveillance components of a quality program, and the distribution and marketing of fluoridated salt required commitment from the owners and managers of salt processing facilities.
- ? The program wanted to avoid the pitfalls of previous salt iodination programs that did not maintain commitment and relationships with the salt producers, thereby contributing to periodic lapses in the quality of the program.
- ? Since 1995, visits and assessments have been made to over 130 producers/processors in all 16 countries. This has formed the basis of a long-term relationship with the salt industry.

Program Stages of Implementation for Salt Fluoridation

Phase I Feasibility Assessment and Program Implementation	Phase II First Evaluation	Phase III Long-term Evaluation Consolidation
Baseline Fluoride in drinking water	Periodic analysis of Fluoride in water	Continued analysis of Fluoride in water
Baseline study on marketing and use of products with Fluoride	Monitoring of Fluoride- containing products in the market	Continued periodic monitoring of Fluoride-containing products
Development of monitoring guidelines for Fluoride concentration in salt	Monitoring Fluoride concentration in salt	Continued monitoring of Fluoride concentrations in salt
Baseline DMFT fluorosis surveys in 6-8, 12, and 15-year-old	DMFT and dental fluorosis surveys 7 years after	DMFT and dental fluorosis surveys fourteen years after
Initial assessment of Fluoride concentration in urine in 3-5 year-old children	Periodic evaluation of Fluoride concentration in urine	Periodic evaluation of Fluoride concentration in urine

Legal mechanisms:

- ? Legal and regulatory procedures are considered important to cement the success of the salt fortification. These include such issues as:
 - Concentration of fluoride, or in this case DEC, in the salt, the areas where fluoridated or fortified salt may or may not be sold.
 - The labeling and packaging of the salt.
 - The importation or prohibition of external non-fortified salt.
 - The types of salt, which may be fortified.
- ? The legislation for salt fluoridation in the Americas is either obligatory or voluntary. Obligatory salt fluoridation forces the health authorities as well as the salt industry to fluoridate. Most countries in the Americas have obligatory salt fluoridation programs, except for Uruguay, where salt fluoridation is voluntary.
- ? Mandatory salt fluoridation is recommended by PAHO because most health ministries put little priority in motivating private industry. The preferred regulatory option requires fortification, and gives industry incentives to comply. From the experience in the region, PAHO has been able to develop a model framework for legislation and regulation, which has sufficient flexibility for practical, timely and smooth implementation.

The economics and cost-effectiveness of salt fluoridation:

- ? An important question in evaluating the merits of any public health intervention has to do with “what difference does it make”. Salt fluoridation improves health outcomes as intended.
- ? An efficient intervention achieves good results with the least amount of resources. Economics and effectiveness are, therefore inextricably linked, especially in public health interventions; especially in developing countries where resources are scarcer and decisions are, inevitably more pointed.
- ? Using DEC fortified salt as a control strategy to eliminate LF also represents a cost-effective approach to improving health outcomes.

Preventive-effectiveness of salt fluoridation:

- ? Apart from its low cost, the experience of salt fluoridation is showing that it is as effective in preventing caries as water fluoridation.
- ? Data collected from the various national programs show high rates of prevention of caries. It is clear that salt fluoridation has achieved dramatic preventative results.
- ? Monitoring outcomes of a DEC fortified salt program to show degree of LF control will be critical to the sustainability of this strategy.

Cost-effectiveness of salt fluoridation:

- ? Estimates reveal that the cost-benefit ratio ranges from 1:122 to 1:203. Salt fluoridation is proving to be one of the most effective interventions in modern public health.
- ? Evaluating cost-benefit of a DEC fortified salt program will also be critical to the sustainability of this strategy.

Equity considerations:

- ? The population groups who potentially will benefit most are those of low socio-economic status, especially children. DEC-fortified salt would be an excellent way to reach children and other hard to reach populations.
- ? In addition to its excellent anticipated cost-benefit ratio, a fluoridation program is socially, highly equitable. This will also be the case for DEC-fortified salt as children are an important, and often hard to reach, yet important population group to target.

Strategic alliances:

Dr. Estupiñan explained that the success of the salt fluoridation program has been a function of strategic alliances between PAHO and the countries, and between PAHO and the private and public sector. PAHO's work and technical cooperation in the six years has been dedicated to assisting countries in each of the salt fluoridation program components. These components have included feasibility studies, disease survey design, training of surveyors, data analysis, development of surveillance systems for biological and chemical monitoring of fluorides, the quality assurance of salt fluoridation, as well as the review of the legal framework and legislative actions needed to ensure compliance and regulatory standards for these programs. Any salt fortification program as part of a LF control initiative will need to rely on strategic alliances already in existence and continue to develop new alliances.

Mr. Milner gave a comprehensive presentation on the technical components and the actual engineering needed to produce fluoridated salt. He was of the opinion that adding DEC to the existing fortification process would be feasible. He offered to work with the LF control program to design the engineering of such an initiative. More information can be requested directly from Mr. Milner (see participant list at the end of the document).

Conclusions:

- ? Salt fluoridation is an effective intervention to prevent and reduce the overall burden of dental caries.
- ? Technical implementation of salt fluoridation programs is generally feasible; it requires small financial investments; anticipated benefits greatly exceed initial and subsequent maintenance costs.
- ? Unlike many other public health interventions, salt fluoridation has the potential to become self-

sustaining in the short term, and the benefits of salt fluoridation are for a lifetime.

- ? As part of the LF control program, adding DEC to the existing salt fortification initiatives should be considered an additional tool in the LF elimination strategy.

KEY ISSUES: MORBIDITY CONTROL PROGRAM

Chairman: Dr. David Addiss, Medical Epidemiologist, CDC

Rapporteur: Dr. Steve McLaughlin, Epidemiologist, CDC

Building a Morbidity Control Program

Dr. Gerusa Dreyer, Federal University of Pernambuco, Brazil

Dr. Gerusa Dreyer of Brazil discussed key issues related to the development of a morbidity control program. Dr. Dreyer mentioned that she was presenting the first version of guidelines for a strategic plan to implement morbidity control in Brazil. She emphasized the importance and responsibility of health professionals to use the available tools and knowledge to limit the suffering associated with this disease.

Dynamics of filarial disease:

- ? LF disease is not only an infection by a parasite which causes clinical disease. It is a multifactorial disease. There are many important cofactors such as:
 - Age
 - Gender
 - Pregnancy and associated venous insufficiency
 - Location of the worm
 - Individual variation in response to filarial burden
 - Hygiene

Assessing the problem:

- ? Determine if filariasis-related morbidity is a problem in an area.
- ? First review medical records to see if lymphadema is a problem (be sure you are aware of any local names used in the community to describe this manifestation).
- ? Identify current community practices for treating the problem: what level of education and what type of community program needs to be launched.
- ? Assess microfilaremia using currently available

tools (e.g. antigen test).

- ? If the magnitude is very low, individual treatments at referral centers will be adequate. If the problem is considerable, public health interventions at the community level will be needed.

Management and training:

- ? Determine who should be trained and at what level (e.g., administrative or technical).
- ? Use international training site in Brazil as first level of training and then use these people to train at the local level.
- ? Decide what kind of infrastructure is needed for the specific morbidity management facility.
- ? Take advantage of material already available and most suitable for the particular setting (e.g., transparencies, slide sets, videos, CDs, manuals, hard-copy manuals). Appropriate materials should be selected depending on the infrastructure available in each area.

Cost:

- ? Although there is an International Training Center in Brazil, the main concern is sustainability of the center in terms of the cost to keep it operational with the resources available.
- ? To date, eleven countries have benefited from the training but there are 80 endemic countries in the world.
- ? One must determine the cost for training at the country level.

Interventions can include the following activities:

- ? Community based education
- ? Advocacy
- ? Improved hygiene
- ? Surgery for hydrocele
- ? Drug distribution

GROUP DISCUSSION ON MORBIDITY MANAGEMENT:

Status of national strategy based on available resources, needs, partner institutions, perspectives of the community, community involvement and sustainability.

The countries were separated into two groups to discuss their plans for morbidity management and then reconvened briefly to present the findings of the discussion to the entire group. The following is a summary of the presentations.

Existing status:

- ? More work needs to be done to assess the magnitude of the morbidity problem via active or passive surveillance.
- ? Community-based surveys and reviewing hospital records for occurrence of lymphedema and or hydrocele were suggested.
- ? Haiti has a morbidity management program that has been quite successful so far. It needs to be expanded.

Available resources:

- ? Each country would like to send a doctor to the International Training Center in Brazil to learn surgical techniques to deal with hydrocele.
- ? Need to identify a reference center in each of the countries and a team to work at the reference center including a medical officer, a nurse, a social worker and a community health worker.
- ? Countries with common borders felt the need to have more inter-country meetings.
- ? Train and sensitize medical students, medical practitioners, social workers and health care workers in the management and complete care of persons with LF.
- ? Partner institutions / Potential partners: SmithKline Beecham for drug donations for mass treatment initiatives.
- ? Establish collaboration with PAHO/CAREC and NGOs (in and outside of the country) to promote and develop this component.

Perspectives of community involvement:

- ? Concern was raised about being able to meet the community expectations of a morbidity control program. All recognized the need to integrate health education and community mobilization into the plan.
- ? Environmental sanitation and vector control was suggested.

Sustainability:

- ? Morbidity control should be part of the national plan of action when requesting funding. Most programs will require and request funding from agencies such as IDB and the World Bank.

Obstacles & needs:

- ? Lack of political support.
- ? Dwindling human resources.
- ? Absence of knowledge and sensitivity of the disease.
- ? Interruption of programs because of other priorities over time.
- ? Cross-borders concerns (e.g., migration).

OTHER KEY ISSUES

Chairman: Dr. Barnett L.Cline, Professor Emeritus, Tulane University, School of Public Health and Tropical Medicine

Rapporteur: Prof. Baltus Oostburg, Suriname

Role and Designation of a Regional Task Force

Dr. Barnett L.Cline, Professor Emeritus, Tulane University, School of Public Health and Tropical Medicine

Dr. Cline talked about the current Program Review Group (PRG) and its history. He explained that the global alliance had reached a strong consensus based on the evolution of the LF programs on the need for more decision making at the regional level. It was felt that, although many important functions would continue to be centered at WHO's headquarters in Geneva, many of the issues could be dealt with more appropriately at the regional level. Dr. Cline talked about the current program review group, the PRG, and its history. He briefly summarized key issues related to regional cooperation which were discussed during the global alliance meeting held in Santiago de Compostela, Spain, last May. He also discussed some of the more specific issues about the creation of a regional coordinating body for the Americas.

The PRG was appointed a little over two years ago by WHO. It consists of members from India, the Philippines, Tanzania, Japan, the Cook Islands and the United States (Dr. Cline). The terms of the appointments are for three years and are renewable. Analogous to the application process developed by Mectizan (ivermectin) Donation Program, the PRG was responsible for creating the mechanism for countries to apply for donations of albendazole for national LF programs. Thus the primary function of the PRG has been to receive, review and ultimately approve applications submitted by country programs. This mechanism provides the kind of assurances demanded by the pharmaceutical industries involved in these donation programs. Specifically, that the drugs are to be used in a safe, appropriate and responsible manner. The PRG's approach is to facilitate the process, it is not to "refuse or reject" an application, but simply to make the kinds of recommendations and suggestions that are needed to bring it up to the minimal needs (for more information on the criteria, contact Dr. Cline; see participant list for contact information). He noted that even though the application process to receive

the drug donation is fairly rigorous, it is not a difficult process. Seventeen applications have been approved to date, and programs are underway in eight of those approved countries. He also noted that the Dominican Republic's Albendazole application has been reviewed and approved, so that is actually the first program officially approved in this region.

Dr. Cline defined a regional coordinating body as a free affiliation of countries and other organizations, a non-legal body established to: 1) review national plans and recommend on Albendazole donation applications; 2) foster links through communication, coordination, advocacy, and sharing of resources, and; 3) interact with existing structures, such as WHO regional offices and others, to respond to their evolving needs.

He then briefly reviewed relevant questions that were raised at the workshop.

Why regionalize?

To move the decision-making process closer to the problems in the field.

- ? To deal with local issues more appropriately, such as cross-border issues.
- ? To accelerate the drug application process. The idea was that it could appropriately be adapted to the regional needs.
- ? To simplify, as much as possible, and streamline the application process and the communication process.
- ? To streamline the distribution of drugs and the re-application process. The cultural and geographical similarities and the regions would facilitate common approaches.
- ? To increase visibility of the programs to regional donor organizations and NGOs.
- ? To assist each country with the process of pre-certification and certification of eradication process.

What would be the role of a regional coordinating body?

- ? Above all, it would recommend approval of drug application. The existing PRG would assist in the transfer of this process to the region.
- ? Create an electronic communication system. The regional body would coordinate information in the region and create a system of electronic communication to permit easy access and exchange of information among the members of groups. One suggestion was to adapt WHO's current LF web site, so it could be used more appropriately at the regional level.

- ? Assist with the development of the national plans and creation of national task force. He noted that a great deal of progress has already been made in this area. He acknowledged PAHO's significant efforts in each of the LF endemic countries to move toward the development of national plans. He thought PAHO would need additional assistance and that this could be provided through a regional coordinating body.
- ? Work toward globalization of regional resources so drug donations could be shipped directly to the regions. This would greatly facilitate the movement of supplies, as the pharmaceutical companies prefer to ship directly to the region to minimize their concerns about controlling the donation of drug supplies.

Who would be involved in the regional coordinating body?

- ? It was recommended at the workshop that the current members of the PRG would play a lead role in helping move the process. As Dr. Cline has served on the PRG for two years and understands its working, he would assist in this process.
- ? Other members of this regional coordinating body would include representatives from the countries within the region. The idea is to keep this body relatively small so that it can function very effectively, efficiently and rapidly communicate with each other. It would not be necessary for all of the member countries to have representatives, but it could be done on a rotating basis. For example, it could start with two countries and then rotate every two years.
- ? Other important members of the coordinating body should include donor partners, NGOs, IDB or the World Bank. PAHO would act as the Secretariat and WHO would have either direct representation or some form of a liaison with the committee. The regional coordinating body will continue to communicate with and relate very closely to the Global PRG at WHO's headquarters in Geneva.

Dr. Ehrenberg referred briefly to his experiences with the onchocerciasis program coordinating committee (PCC). Countries are represented in the PCC as is PAHO, Emory University, the Carter Center, etc.. The PCC meets twice a year to address issues that are relevant to the region. These issues can be administrative in nature such as how to mobilize resources, technical and they can address obstacles at the regional level and means to overcome these. Dr. Ehrenberg noted that there are excellent technical

resources in the region of the Americas, and the important thing now is to coordinate and exchange these resources. As a representative of PAHO, he strongly supported the formation of a regional program review group for LF with PAHO acting as its Secretariat.

The Program Manager's Manual & the Regional Initiative

*Dr. John P. Ehrenberg, Regional Advisor
Communicable Disease, PAHO*

The program manager's manual and the regional initiative:

Dr. Ehrenberg summarized the framework of the manual explaining how the document had been the result of a joint WHO-CDC meeting which took place in Atlanta last July 2000. Participants from the CDC, WHO, PAHO and country representatives pooled their efforts to produce the manual. The document should be considered a work in progress, one that can be adapted depending on each of the endemic countries needs. Copies of the document were in the folders that were distributed at the beginning of the meeting. The manual is subject to adaptations. Participants were encouraged to send their comments (in any of the endemic countries official language) to the WHO through the regional PAHO offices.

The guideline for program managers (in non-onchocerciasis co-endemic countries):

- ? Will be adapted and changed as the LF community "learns-by-doing".
- ? All comments and suggestions for changes to the manual are welcome. Suggestions should be addressed to filariasis@who.int. (or to Dr. John P. Ehrenberg; Regional Advisor in Communicable Diseases; Communicable Diseases Program; PAHO/WHO, 525 23rd Street, N.W. Washington, D.C. 20037-2895).

Dr. Ehrenberg emphasized the importance of an updated situation analysis and the designation of a national task force in the development of a national plan of action.

A national task force would have to be designated by the Ministry of Health in most countries. It should work closely with the program manager or coordinator, providing technical feedback on the implementation of the national plan of action as well as alternatives to guarantee the sustainability of the program. Dr. Ehrenberg acknowledged the interest of

the Ministries of Health from all seven endemic countries represented at this meeting, some of which (e.g. Guyana) had already designated a task force. In summary:

- ? The task force's secretary should ideally be the manager or the program coordinator, as this person will be responsible for coordinating the overall initiative and ensuring information is exchanged.
- ? Representation should be as broad as possible, inviting members not only of the public sector, but also members of the private and academic sectors.
- ? It should be supported by one or more technical groups.
- ? It should include 6-10 additional members from different sectors.
- ? The initial activity should be to establish terms of reference.
- ? Meetings should be at least twice per year if not more frequently.

On the situation analysis: the current distribution of the infection and morbidity would have to be assessed in the start up phase of the plan of action. Historical records and published materials will need to be reviewed. ICT testing should be considered in each case in order to obtain an up dated mapping of the infection. An implementation unit will then need to be established in some of the countries to deal with the massive treatment activities. The national programs will need to rely on PAHO/WHO's and the CDC's technical expertise, on the availability of institutional and agency linkages, and on alliances with the private and public sector, particularly during the start-up phase. He indicated that PAHO/WHO would help the program managers in this task. In summary, programs will need to :

- ? Assess current status of infection and disease.
- ? Conduct rapid assessments (antigenemia) in suspect areas by lot quality assurance sampling.
- ? Conduct assessments to assess morbidity.
- ? Designate an implementation unit that would be responsible for implementing mass treatment (everyone is treated regardless of infection status).

On available human resources and institutional linkages to implement the plan of action:

- ? Look for resources within the Ministry of Health.
- ? Look to other ministries (e.g. intersectorial alliances with the Ministry of Education).
- ? Network with the private sector.
- ? Network with the NGOs.
- ? Expand to look outside the country for additional resources and institutional linkages.

Progress in the region:

PAHO's advocacy work among the Ministries of Health of the seven endemic countries in the region has resulted in the designation of program coordinators. So far, PAHO has worked directly with four of the seven program managers to help them develop their country's national plans. The remaining three countries seem to be approaching the elimination goal. PAHO will provide technical assistance in the preparation of their national plans of action before the end of the year.

The following table shows the progress in LF elimination in each of the endemic countries. Dr. Ehrenberg noted that this was prepared before the meeting, so it may need to be updated.

Dr. Ehrenberg acknowledged the excellent and extensive work conducted by Dr. Dreyer and Dr. Castellani in Brazil. He also noted the valuable contributions of Dr. Samuel Rawlins of CAREC/PAHO in furthering our understanding of LF in the Caribbean Region. PAHO's national and regional offices are committed to working with the program managers to support this initiative. He also drew the attention to progress in Haiti and the Dominican Republic towards the designation of a national task force, acknowledging the efforts of Dr. Nicolas of Haiti and Dr. Gonzalez of the Dominican Republic. Applications for Albendazole distribution are in various stages. The Dominican Republic has submitted theirs and received approval. Guyana is in the process of completing its application form while Haiti has begun a pilot study and is expected to define its treatment activities following completion of ongoing mapping activities.

Progress in the Elimination of Lymphatic Filariasis

Country	AMRO's focal point I. Mission	National focal point	Plan of action	Ongoing efforts to mobilize Resources	National Task force	Albendazole application	ATO (I)
Brazil	yes	yes	yes	IP	-	-	-
Dominican Republic	yes	yes	yes	-	IP	yes	200,000
Haiti	yes	yes	yes	IP	IP	IP	300,000
Guyana	yes	yes	yes	IP	yes	IP	200,000
Suriname	-	yes	NS	-	-	-	-
Trinidad & Tobago	-	yes	NS	-	-	-	-
Costa Rica	-	yes	NS	-	-	-	-

IP: in process

NS: not submitted

ATO (I): First year annual treatment objective

Dr Ehrenberg explained that he has worked with Dr. S. Persaud of Guyana, Dr. E. Nicolas of Haiti, Dr. M. Castellani of Brazil and Dr. G. Gonzalez of the Dominican Republic to develop and operationalize treatment activities based on available human and financial resources. He emphasized that the goal is to treat the entire population at risk and to begin coverage of as large a number of at-risk persons as possible with the hope of reaching the goal of LF elimination before 2020.

Assessing LF Endemicity; The Role of the ICT Test.

Dr Patrick Lammie, Investigator, CDC

Dr. Lammie discussed the use of the ICT test for assessing LF endemicity, and for monitoring elimination programs. He first outlined various assessment techniques and proceeded to discuss in more detail the advantages and applications of the ICT card test.

Initial assessment of filarial endemicity can be done through the following activities:

- ? Historical records to identify potential foci.
- ? Hospital records to assess the importance of hydrocele and lymphedema as clinical manifestations.
- ? Malaria surveys to assess vector burden.
- ? Rapid assessment techniques to get an initial sense of the magnitude of the problem.

Rapid assessment of the prevalence and distribution of lymphatic filariasis can be accomplished through the following activities:

- ? Lymphedema surveys: these may not be very sensitivity in that all true cases may not be detected.
- ? Hydrocele surveys: - these surveys may not have wide acceptance given the sensitive nature of the problem.
- ? Entomological techniques: issue of sensitivity.
- ? ICT: the issue of cost. While this is a rapid test, it is more expensive than other methods.

The card test (ICT) for filarial antigen has the following advantages:

- ? Rapid- results in 15 minutes.
- ? Specific for *Wuchereria bancrofti*.
- ? Appropriate for daytime screening.
- ? Can be used with whole blood.
- ? Only finger prick required.
- ? Standardized procedure.
- ? Can be used on school age children.
- ? Can be based on treatment units.

Does the whole blood cart test work: The following results suggest the ICT card does work.

- ? 112/113 microfilaremic persons in Haiti were antigen-positive (99.1%).
- ? 37/93 MF-negative persons were antigen-positive (39.8%).
- ? 0/210 persons from a non-endemic area of Haiti were antigen-positive.

- ? The ICT card technique has similar sensitivity and specificity as noted in WHO-sponsored multicenter trial.

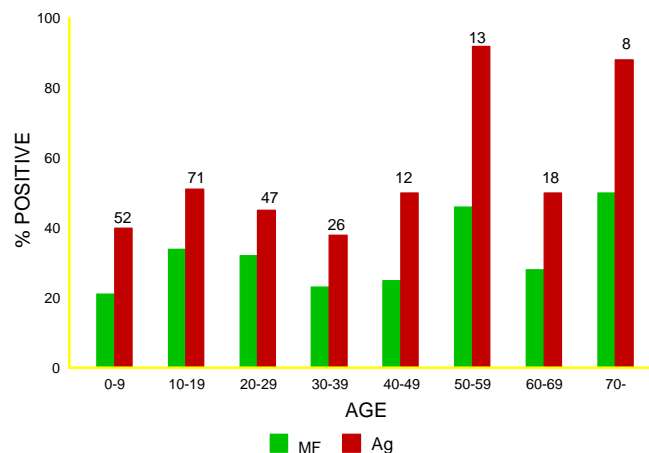
Issues to consider when using the ICT card test for program monitoring:

- ? Antigen clearance occurs slowly:
 - Clearance is related to pre-treatment MF density.
 - MF-positive persons remain positive for up to 3 years after treatment.
- ? Should children who are born after implementation of the intervention be screened? If so, consideration must be given to how large a sample would be necessary to adequately monitor the specified age group.
- ? The specificity of the test in children is not known.

Issues to consider when using the ICT test and certification of LF elimination:

- ? More stringent criteria for countries with evidence of recent transmission.
- ? In order to demonstrate a prevalence of 1 per 1000, 3000 persons must be screened.
- ? If sensitivity is 99.5%, 15 false positives are expected.
- ? The use of the ICT test for diagnosis of individual patients has limitations.
 - It is expensive to use.
 - It is rarely positive in persons with acute attacks or lymphedema.
- ? The ICT test is a very good tool for rapid assessments as it :
 - Replaces need for night bleeds.
 - Is rapid, sensitive and specific.
- ? It is not clear if the ICT test is the ideal survey tool for program monitoring. Additional research is needed to determine this. At this point, the membrane filter technique is recommended.
- ? Further research is required to determine the use of the ICT test as a tool to certify elimination.

Antigen Prevalence Is Greater Than Microfilaria Prevalence



The status of LF in the Southern Caribbean, a Case for Certification of Elimination

Dr. Samuel Rawlins: Caribbean Epidemiology Centre (CAREC), Port of Spain, Trinidad

Dr. Rawlins presented a comparison of the prevalence of circulating *Wuchereria bancrofti* antigen in communities in Guyana, Suriname and Trinidad to support the case for a certification of elimination of LF in Caribbean countries presumed to be free of LF. The data suggest that LF has been eliminated in Trinidad. A reservoir of infected people remains in Suriname while

Guyana has a high LF prevalence. The highlights of the research are noted below.

Comparative results:

- ? Six communities of Guyanese, five of Surinamese and three of Trinidadian school children were assayed for the prevalence of circulating *W. bancrofti* antigen using the ICT for LF.
- ? Small groups of adult populations of these three countries were also assayed, including a focus in Blanchisseuse, Trinidad where mass treatment for LF elimination had been executed 16-20 years ago.

- ? The prevalence of *W. bancrofti* circulating antigen in the school child population was 2.0 - 33.0% in Guyana, 0-0.22% in Suriname and 0% in the Trinidad.
- ? Among adults, the prevalence in the Guyanese populations was 17-32%, while the 211 Trinidadians from 8 communities from north, central and south of the island, as well as the small sample from Suriname were all negative.
- ? The data suggest that contrary to the WHO report of endemicity of the disease, LF may no longer be present in Trinidad and of only very low prevalence in Suriname.

Conclusion:

- ? Proven negative countries (e.g., Trinidad) could seek to be awarded a certificate of elimination.
- ? The apparent LF reservoir among immigrants from neighboring endemic countries could be assessed and positive cases appropriately treated to achieve LF elimination.
- ? LF positive countries, such as Guyana and others, are being encouraged to access the World Health Assembly recommended resources for a LF elimination program.
- ? WHO should define specific criteria for certification of elimination of LF for countries like Trinidad, which may no longer have foci of active transmission. The certification program will illustrate which countries are in need of this help.

ALLIANCES

Chairwoman: Dr. Tonia Marek, Public Health Specialist; IDB Mission in the Dominican Republic
Rapporteur: Dr. Sam. Rawlins, CAREC/ PAHO/WHO, Scientist (Vector-Borne Diseases)

Dr. Marek pointed out that, as seen throughout the presentations at this meeting, it is clear who should be part of the alliances and the issue now is how to materialize the alliances. Based on her own experience she feels alliances don't materialize because of two main problems. The first problem is that people do not meet to discuss their respective agendas and review how their objectives intersect so they can work together. The second reason is the lack of specific activity plans or specific contracts. She encouraged the participants to present examples of successful alliances, as well as lessons learned from unsuccessful ones.

This session included brief discussions on the subject from representatives of the following: PAHO, CDC, SmithKline Beecham, Inter American Development

Bank, Health and Development International, Sacre Coeur, Leogane, Notre Dame, Inter Church Medical Assistance, Emory University, Amaury Coutinho, and The International Center.

PAHO:

Dr. John P. Ehrenberg

Dr. Ehrenberg referred to WHO's alliances with a series of partners and major stakeholders, such as the CDC, SmithKline Beecham, and the World Bank. Major technical and financial contributions have been made by WHO's Collaborating Center on LF elimination at the CDC throughout several decades of work in the Region and in other parts of the world. Others such as JICA and the Arab fund have been active financial partners supporting LF work in different parts of the world. In Brazil, alliances with Dr. Geruza Dreyer's group and the Amaury Coutinho foundation have been extremely active to the benefit of other programs in the Region. Dr. Ehrenberg emphasized the need to increase alliances in the Americas by reaching out to other groups. He explained that with an increasing attention on intestinal helminth control, interest in a multi-disease approach is emerging.

Potentially promising experiences with the NGO sector are beginning to emerge. Such is the case of the active involvement of Health Development International (HDI), an NGO which co-sponsored this meeting. The Ministries of Health of the seven endemic countries in the Americas have shown great interest in the LF elimination initiative and some are in the process of committing resources to the effort (e.g. Brazil). All seven countries now have a focal points to support the implementation of the plans of action and most are committed to join in the battle to eliminate lymphatic filariasis from the Americas by the year 2010.

Obstacles include political change, as is currently the case in the Dominican Republic and Haiti. Our hope is that these political transitions will not have an impact upon the Regional LF elimination efforts.

CDC:

Dr. Patrick Lammie

Dr. Lammie affirmed the designation of CDC as PAHO/WHO collaborating center for the elimination of filariasis in the Americas. He explained that on a practical level, this means that the center is there to serve as a partner to help the ministries in different countries, the NGOs and other agencies develop programs that are related to LF elimination. He

addressed the role of the collaborating center and noted that an early focus was to increase the awareness of the public health opportunities that were afforded by LF programs, specifically integrated programs rather than vertical LF elimination programs. Such integrated programs can offer concrete public health benefits to the entire population in many countries, and to important segments of the population in others. He indicated that while awareness of the problem of LF has increased dramatically, the CDC LF collaborating center continues to be ready to assist countries and agencies with advancing the public health agenda of these programs. Dr. Lammie also stated that the collaborating center is ready to serve as an information-clearing house. Chapters, which relate to the historical perspective of LF were distributed to the countries in the region with the goal of ensuring that the information is widely available and accessible to all. He asked the group for assistance in keeping the information current, so it can be used in future meetings.

Another important role of the center is to provide technical assistance in terms of program design, elimination strategies, and program monitoring. He then indicated that the center has strong research interests with an active laboratory research program that can be used by all. He noted that a particular area of interest was related to certification and efforts to develop new diagnostic and monitoring tools. He then pointed out that the center had ongoing alliances with many of the country representatives at the meeting. He noted the long-standing relationship with Hospital Saint Croix and other partners in Haiti to develop a pilot program for elimination of filariasis from one commune in Haiti. He expressed his hope that the project will provide information and experiences to share with the region about how best to develop and implement programs. A document was prepared of the general principals for developing community participation. For a copy of this document, please contact the meeting organizer, Dr. John Ehrenberg, or Dr. Patrick Lammie (see participant list at the end of the document for contact information). He closed his presentation by re-emphasizing their strong and continued commitment to the development of LF elimination programs

GlaxoSmithKline :

Dr. Brian Bagnall

Dr. Brian Bagnall spoke about the involvement and commitment of GlaxoSmithKline in the LF elimination program, which began with the

collaboration of GlaxoSmithKline and WHO in December 1997. Dr. Bagnall suggested that the magnitude of the problem (a billion people at risk in 80 countries) and the collaborative approach that GlaxoSmithKline is taking might serve as a new model for the pharmaceutical industry. He reminded the group of GlaxoSmithKline's commitment to help build a coalition of public and private partners. He also noted their commitment to provide Albendazole as requested to give both a deworming and hopefully an antifilarial benefit when co-administered with either Ivermectin or DEC. He also indicated the possibility of providing some financial support and staff to help get the elimination program started. GlaxoSmithKline is also bringing private sector skills to the alliance by the way they do business and is hoping their role is regarded as more than just a drug donation, but rather as an innovative and broad-based public-private coalition.

He expressed their support for the evolution of regional coordination and their desire to work with the five WHO regions in the endemic area as well as the Africa DEC region and the South Pacific region. He concluded with examples of GlaxoSmithKline's successful collaboration with other LF partners (e.g., a grant to the Carter Center for work in Nigeria; a grant to the Liverpool School of Tropical Medicine, and the United Kingdom Department for International Development for the LF Support Center in Liverpool; a grant to Emory University for social economic assessment; the unusual comprehensive collaboration with another pharmaceutical company, Merck and Company, on the Mectizan donation program; the partnership with the Inter Church Medical Assistance (IMA) for work in Africa and Haiti, the collaboration with The International Training Center in Recife, Brazil for morbidity control; a grant to James Cook University in Townsville Australia to help them publish the newsletter, *Filarial Update*, and their collaboration with the CDC in Atlanta on the workshop that led to the program manager's manual.

Dr. Bagnall explained that GlaxoSmithKline and their partners are developing a five year forecasting and production plan so that by the end of the next five years medication, administration will have started for approximately 20% of the global at-risk population. That means that by the end of this year, GlaxoSmithKline will probably ship approximately 35 million treatments to about 20 or 22 countries. In the subsequent year, this would increase to 65 million in 27 countries, and in the year 2002, to 115 million treatments. He expressed how pleased

GlaxoSmithKline was for the opportunity to work in partnership in this region.

Inter American Development Bank (IDB)

Dr. Tonia Marek

Dr. Tonia Marek began by addressing, what she feels, is a misconception, concerning the lack of financial resources for elimination of LF. She stated that from the point of view of the IDB, financing is not a problem and she believes this is also the sentiment of the World Bank. She explained the availability of funds is not the problem. How to tap into those resources is the problem. A partnership with the IDB takes place at two levels, at the policy or more central level and at the operational level.

At the central level, the policy level, there is a shared agenda signed a few months ago between the World Bank, PAHO and the IDB on the health strategy for Latin America. This has led to the development of several sub-disciplines (e.g., epidemiologic surveillance, environment, national health accounts, and pharmaceutical). She stated that LF would likely come under the agenda of the epidemiological surveillance and environmental groups and funding requests should be directed there. In addition, she said that the focus of the IDB over the next three years is going to be more on poverty and therefore, it is important to emphasize that LF is a disease of poverty when approaching the IDB about funds for LF. Dr. Marek suggested emphasizing the fact that the disease burden worldwide is even heavier than for onchocerciasis, a disease for which the IDB has already committed substantial resources.

At the operational level of the health sector, the focus is on health sector reforms and re-prioritization towards helping the poor. At IDB, many decisions about allocation of funds are made at the country level rather than the central level, as is the case in the World Bank. She strongly suggested talking directly to the country representative and the person in charge of supervising the sector. Vertical programs are not while integrated approaches are part of the reform concept at the IDB.

Another element of health-sector reform focus is the separation of financing from provision of services. For this, she suggested establishing official agreements with public institutions or some NGOs for the implementation of the LF elimination program. She explained that the LF elimination program could also fit into the education sub-sector, a sub-sector that is currently involved in promoting deworming, and which is likely to receive increasing

financial resources. She stated that the IDB could do something only if the countries present comprehensive national plans with yearly activities, annual budgets and demonstrated feasibility.

Health and Development International (HDI):

Dr. David Addiss

Dr. Addiss was representing Health & Development International (HDI), whose executive director and founder, Dr. Anders Seim, could not be present at the meeting. HDI, one of the co-sponsors of the meeting is a small, non-profit, non-governmental organization that is registered both in the United States and in Norway. Their approach is one of flexibility and filling in as needed to meet the objective. HDI began their involvement with LF in 1996-1997 shortly after the World Health Assembly resolution calling for global elimination of LF. HDI co-sponsored and organized a meeting to outline the broad strategy of this global program which included people from industry, and the private and public sectors. In 1999, HDI saw the importance of drug distribution and coordinated drug distribution from the manufacturing level to the communities. In addition to sponsoring meetings, HDI also provides direct support to some specific country projects (e.g., mapping in Ghana). Dr. Addiss explained that while HDI will continue to support global meetings, they would like to get involved in more regional programs in both the Americas and Africa.

The International Center

Mr. Lindsay Mattison

Mr. Mattison explained that The International Center is involved in community development worldwide. They now have a network of three or four thousand local communities, local groups, missionaries, and Peace Corp volunteers. He described the objective of his institution is primarily to seek out technologies that can be applied at the community level. He also emphasized the importance of working with the communities in the area of supply and distribution. Currently, the International Center is part of an alliance with PAHO and the government of Guyana to help support and develop the intestinal helminth control and has already committed water purification devices. The International Center plans to get involved in the LF elimination initiative.

Mr. Mattison explained that from his experience, NGOs are an important sector in these countries since they can influence opinions at both the public and

local level and, therefore, should be included in the Regional strategy to make the program more acceptable. He stated that his organization spends a lot of time presenting these national and community based development projects to the United States Congress with the goal of effecting policy development.

Ste. Croix Hospital

Mr. Jack Lafontant

Mr. Lafontant explained that the hospital is an institution of the Episcopalian Church of Haiti, and is based mainly in Leogane, which has a population of 125,000 inhabitants. The Church works in several areas, including research, curative medicine, health worker training, and information dissemination. He explained that the Church has been working with the CDC for more than 15 years and has excellent relations with the Ministry of Health in Haiti, other religious denominations, the public sector (SmithKline Beecham, Merck) and the University of Notre Dame. He discussed their work in LF, specifically, the organization of an LF workshop in their hospital, sending a hospital employee to the LF training course in Recife, Brazil, and meeting with the President of Haiti, Mr. Rene Preval to discuss the problem of LF. He expressed his certainty that the government will be providing support to the LF elimination program since a large part of the Haitian population suffers from the morbidity associated with the disease. The Church is working on a LF pilot control program in their municipality and hopes to share their experiences with other municipalities.

Notre Dame University

Dr. Thomas Streit

Dr. Streit explained that the University of Notre Dame has no school of public health but interestingly, has been involved in the area of parasitology and vector-biology and that this meeting was their first step into an alliance to fight LF. They are pleased to be a part of this program and are currently working with grants from several foundations and private philanthropists in the area of LF elimination in conjunction with the CDC. Through the grants they hope to build the physical and human infrastructure, equipment purchasing, networking support and problem identification. They have already begun to support the ministries mapping activities. He concluded by stating that they hope, that before this year is out, they will have the capacity to host more national teams working in the LF elimination program.

Inter Church Medical Assistance (IMA)

Dr. Glen Brubaker

Dr. Brubaker explained that the IMA is a coalition of 12 church agencies that have relationships with more than 500 hospitals, medical facilities, and training institutions throughout the world. IMA works through its members, whenever possible, to serve their interest in areas that are not already specifically addressed by the church. Presently, two such areas are onchocerciasis and LF. IMA has been an acting partner in the onchocerciasis program and began activity in Tanzania five years ago. IMA has a place on the national onchocerciasis task force and serves as the lead NGO working closely with the Ministry of Health, in the Tanzanian program. IMA is also a partner in the global LF elimination program, and has a place on the recently formed LF task force in Tanzania. In preparing for mass distribution of Albendazole and Ivermectin, they will begin mapping the area and advocating for the program with the community leaders. The national mapping is starting this week, and completion is expected in a few months. He explained that the church is already involved in LF morbidity treatment with great success and plans to get involved with more diseases in other regions.

Emory University

Dr. Richard Rheingans

Dr. Rheingans introduced the LF support center, which is housed at the Emory School of Public Health and has been in existence for two years, primarily through the support of SmithKline Beecham. He explained that their main function is to provide economic information to different kinds of decision-makers such as donors, program developers, and policy makers at national levels and international levels to support decisions about LF programs.

He discussed how the center could be of use to people in the region as we try to move ahead into the next stages of LF elimination. Economic information can be used to build support for addressing the problem (e.g., to create awareness of the problem, the magnitude of the problem and the feasibility of addressing the problem). Economic information can also be used to try to improve programs in terms of the most cost-effective interventions and how to design those in specific countries. Economic evaluation has been used in the past in India and in Ghana. The initial work that came out was gathering information about the burden of the disease, about trying to understand the magnitude of the problem. Information on losses of productivity, medical costs

for treating LF, monetary values of the other aspects of the disease, such as the human suffering are pieces of information for decision makers. Dr. Rheingans explained that, in collaboration with WHO and other partners, the next project would be to develop initial cost projections for establishing national LF elimination programs in order to promote the planning process at a national and international level. To do this, it is important to start thinking about certain processes and about what is the magnitude of resources that are needed to address the problem.

He explained that he would like to now get more reality based measures of what it would cost to establish LF morbidity control programs in specific areas of the region and use that information to help develop better programs in specific countries and to learn from those lessons so that they can help others establish programs. The next general area for economic analysis is in designing cost-effective strategies in countries. He explained that there is great deal of diversity between countries, but also within countries, in terms of the distribution of disease, the organization of health care resources, and trying to look at how strategies can be combined, both geographically, or in different areas within a country or over time. He concluded by encouraging the participants to try to identify cost-effective strategies for delivering both treatment and morbidity control programs that might be effective initially but then need to be supplemented in the future.

Amaury Coutinho

Dr. Geruza Dreyer

Dr. Dreyer began by drawing the attention to Dr. Amaury Coutinho's achievements and contributions to the field of LF. She explained that the financial support to continue the research in Recife, Brazil was under risk, this being the reason why her group decided to form an NGO to sensitize donors to support their continued research efforts. Their main projects are to respond to some of the key questions related to the global elimination program, such as the magnitude of the infection and disease in children, adult morbidity, psychological disability and reconstructive surgery. She explained that the International Training Center for LF morbidity control has funding and will continue to work with the alliance towards the goal of global elimination of LF by the year 2020.

Liverpool School of Tropical Medicine

Dr. David Molyneux

Dr. Molyneux explained that he recently took on the role of managing the Liverpool School of Tropical Medicine Support Centre. The Center's mandate is to facilitate creation of partnerships and to act as a broker to facilitate the development and promotion of country programs. He stated that the center's commitment to supporting LF was made at the second European Congress of Tropical Medicine in September of 1998. At that time, the challenge was to find support for the alliance which now exists. He reiterated Dr. Marek's earlier comments that the LF elimination program fits into the global health reform agenda to eliminate poverty. The Center was developed as a coordinating center to effectively use available financial resources for LF elimination. Housing the center in the Liverpool School of Tropical Medicine and International Health made sense, as the school has a long history of collaboration with endemic countries in the tropics. The center is funding several groups currently working in LF and onchocerciasis, in a variety of fields including molecular biology, entomology, and evidence-based medicine. The Center is co-funding mapping activities in Africa, hosting workshops in Ouagadougou, and providing funding directly through WHO into three countries in Africa as well as supporting other country specific activities. He noted that they are working to engage NGOs that have not traditionally been associated with disease control and will continue to work with WHO and SmithKline Beecham. He concluded by emphasizing that their mission is to help the LF alliance get up and running.

Discussion

Dr. John Ehrenberg commented on the work of the International Center and how this is an example of an across sector alliance with an NGO that does not have a health background.

Dr. Marek stated that so far, only good things have been said about the alliances and she asked the group to comment on problems they have faced.

Dr. Mario Castellani of Brazil commented on the difficulty of transforming vertical programs into horizontal programs, in terms of the organization of the services and the practical side of the intervention. The LF global alliance initiative emphasizes the integration with other programs of primary health care. This approach poses a challenge in Brazil. He asked if the IDB, the World Bank, or any other financing agencies will work with the countries to organize horizontal programs specifically designed

for each country, or for different regions of the country ?

Dr. Marek addressed the issue of the IDB partnership to eliminate onchocerciasis in the Region and mentioned that the World Bank is also helping to finance some other disease control programs in Brazil.

Dr. David Molyneux was of the opinion that there is a good chance of integrating LF elimination into other existing health programs. He raised the issue of problems with alliances and what is needed to make these work. Alliances have to be based on trust, on personal, one-to-one contacts, and on the ability to share problems and understand each other's points of view. Communication is essential.

Institutionally speaking (IDB), it is unlikely that a grant like the onchocerciasis grant to support onchocerciasis elimination in the Americas would materialize to support LF work, according to Dr. Marek. IDB's goal is to do improve partnerships with the public as well as the private sector in order to facilitate health sector reform. IDB wants to encourage integrated approach for tropical diseases instead of having separate vertical programs. As a task manager, she would like to see a well-budgeted, integrated five-year plan of action targeted to help the poor. The plan should include collaboration with the private and public sector. Dr. Marek encouraged each country to look carefully at their existing IDB loans and its components analysing the best way to integrate them. She offered to consult with IDB's management on the feasibility of designating a person who knows the bank from within and who could work with the program authorities in each of the seven countries on a potential financial partnership with IDB.

Dr. David Molyneux still expressed reservations concerning the mechanisms (supported by proper documentation) on how to implement disease control activities within the framework of the new health reform-financing environment. He believes that the essential element is to try to express the program's goals in the right language so they can receive funding from IDB. He said that although everyone talks about integration and a multi-disease approach, there are some individual, highly cost-effective activities which cannot be readily integrated. Chagas disease and Polio are two good examples. Dr. Molyneux felt that the policy makers are not addressing the issues properly and they would need the input of disease control experts.

Dr. Marek explained that the decision not to mention specific diseases in the IDB projects was a deliberate one. It is important to remember that in the health sector reform IDB looks at generic transformations. She agreed with Dr. Molineaux that the programs have to be packaged in the right way and emphasized the need to identify overlapping interests among the partners and collaborators and try to work on that basis, rather than on the differences.

A participant raised the question as to whether funding requests to IDB should be submitted through the country's government rather than non-governmental organizations or a regional center. Dr. Marek confirmed this was the best approach, although a regional organization could contract with the government to implement part of the national program.

Dr. Ehrenberg encouraged the participants to follow Dr. Marek's suggestion and approach IDB's task managers in each of the endemic countries in order to work with them. He noted that the IDB has been very open and receptive in the past and he is sure they will continue to do so. He concluded by saying that every venue should be explored and taken advantage of and thanked Dr. Marek for coordinating the session.

Group Discussion: Next Steps: "Where Does the Regional Initiative Want to go From Here?"

Chairman: Dr. Richard Rheingans, Research Assistant, Professor, Emory University
Rapporteur: Dr. John P. Ehrenberg, Regional Advisor Communicable Diseases, PAHO

The focus of this session was to analyse a series of issues (e.g. across border) to be considered in the implementation of each of the country's plans of action. Regional expectations over the next 5 years were also addressed. In summary:

National issues:

- ? National task force: This is underway or in place in some of the endemic countries.
- ? Mapping: ICT mapping is planned, underway or completed in all the countries.
- ? Plan of action: Underway in some, completed in others.
- ? Funding sources: Each endemic country is beginning to identify funding sources.
- ? NGOs : Endemic countries have begun to analyse the perspectives of working with NGOs.

- ? Plans should integrate health education and community mobilization in the morbidity control plan.
- ? Training and human resource needs: this be analysed by all of the endemic countries prior to initiation of program.

Legal aspects:

- ? Drug laws reviewed and mass treatment plan accepted under current law: Guyana, the Dominican Republic and Brazil have begun to address this issue.
- ? DEC salt regulatory mechanisms explored: Guyana, the Dominican Republic and Brazil have begun to address this issue.

Outcomes expected in the next 5 years:

Expected outcomes over the next five-years are being considered in most of the endemic countries with the exception of Trinidad and Tobago, a country where LF transmission is believed to have been interrupted.

- ? Administrative structure related outcomes: Underway in all endemic countries.
- ? Mapping assessment outcomes: Underway in Haiti, Guyana and the Dominican Republic.
- ? Training human resources: Underway in Brazil, Haiti and the Dominican Republic.
- ? Funding sustainability issues: Funding sources being sought in all countries for elimination or morbidity control, patient treatment or pre-certification of elimination exercise.
- ? Mass treatment or DEC salt outcomes: Objectives and strategies being explored in all endemic countries.
- ? Regional meeting objective: Discussion and planning of regional alliances and meetings underway involving all endemic countries.

Country specific issues:

Participants split in two groups.

- ? Guyana/Suriname/Haiti/Trinidad & Tobago:
 - Continued development of regional alliances:
 1. Create a regional committee with at least two country representatives.
 2. Have regular meetings of the national committee.
 3. Create sub-regional groups between interactive countries (e.g. Suriname and Guyana, Haiti and the Dominican Republic) meeting twice a year to discuss and possibly implement common activities in the border region and the entire country.
 - Identify regional research needs and develop regional pilot projects on LF.

- Distribute relevant WHO publications as a source of information and guidelines (e.g., scientific literature, management of lymphedema).
- Seek more information and guidelines on criteria for certification of LF elimination.
- Identify regional technical and/or resources needs in anticipation of the certification process.

- ? Dominican Republic /Costa Rica/Brazil: This group looked at tasks underway, completed or planned for next year, reviewed issues and identified common problems and those which are unique to the country.
 - In Brazil and the Dominican Republic, the formation of a national task force is underway. Costa Rica is at a much earlier stage of defining what the nature and degree of the problem.
 - All three programs are exploring funding mechanisms to re-assess the LF problem and identify resources needed for next steps to ensure program sustainability.
- ? For Brazil and the Dominican Republic:
 - Formation of technical and administrative sub-groups in Brazil and the Dominican Republic.
 - Review the national plans with the idea of implementation in the near future.
 - Create an administrative structure in order to integrate the LF program within the government structure in a changing health sector environment.
 - Agree on mass treatment objectives.
 - Initial contacts have been made with NGOs but further links need to be established.
 - Identify training needs.
 - Develop a legal framework for the program.

Wrap up: Highlights of the Meeting

Dr. David Molyneaux: Managing Director, Lymphatic Filariasis Support Center, Liverpool School of Tropical Medicine

Dr. Molyneaux addressed the highlights of the meeting. He began by praising the Region and the group for their enthusiasm and commitment to the problem and the high quality of scientific and management activities in the Americas. Dr. Molyneaux pointed out the important alliances that have developed in this region over the last two years and the importance of meetings such as this one as a mechanism to learn from each

other. He challenged the region to eliminate the disease before any other region.

Great progress has already been made in the Americas :

Programmatic issues

- ? Program development in the Dominican Republic and Guyana.
- ? A well developed alliance between Haiti- CDC- Notre Dame.
- ? Interest on the side of the bilateral agencies, the banks, and NGOs to strengthen the existing alliances and develop new ones.
- ? Good prospects for support from these agencies
- ? The need for the people at the country level to recognize that they must take an active approach to secure and utilize the resources available.
- ? The region has demonstrated success and feasibility of meeting the goal to eliminate transmission of LF by the year 2020.
- ? Dr. Molyneaux thought this goal could be met earlier based on the considerable technical capacity in this Region.
- ? The political commitment has been demonstrated by the designation of program managers in seven countries.
- ? The importance of integrating other important health issues such as de-worming.
- ? Elimination of LF fits in with the prevailing global health policy supported by viable public-private partnerships.

Epidemiologic characteristics

- ? *Culex* is the sole transmitter of lymphatic filariasis in the region. Vector control is not considered in the elimination strategy. Minimal intervention is required to push the disease into the elimination status.
- ? There is evidence that elimination of transmission may have been achieved in parts of the region (Suriname, Trinidad and Tobago).
- ? Mapping of the disease continues to be a global priority; progress is being made in Haiti, and in the Dominican Republic. Guyana is committed to doing it by the end of the year.
- ? The common border between Haiti and the Dominican Republic is a clear opportunity to show inter-country collaboration to eliminate this disease and ensure success in these two countries as LF crosses common borders.
- ? The Region offers an ideal environment to develop the certification process, as there are models to work with. For example, as the Guyana program moves forward, it will be

possible to track the steps over a five-year period from program initiation to a point in time where it will be possible to certify the elimination of transmission.

Technical highlights

- ? Emphasis on the importance of the disease in childhood and the need to get as high a coverage as possible to stop children from becoming infected.
- ? Unless we move forward, a million new children a year will become infected. It is our moral duty to do something about those children ensuring high treatment coverage rates.
- ? The Resolution of the 1997 World Health Assembly prompted GlaxoSmithKline's commitment to provide Albendazole.
- ? The donation of Albendazole is the biggest donation ever made by a pharmaceutical company to a public health program.
- ? Significant progress has been made in research.
- ? The demonstration of the efficacy of the two drug combination as a transmission blocking agent.
The development of the ICT test.
- ? Demonstration that we can have an impact on the human suffering through morbidity control.

Health sector reform issues

- ? Health sector reform is now focused on poverty.
- ? Talk to World Bank and IDB representatives at the country level to learn more about program priorities and how financing works; convince them that LF should be part of the health sector reform package, as it is a disease of poverty and a disease that contributes to poverty and one which can be controlled.

Policy issues:

- ? Albendazole is a donated product for LF elimination, interweaving this with school health programs is acceptable.
- ? The school should be an entry point for achieving transmission control through high coverage, for example, the parents and families of those children, not just the children.
- ? No clear treatment is suggested during pregnancy and further consideration will be given to the issue.
- ? Certification by WHO may now be feasible in some of the countries.
 - Models for this process include Guinea Worm eradication and Chagas disease.
 - Passive surveillance is a useful tool for monitoring what is going on.

- ? The use of Albendazole is expected to have profound health benefits beyond LF transmission control.
- ? The concept of combining Albendazole with iodized, fluoridized, DEC salt offers a unique opportunity.

Morbidity control:

- ? There is an active training center in Recife, Brazil, and patients are benefiting directly from what is being done there.
- ? Start a morbidity control program before you launch a chemotherapeutic program, as it gives you an entry point into the communities.
- ? Training manuals and tutor’s guides should be published shortly.
- ? Extraordinary videos will be available which can be the basis of training in all countries.
- ? Identify NGOs that might wish to identify themselves with this particular activity.
- ? Create a regional group which can drive this initiative forward and demonstrate its commitment and leadership.
- ? The need to be aware of the constraints as the program moves toward evaluation and monitoring.
- ? Country programs should seek financial support to make sure that the ICT test is available.
- ? As the shelf life of the test is only about 11 months, it is important to do serious planning in terms of regional needs for those tests.

Five-year goals:

- ? Mapping of the whole region to be completed within a year.
- ? By the end of the year, there will be a functional regional coordinating body with defined responsibilities with PAHO/WHO acting as the Secretariat.
- ? By the next meeting (probably in twelve months), the agreed criteria for certification will be established and a model for the certification of elimination will have been established.
- ? Establish operational morbidity control programs that utilize training manuals, videos, and the appropriate guidelines.
- ? The new programs will be subject to adequate monitoring.
- ? Baseline data are available before implementation to allow meaningful evaluation and the ability to assess the impact of the elimination program over the 4-5 year period. This will require adequate quality management and information capture.

- ? Resolve issues around safety and treatment during pregnancy.
- ? Develop and put in place a “lesson-learning” strategy.
- ? Remain flexible and open to accept changes in strategies as new tools become available (e.g., antibiotic that kills the adult worms) or be flexible in how to use the tools that are available.
- ? Using operational research to guide approaches and to make approaches more cost-effective.

Summary:

- ? Enormous prospects for confirming certification of elimination.
- ? Great alliances are in place.
- ? This region leads the world in the technical areas of morbidity control and operational research.
- ? This region can lead the world in certification of transmission elimination.
- ? This region can integrate control programs into other health programs and endorse the concept of a regional coordinating body.

Closure

Dr. John Ehrenberg closed the meeting by thanking all of the participants for their enormous efforts over the last couple of months, some over the last couple of years, to launch the lymphatic filariasis elimination initiative in the Americas. He then proceeded to thank the Dominican Republic for their enormous hospitality, and in particular, Dr. Guillermo González, who together with his staff did a fantastic job in helping PAHO with the meeting arrangements. Special thanks for the support provided by Dr. Francisco Paulino, head of the lymphatic filariasis elimination program in the Dominican Republic.

Dr. Ehrenberg thanked WHO's partners, SmithKline Beecham and Health Development International for co-sponsoring this meeting. He concluded by thanking Dr. David Molyneaux for his comprehensive summary and his contributions to the alliance, Dr. Tonia Marek of IDB, for attending the meeting, for providing an extremely useful insight into the mechanisms behind a potential financial partnership and alliance with IDB and the World Bank and for her interest in a successful outcome of the elimination program.

