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Midterm Evaluation
May 6 - 21, 1993**

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VBC PROJECT

Tropical Disease Control for Development

**Ivermectin Delivery Program
Suchitepequez Department, Guatemala
Midterm Evaluation**

May 6 - 21, 1993

Implemented by:

**International Eye Foundation
Guatemalan Ministry of Health
International Eye Foundation/Guatemala
Universidad del Valle
National Committee for the Blind and Deaf**

Team Members:

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VBC Report No. 81422

Table of Contents

Executive Summary	6
1. Background	1
The Scourge of Onchocerciasis	1
The Promise of Ivermectin	1
Ivermectin Delivery in Guatemala	2
Baseline and Follow-up Epidemiological Information	5
Baseline Information	5
Recommendations	11
2. Epidemiological Resurveying of Treated Communities	13
Recommendations	13
Project Information System	14
Background	14
Current Use of the H/MIS	16
Issues and Conclusions	20
Recommendations	21
Project Indicators	23
Background	23
Management Versus Performance Indicators	24
Management Indicators	25
Objective-level Performance Indicators	28
Goal-level Performance Indicators	29
Training of Project Staff and Voluntary Health Workers	30
Background	30
Formal Training Activities to Date	31
Conclusions and Recommendations	36
Health Education	37
Motivation Events	38

Distribution/Education Activities	40
Education for CBWs, Health Workers, and Supervisors . . .	40
Issues and Conclusions	41
Recommendation	42
Distribution of Ivermectin and Monitoring of Adverse Reactions	42
Evaluation of the First Round	47
Sustainable Model for the National Distribution Plan	51
Recommendation	55
3. Recommendations	58
Epidemiological Information	58
Epidemiological Resurvey	59
Project Information System	59
Project Indicators	60
Goal-level Performance Indicators	62
Training	63
Health Education	64
Distribution of Ivermectin and Adverse Reaction Monitoring	65
Sustainable Model for the National Plan	67
Annex A - Statement of Work	69

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Abbreviations and Key Terms

A.I.D.	Agency for International Development
Brigadista	SNEM Health Worker
CBD	Community-based Distributor
CHW	Community Health Worker
Department of Onchocerciasis	Part of the Division de la Malaria, formerly SNEM (still called SNEM for convenience in this document)
Health Promoter	Same as health worker
H/MIS	Health Management Information System
IDP	Ivermectin Delivery Program
IEF	International Eye Foundation
NCBD	National Committee for the Blind and Deaf
MOH	Ministry of Health
OHE	Onchocerciasis Health Education
PVO	Private Voluntary Organization
SNEM	Servicio Nacional para la Erradicacion dela Malaria (now Division de Malaria) of the MOH
Suchitepequez Province	Same as Suchitepequez Department
UVG	Universidad del Valle de Guatemala

Executive Summary

The Ivermectin Delivery Program (IDP) in the Suchitepequez Department of Guatemala is a three-year pilot program funded through a cooperative agreement between the Agency for International Development (AID) and the International Eye Foundation (IEF) to establish an effective, safe, and locally sustainable model for the distribution of ivermectin to endemic communities. The distribution of ivermectin will significantly reduce the intensity of onchocerciasis in these communities. The ultimate goal is interrupting transmission of the disease as the program is absorbed into the National Plan for the Elimination of Onchocerciasis in Guatemala.

The overall purpose of the IDP is to assess the feasibility of using Private Voluntary Organizations (PVOs) to strengthen the institutional capacity of indigenous health systems to provide cost-effective and sustainable delivery of ivermectin, thereby strengthening the indigenous health care system. IEF collaborates with the National Committee for the Blind and Deaf (NCBD), the Universidad del Valle de Guatemala (UVG), and the Onchocerciasis Control Department of the Ministry of Health in the realization of this goal.

The Suchitepequez project began October 1, 1991. During this midterm evaluation, which follows approximately 18 months of program implementation, an assessment was made to determine whether the basic objectives are being achieved. In addition, this evaluation was meant to serve as a time to reflect on the goals and purposes of the IDP and to openly discuss strengths and weaknesses of the project. It affords an opportunity to redirect priorities and request assistance.

The evaluation team remained in Guatemala between May 6-21, 1993 and visited all implementing institutions and key personnel. A two-day field visit to the area of ivermectin distribution was conducted to observe both IEF/NCBD and Ministry of Health distribution activities and the training of community-based distributors.

Overall, the evaluation team found the IDP to have many strengths and a few weaknesses. Foremost among strengths is the strong capacity of the numerous players to work together to design and implement a program that achieves the common goal. IEF and its project staff in

Guatemala are performing excellently in their function of "putting themselves out of business." Specifically, they are establishing a program within the existing health care structure, guiding the initial scientific work, establishing the mode of drug delivery, training personnel, beginning health education/motivation, and establishing an information and accounting system. All of these activities will eventually be assumed by the Ministry of Health. In short, they are developing the capacity of the indigenous health care system to carry out ivermectin delivery over the long run. This is evident in the fact that the IDP in Suchitepequez Department has become the model for the National Plan for the Elimination of Onchocerciasis in Guatemala.

Some of the specific accomplishments of the IDP/Suchitepequez are:

- 1) Development of a methodology for accomplishing epidemiological studies employing a rapid epidemiological assessment.
- 2) Establishment of a functioning health management information system (H/MIS) at project headquarters in the Universidad del Valle and in the Department of Onchocerciasis, Ministry of Health.
- 3) Development of an effective treatment coverage system in the endemic areas, where 30,833 persons out of 36,665 eligible (84.1%) have been treated.
- 4) Creation of an effective system to treat adverse reactions to ivermectin, through which 2,228 persons were treated during the first distribution round.
- 5) Establishment of a program within the indigenous health care structure responsible for operational research, drug delivery, personnel training, health education/motivation, and monitoring and evaluation. All of these activities will eventually be assumed by the Ministry of Health.
- 6) Development of a monitoring system capable of tracking (with some further refinement) key indicators of program performance and financial management for use in producing appropriate managerial and evaluation reports on a periodic basis.

There are also weaknesses in the IDP/Suchitepequez. These weaknesses were found in the areas of health education/motivation, training materials and manuals, recurrent costs, estimation of coverage rate, and, potentially, in the effectiveness of the CBD network of distributors. Specific weaknesses were noted as follows:

- 1) Overall, health education has been neglected as a project priority. Reasons for this include limited funding, limited time by implementors, lack of health education experience, and lack of communication with the accomplishments of the neighboring IEF Yepocapa project.
- 2) Training materials and the content of training sessions were found to be inadequate, particularly for the MOH health promoters and for community-based distributors.
- 3) Recurrent costs continue to be relatively high and efforts need to be made to reduce expenses and increase cost effectiveness.
- 4) Official counts place considerably more residents in the project area than project staff have been able to locate. Nearly 56,000 of 91,000 official residents failed to be located in the distribution area. The figure, if accurate, may consist largely of migrants from the highlands who descend for the coffee harvest in the fall. It is important that an accurate number of residents of the distribution area be determined in order to calculate the coverage rate.
- 5) Community-based distributors are only now beginning to function in their communities, although none has yet begun to distribute ivermectin alone. Care must be exercised to assure that the CBD's are adequately trained and motivated to continue years into the future without the same high level of supervision as exists at present.

The following summary of recommendations addresses these and other issues found by the evaluation team.

- 1) Complete the statistical analysis of the epidemiological information obtained for classifying the communities by level of endemicity.

- 2) Complete the statistical analysis of the ophthalmological information gathered by the group from the National Committee for the Blind and Deaf.
- 3) Conduct a full review of the health education/motivation component to structure a consistent and well-designed program and define strategies and an improved methodology for delivering the appropriate health messages to communities.
- 4) Carry out a study to understand the nature of migration patterns in endemic zones, particularly that of the migrant workers from the highlands (cuadrilleros), and the effect these patterns may have on disease distribution and severity. The total number of persons at risk from onchocerciasis may be considerably more than the project census has recorded.
- 5) Evaluate the effects of ivermectin treatments on onchocerciasis prevalence and infection intensity in Suchitepequez by means of the Rapid Epidemiological Assessment. This should occur during the first quarter of 1994, immediately following the third round of ivermectin treatment.
- 6) Evaluate annually the effect of ivermectin treatments on prevalence and infection intensity in the sentinel communities.
- 7) Repeat the ophthalmological study on the mesoendemic and hyperendemic communities previously studied by NCBBD/Hospital Robles staff for evidence of change in ocular damage. This should also be carried out after the completion of the third round of treatment.
- 8) The categories of information collected, stored, and processed by project management for project monitoring and reporting purposes should be augmented by key performance indicators, designed to measure progress toward achieving ultimate project objectives.
- 9) A decision should be made to use one or the other of the two health management information systems.

- 10) It appears that SNEM and NCBD are functioning largely independently. Greater efforts should be made to integrate activities to assure a common message and approach to community leaders and household heads. Integration will involve mixing of teams and common retraining.
- 11) A common training and retraining program for all distributors is necessary with regard to the motivation and education campaign, because all teams now do both motivation and distribution activities in one process.
- 12) Training of CBDs needs to be better defined and expanded. Refresher training for these volunteers should rely on the results of frequent evaluation by supervisors. Their approach to households and the quality of the health education message are crucial in sustaining ivermectin acceptance in endemic communities.
- 13) The current CBD manual requires expansion to include a wider variety of material, while at the same time simplification of language and technical content. The manual should be used as the basis for a three or four day training course at headquarters to which attendance should be mandatory for all CBDs. This should be completed in advance of the third distribution campaign.
- 14) To effectively build a uniform education and distribution activity in Suchitepequez capable of serving as model for the National Plan, it is desirable that a renewed health education strategy be designed as soon as possible. An enhanced health education program should provide community members with a better understanding of the disease, its treatment, treatment-seeking behaviors, and the role of health workers and community-based distributors in supplying the treatment.
- 15) A thorough cost analysis of the project should be made soon to assist in reducing costs, currently running about \$3.18 per person treated.

2

- 16) Because it is likely that a problem of roles and relationships will emerge under the National Plan, it is recommended that a coordination mechanism through a National Steering Committee be established. This would be in addition to the Advisory Technical Group, directly attached to the Minister of Health, to be presided over by the Vice Minister as direct delegate of the Minister.



1. Background

The Scourge of Onchocerciasis

Worldwide about 18 million people are infected with onchocerciasis, commonly known as river blindness. Of this number up to one-third of a million people are already blind from the disease and an equal number has suffered serious visual impairment. The causal agent of river blindness, the parasitic worm known scientifically as *Onchocerca volvulus*, is spread by black flies of the genus *Simulium*.

There are tens of thousands of small communities throughout the world where from 2% to 15% of the population have already been blinded by the disease. A majority of these communities are remote from population centers and generally beyond the reach of most health services. Without significant intervention from the outside, the scourge of river blindness will continue unabated into the 21st century.

The Promise of Ivermectin

Ivermectin, replacing diethylcarbamazine (DEC) as the drug of choice against the causal agent of onchocerciasis, was licensed for human use in 1987 by Merck & Co. Like its predecessor, ivermectin (trade name Mectizan) kills only the microfilariae, leaving the adult worms in the human body to reproduce. In order to free human beings of millions of these tiny offspring, whose migrations through the skin lead them inevitably into the eyes in sufficient number over the years to cause blindness, ivermectin must be taken at least once a year for the life of the adult worms—about 10-15 years.

Although ivermectin has been donated free of charge by its manufacturer to the fight against river blindness worldwide, the remoteness of communities where the disease is endemic and the long period of its use before the adult worms are eliminated, pose serious challenges to mounting an effective disease control effort. Complicating the obvious logistical problems in maintaining a sufficient supply of this medicine to hundreds of thousands of users in far-flung communities of Africa and Latin America is the need to create a self-sustaining demand

for the drug by its prospective beneficiaries. If taken at appropriate intervals by populations at risk, ivermectin can safely and effectively liberate whole communities from the threat of blindness.

Ivermectin Delivery in Guatemala

There are an estimated 450,000 people living in endemic areas for onchocerciasis in Guatemala; of these approximately 50,000 are thought to be infected with the parasitic filaria. Infection with *Onchocerca volvulus* leads to itching, skin disfigurement, visual disturbances and, if left unattended, possible blindness. Although the manifestations of the Latin American onchocerciasis are less dramatic than the African version, onchocerciasis nevertheless presents a serious public health problem. With the advent of ivermectin, it is possible to control, and with significant effort, eventually eliminate transmission of this disease in Latin America.

The International Eye Foundation in Guatemala, in collaboration with the National Committee for the Blind and Deaf, the Onchocerciasis Department of the Ministry of Health, and the Universidad del Valle, has implemented a program to control onchocerciasis in the Suchitepequez Department of Guatemala. This program began as a three-year pilot project sponsored through a cooperative agreement with the Agency for International Development. As the program proceeded, it became the model for the National Plan for the Elimination of Onchocerciasis. The National Plan, funded by numerous sources, was implemented in the Summer of 1993 and will absorb the Ivermectin Delivery Program of the Suchitepequez Department. The program will proceed, however, as originally outlined in the Cooperative Agreement and the Detailed Implementation Plan, serving the same communities in the epidemiologically mapped areas of Suchitepequez.

There are four major foci of onchocerciasis in Guatemala: the CHISOLOSUI focus (Chimaltenango, Solola, and Suchitepequez Departments combined), San Vicente Pacaya, Santa Rosa, and Huehuetenango. Of these, the CHISOLOSUI focus is the largest with at least 155,000 people living in endemic areas. IEF is concentrating its efforts in this region, treating all eligible people in proven endemic areas of Suchitepequez Department and, under a separate project, in southern Chimaltenango. This is a mountainous region, with endemic communities located at between 500-1500 meters.

The vast majority of the rural population is indigenous Mayan, living on "fincas". Fincas, the coffee growing plantations of the region, vary in size from a few dozen residents to several hundred. Beyond the permanent residents, there are migratory workers that participate in the coffee harvest, usually October through February. This period also corresponds to the high point of onchocerciasis transmission. Life and services on fincas can vary greatly, ranging from availability of some public or private health services to complete deprivation. Fincas owners, correspondingly, range from highly cooperative to indifferent with respect to IDP activities. In addition to fincas, the population lives in small villages serving several fincas and in much larger urban areas of up to several thousand inhabitants (cabeceras).

This variation in community size presented IEF the challenge and opportunity to test several modes of ivermectin distribution. In collaboration with the Ministry of Health (SNEM)¹, whose onchocerciasis health workers were active in this region, IEF and SNEM divided the responsibilities. The very smallest and largest communities are served by SNEM workers; the medium-sized communities are served by IEF/NCBD promoters. In the smallest communities of under 250 residents, SNEM uses health workers (brigadistas) to deliver ivermectin in a house-to-house fashion. No community based worker will be trained in these communities at present. The largest communities, those with more than 1,000 residents, also served by SNEM, have a centralized mode of distribution.

Health workers serve each community in teams of two, one primarily remaining in a central location, the second announcing distribution activities and providing ivermectin to the community. In the medium sized communities, those between 250 and 1,000 residents, ivermectin delivery is conducted primarily by IEF/NCBD health promoters working both house-to-house and from a central location.

¹For the sake of brevity and tradition the acronym SNEM (Servicio Nacional para la Erradicacion de la Malaria) — although no longer the formal name of the Division de Malaria — will be employed throughout this document to represent the institution and personnel of the Onchocerciasis Department of the Malaria Division of the Ministry of Health and Social Assistance.

It was decided to train community-based workers who are actual residents of the community and would be responsible for ivermectin distribution after the first year. They are trained and supervised by the health promoters and the supervising social worker. At project completion, there are scheduled to be 60 trained community-based distributors, 10 health workers, and a field coordinator under the direct aegis of IEF/NCBD. The social worker is an employee of SNEM "on loan" to the NCBD group. Two SNEM health workers also are integrated into the NCBD contingent.

The Project Manager for this effort is Dr. Ricardo Lujan. The SNEM mobile teams are coordinated by Dr. Julio Castro. Dr. Rodolfo Zea-Flores is responsible for the supervision of the IEF/NCBD field teams, as well as for assisting Dr. Castro with the SNEM teams. Per diems of the SNEM teams are financed under the project.

The IEF project directly employs 10 health workers, computer programmer, accountant, field and laboratory technicians (one each), data clerk, field technician and driver (one each), secretary and student assistant. Administrative Director for IEF in Guatemala is Dr. Gustavo Hernandez-Polanco. Medical Director at the NCBD Robles Hospital is Dr. Fernando Beltranena. Support from IEF headquarters in Washington D.C. is provided by Dr. Christine Witte, Onchocerciasis Program Coordinator.

The project is funded for a three-year period commencing October 1, 1991 and ending September 30, 1994. Total funding for the project is \$474,947 of which AID is providing \$420,202, with additional contributions, both in-kind and in cash of \$54,745 provided from IEF, NCBD and the MOH.

Project objectives are to:

- 1) Conduct epidemiological surveys to determine the prevalence and intensity of infection;
- 2) Determine the impact of the treatment through parasitic indices;
- 3) Establish a health management information system with emphasis on quality assurance;

- 4) Assess the project by a defined set of indicators;
- 5) Train project staff;
- 6) Educate community members about onchocerciasis and motivate them to participate in the distribution campaign;
- 7) Provide ivermectin to the eligible population of Suchitepequez Department; and
- 8) Develop a distribution plan that can be extended to the whole nation and be sustainable for as long as is required to interrupt transmission of the disease between people.

Baseline and Follow-up Epidemiological Information

Baseline Information

In developing the Ivermectin Delivery Program, it was estimated that all communities in the department of Suchitepequez lying between 500-1500 meters above sea level are "at risk" of acquiring onchocerciasis. These are the elevations where the disease is endemic in Guatemala, due to the high density of *Simulium ochraceum*, the primary vector species. Consequently, project organizers felt the need to undertake baseline epidemiological studies using indicator groups, school surveys, and sentinel communities to determine and/or reconfirm the prevalence and intensity of onchocerciasis infection at the community level.

An assessment of onchocerciasis endemicity was conducted by means of the methodology called Rapid Epidemiological Assessment (REA), which consists of an examination of a sample of up to 30 males, 15 years of age and above (indicator group). Plans are now underway to include 30 females of same age in the indicator group to eliminate suspicions that the teams play some role in military recruitment. The following indicators were selected for epidemiologically ranking the communities by degree of endemicity:

- Geometric mean microfilarial skin density of the indicator group calculated for each community (total microfilarial density-indicator group, or TMFD-IG);

- Geometric mean microfilarial density of just the positives in the group (positive microfilarial density- indicator group, or PMFD-IG);
- Microfilarial prevalence among the indicator group (microfilaria prevalence-indicator group, or MP-IGMP-IG);
- Nodule prevalence (nodule prevalence-indicator group, or NP.IG);
- School nodule surveys (SNS). Examination of children under 15 years of age for nodules on head and thorax to evaluate transmission impact of ivermectin distribution over a long-term period; and
- Microfilarial prevalence among the indicator group (microfilaria prevalence-indicator group, or MP-IGMP-IG).

In-depth surveys are also planned to be performed annually during the project in seven mesoendemic and hyperendemic communities. This small sample of communities with at least 30% endemicity as revealed by skin biopsies are known as "sentinel communities" (SC). All individuals of these communities will be examined for onchocerciasis (presence of palpable nodules and dermal conditions, microfilarial densities, and evidence of ocular lesions). The indices produced by the school nodule surveys (SNS) must include both age and sex standardized and stratified values for community microfilarial load (CMFL), the mean microfilarial load among positives (MMFL), microfilarial prevalence, and nodule prevalence. These sentinel communities and school surveys are expected to provide data to evaluate the program's impact on morbidity (visual acuity and dermal disease) and disease transmission (age-specific prevalence rates and incidence among previously negative persons).

Since the beginning of the project in October, 1991, much time was spent reviewing the epidemiological data that SNEM had collected over the last decade. All data going back to 1986 were entered into a database. The information was then used for setting priorities for the epidemiological survey performed in February, 1992.

All communities were properly identified. An identification number was assigned based on four criteria: country, department, district, and

cartographic coordinates (1:50,000 scale maps) of altitude, longitude and latitude. This information was entered into the database for each community.

Based on the Rapid Epidemiological Assessment, a total of 149 communities were identified in the Suchitepequez department, with a total target population for treatment estimated at 91,169. The initial MOH listing contained 117 communities, but only 109 of these were located. However, 40 "new" communities were found, making a total of communities by district as follows:

District	Communities	Population
Chicacao	91	39,295
San Miguel Panan	11	4,022
San Juan Bautista	4	6,203
Santa Barbara	16	11,206
Patulul	27	30,443
Total	149	91,169

Of these 149 communities, 99 (66%) were positive by microfilarial and/or nodule prevalence rates in 1992. One community (population 35) was not investigated through an oversight of scheduling.

The overall pre-treatment prevalence of onchocerciasis infection (microfilarial prevalence among the indicator group) in Suchitepequez department was 35.5%. Microfilarial prevalence varied from 6.0% (San Miguel Panan district) to 41.9% (Chicacao district). Communities with onchocerciasis are classified by level of endemicity: hypoendemicity (prevalence of 40% or less); mesoendemicity (between 40% and 59%), and hyperendemicity (60% and above). All are under treatment with ivermectin.

Pre-treatment Prevalence of Microfilaria in Adults over 15 in Suchitepequez province, Guatemala, 1992*

District	No. Examined	No. Positive	% Positive
Chicacao	1,641	687	41.9
San Miguel Panan	116	7	6.0
San Juan Bautista	55	6	10.9
Santa Barbara	265	69	26.0
Patulul	372	101	27.2
Total	2,449	870	35.5

* Microfilarial prevalence-indicator group studies in the sentinel communities.

In-depth epidemiological studies were conducted in four communities of the Chicacao District. The communities of Monte Carlo and Las Armonias can be classified as hyperendemic (>60%), and Valle de Oro and Mercedes as mesoendemic (between 40-59%).

**Pre-treatment Prevalence of Infection in the Sample
Population of Chicacao District, Suchitepequez, 1992**

Community	Total Population	No. Examined	Microfilaria + No. (%)	Nodule + No. (%)
Monte Carlo	208	169	137(81)	92(54)
Las Armonias	160	114	77(68)	57(50)
Valle de Oro	572	417	226(54)	129(31)
Mercedes	203	152	68(45)	311(37)

The overall pre-treatment prevalence of infection, expressed by microfilarial and nodule prevalence by age group for the four sentinel communities from the Chicacao District is summarized below. Results show that 502 (60%) out of 837 individuals examined were positive for microfilaria in skin biopsies: 69% of the males and 57% of females. The microfilarial rates increased with age for each group. The nodule prevalence (NP) also showed that 308 (37%) out of 844 individuals examined were positive: 45% of males and 28% of females. Nodular rates also increased with age for each group examined.

**Pre-treatment Prevalence of Infection by Age Group in the
Sample Population of Four Sentinel Communities of
Chicacao District, Suchitepequez, 1992**

Age Group	Microfilarial Prevalence		Nodule Prevalence	
	Total Population Examined	No. Positive (% +)	Total Population Examined	No. Positive (% +)
0 - 4	15	2(13)	15	3(20)
5 - 14	343	148(43)	344	114(33)
15 - 29	199	142(71)	203	80(39)
30 - 44	151	121(80)	153	58(38)
> 45	129	89(69)	129	53(41)
Total	837	502(60)	844	308(37)

Data concerning the ophthalmological study performed by the National Committee for the Blind and Deaf in three sentinel communities (685 patients) in May, 1992 are not yet available. Results are apparently highly significant, because 37% of the population examined presented ocular damage (personal communication provided by Dr. Fernando Beltranena during the evaluation team visit to the NCBD Hospital Robles). Results obtained, however, are still being analyzed. New information to evaluate the program's impact must be obtained after the second year of treatment (First Quarter, 1994). Preliminary results of the first survey should be made available to SNEM and UVG as rapidly as possible.

Issues and Conclusions

A major problem encountered in the epidemiological surveys was the reluctance of some people to be skin-snipped for biopsies and to be subjected to nodule palpation for diagnosis of the presence of adult filaria. This reluctance was more marked in communities greater than 1,000 inhabitants, where there was no direct way by which local authorities could persuade people to be examined. At coffee plantations,

usually smaller than 1,000 inhabitants, cooperation from the authorities (owner, administrator, or local mayor) and the local people was significantly greater.

Refusal to be skin-snipped or to participate in a physical examination for nodules was probably related to the lack of an adequate health education/motivation program, whose messages should have better presented to people the health benefits of such examinations.

A similar situation was found by Collins, et.al.(1992)² during ivermectin treatments in five communities located in the Guatemalan central focus. They used a consistent educational component to overcome the negative attitude of the population. The structure, methodology and strategies used by this project (and other similar projects in Guatemala) should be reviewed carefully to improve the content of the IDP/Suchitepequez health education/motivation activities. Efforts should be made to coordinate specific activities with the Yepocapa project in the expansion to the National Plan for the Elimination of Onchocerciasis in Guatemala given its need for improvement in Suchitepequez.

Another problem encountered was the high degree of migration in the endemic areas. Workers and their families change residence frequently in search of employment opportunities. Of special importance is the group called "cuadrilleros", who work in endemic areas for one to two months but actually reside in the highlands. This migratory working population in the onchocerciasis zones may affect the prevalence and intensity of the disease in ways the IDP/Suchitepequez should better understand.

Recommendations

- (1) Complete the statistical analysis of the epidemiological information and stratify the communities based not only on disease prevalence, but on a wider range of measures designed to indicate the degree of

²Collins, R. et al. 1992. "Ivermectin: Reduction in Prevalence and Infection Intensity of Onchocerca Volvulus Following Biannual Treatments in Five Guatemalan Communities." American Journal of Tropical Medicine and Hygiene, 47(2): 156-159. August, 1992.

risk for onchocerciasis transmission. Beyond the parasitologic information obtained through the Rapid Epidemiological Assessments, this will include other indicators such as elevation, distance from streams, and entomological data, if available from past evaluations. Communities with high risk of transmission must receive priority attention for the third and fourth rounds of treatment.

- (2) Complete the statistical analysis of the ophthalmological information gathered by the group from the National Committee for the Blind and Deaf. This study will provide valuable information to evaluate the impact of ivermectin on onchocerciasis morbidity.
- (3) Review the health education/motivation component to structure a consistent and well-designed program and define strategies and an improved methodology for delivering the appropriate health messages to communities. Coordinate this activity with the National Plan for the Elimination of Onchocerciasis in Guatemala.
- (4) Attempts to characterize the human migratory patterns in and between endemic areas and outside regions should be made to grasp its effect on the distribution of onchocerciasis in Suchitepequez Department. The role in disease transmission of the "cuadrilleros", who reside in the onchocerciasis areas for one to two months at harvest time, should be addressed as soon as possible.

2. Epidemiological Resurveying of Treated Communities

The second objective of the Detailed Implementation Plan for the IDP in Suchitepequez Department is:

To survey each treated community epidemiologically at least once more during the course of the project to facilitate evaluation of the impact of ivermectin treatment on parasitologic indices of onchocerciasis.

This evaluation should be performed in the First Quarter of 1994, following the third round of treatment. It is needed to measure the impact of ivermectin use on onchocerciasis prevalence and infection intensity among the population strata most affected by onchocerciasis—adult males 15 years of age and above (the indicator group). This corresponds to the indicator group in the first epidemiological survey.

Because significant impact on filarial load is expected after two or three treatments of endemic communities, the resurvey should get under way as soon as possible after the third treatment and while preparing the fourth campaign. The first round of treatment was delivered from May through December, 1992. The second one took place from February through June, 1993. The third one is occurring from August through December, 1993.

Recommendations

- (1) Evaluate the effects of ivermectin treatments on onchocerciasis prevalence and infection intensity in Suchitepequez by means of the Rapid Epidemiological Assessment using samples consisting of up to 30 males, 15 years of age and above (indicator group). The best time for this evaluation would be the first quarter of 1994; that is, immediately following the third round of ivermectin treatment.

- (2) Evaluate annually the effect of ivermectin treatments on prevalence and infection intensity in the sentinel communities. According to actual progress of the project, such evaluations must be performed in at least four sentinel communities in May-June, 1993 and in the seven communities (including three from Acatenango) in May-June, 1994.
- (3) Repeat the ophthalmological study once before project end on the mesoendemic and hyperendemic communities previously studied by NCBD/Hospital Robles staff for evidence of change in ocular damage.

Project Information System

Background

The IEF proposal and cooperative agreement with A.I.D. called for the collection, processing, analysis, and dissemination of appropriate information. Appropriate information was defined by the project proposal as: monitoring of inputs and outputs and baseline, annual and end-of-project measures of project indicators. Inputs and outputs were specified as follows:

Inputs	Outputs
Surveys: Baseline, Epidemiological, KAP	Baseline, mid-term, and final evaluation data
Detailed Implementation Plan	Implementation schedule and health information system
Project staff	Hired and in place
Training of core staff	Core staff trained
Training of university staff	Technicians trained
Education/motivation campaigns	Community leaders trained Villages sensitized
Training of village health promoters	Health promoters trained
Ivermectin distributed	Tablets distributed
Monitoring of adverse reactions/treatment	Record of reactions and treatment given
External evaluations	Evaluations carried out, distribution models appraised, and design of sustainable national plan

Project indicators were left unspecified in the proposal, but were tentatively listed in an appendix of the Detailed Implementation Plan (March, 1992).

The Detailed Implementation Plan provides clearer intentions of the nature of the information systems to be developed under the project: a health information system (HIS); a management information system (MIS); and a geographic information system (GIS). The objective of these information systems was "to aid in targeting program resources, delivery of services, determination of drug coverage, and evaluation of the impact of the elimination effort." The HIS and MIS were first developed by Dr. Eckhardt Kleinau in April 1992 in FoxPro. With subsequent modification, this system became the project computerized information system or IDP-CIS. In order to maintain compatible records, it was presented to the Malaria Division of the Ministry

(SNEM), which accepted it with some hesitation because their analyses were then carried out in LOTUS. It appears that SNEM continues to maintain two sets of records, one in LOTUS and another in FoxPro for use in supplying monthly data to project headquarters at the Universidad del Valle.

A somewhat simplified version of the H/MIS was developed by VBC in Washington, D.C. and supplied to the project first in March, 1993 and again with modification in late April. This information system, termed the IDMS, was developed in R-Base and seems well adapted for use by the project in future. Because of the incompatibility of D-Base and R-Base, however, information from the old system cannot yet be transferred to the IDMS or, once in the IDMS, to the GIS.

A GIS was developed by a consultant to the project, Dr. Frank Richards. It permits a visualization of the project communities and the possibility of calling up information by pointing to the communities on screen. Inputting of data from the IDP-CIS is possible because FoxPro is compatible with the D-Base system of the GIS.

Current Use of the H/MIS

The IDP-CIS currently holds information from the major project activities and is updated continuously. Major information forms yielding inputtable data are:

1. Epidemiological Evaluation

This is the form used in the Rapid Epidemiological Assessments in which nodules and skinsnips are documented in each community surveyed. These results have been entered for the first survey in 1992 and will be re-entered when the survey is redone in 1994. The form includes the names of individuals selected for epidemiological analysis.

2. Onchocerciasis Community Data

This forms records basic community data.

3. Ivermectin Distribution Coverage for Permanent Residents

This is the summary form for each community and includes number of inhabitants, new inhabitants since original census, dates of treatment, population treated, number refusing treatment, people missed because of temporary absence, population absent, and ineligible population by type of ineligibility.

4. Ivermectin Distribution Register for Permanent Residents

This is the summary document for tablets distributed by community. Number of persons treated for each dosage (1/2 to 2 tablets) is listed with total tablets at onset and the total after treatment. Missing tablets must be listed and explained.

5. Side Effects from Ivermectin Treatment for Permanent Residents

This form records summary data by community treated on number of side effects encountered by severity (slight, moderate, and severe) and by number of consultations by those with side effects.

6. Register of Medicines Used to Treat Side Effects from Ivermectin on Permanent Residents

This is the summary form by community recording dates of side effect treatment and the total amount of each medicine used in treating these reactions.

7. Results of Ivermectin Distribution Coverage for Permanent Residents of Suchitepequez Department

This is the summary statement for all of Suchitepequez by community treated. It includes treatment dates, total present population, eligible population, eligible population treated, eligible population not treated by category (refused, temporarily absent, long-term absent), and non-eligible population by type (less than 15 kg, pregnant, lactating, sick, deceased).

8. Form for Updating Census and Treatment of New Permanent Residents

This is the form for each community for updating the census and recording treatment of new persons since last treatment and census update. It records basic data on sex, date of birth, level of education, occupation, length of residence, dialect spoken, previous treatment and date, weight, and number of ivermectin tablets taken.

9. Census Form for the Onchocerciasis Areas

This is the basic census form for recording all residents by community in the onchocerciasis treatment zones. It records names, age, sex, date of birth, level of education, occupation, length of residence, dialect spoken.

10. Census Form for People Examined in the Epidemiological Evaluation

This is the form used in each community in the original and follow-up epidemiological evaluations, particularly in the sentinel communities where all residents are examined. It can be used for rapid epidemiological assessments. Information includes names, sex, birthplace, length of residence, occupation, knowledge of onchocerciasis, whether treated for onchocerciasis previously (without ivermectin), travel to other endemic zones.

11. Form for Census and Treatment of Migrants

This form is used to take the census of and treat migrants during treatment tours in each community. It records people who are obviously temporarily resident in the community, not just people missed during earlier census rounds. It records basic data on age, sex, level of education, migration time, previous treatment, weight, and tablets taken.

12. Form for Census and Treatment of Permanent Residents in Communities Numbering 1,000 or More

This is the form used to record persons living and receiving treatment in each community of 1,000 or more residents. It contains basic data on age, sex, length of residence, occupation, date of treatment, weight, and tablets taken.

13. Evaluation Questionnaires for IEF/NCBD Health Workers and Volunteer Promoters

- a. Questionnaire for the Health Workers
- b. Questionnaire for Supervisors
- c. Questionnaire for Local Residents
- d. Questionnaire for Voluntary Promoters
- e. Questionnaire for the Heads of Plantations (Fincas)

These questionnaires are filled out monthly (or as often as possible) by the persons interviewed or by the interviewer (normally the field coordinator). Other periodic written and interview evaluations are also carried out. The evaluation protocols are only used by the IEF/NCBD teams, because the SNEM personnel refuse to be evaluated except by their own ministry. Unions among government workers, however, significantly limit such evaluation. Efforts should be made to assure that MOH evaluation does occur in the future and that the content of the present protocols can be incorporated into ministry evaluation norms.

Information used in maintaining financial and logistical records is kept separately from the health information system (IDP-CIS) and the GIS. A full-time accountant and records manager prepare basic data for monthly financial reports and for quarterly vouchers to the International Eye Foundation in Bethesda. These vouchers and accompanying materials have been filed in a timely fashion. There seems to be no financial or logistical tracking problems in the project.

In addition to financial reports and vouchers, the project has prepared progress reports for: January 15 - March 31, 1992 (1st Quarterly Report); October 1, 1991 - March 31, 1992 (6 Months Report); April 1 - June 30, 1992 (2nd Quarterly Report); October 1, 1991 - September 30, 1992 (Annual Report); and October 1 - December 31, 1992 (4th

Quarterly Report). Quarterly reports for the third quarter of 1992 and for the first quarter for 1993 were not made available to the team, but they apparently were completed. The information in these periodic reports is largely drawn from the H/MIS (IDP-CIS). It covers population under treatment; ivermectin tablets and dosage; adverse reactions and their treatment; and epidemiological studies and their results. These data are gathered on the various forms noted earlier.

Further data are provided in these reports on training, health education, and reports supplied from the field. These data are not held in the IDP-CIS or in the financial management system, but are supplied to the project manager quarterly by the IEF/NCBD and Onchocerciasis Department field coordinators. The basic reports submitted by field personnel on population census, treatment, and ivermectin delivery and dosage, however, are forwarded weekly for input to the IDP-CIS.

Issues and Conclusions

1. The categories of information collected, stored, and processed by project management are appropriate and complete, although they should be augmented by key indicators listed in the next section (cf. Project Indicators). Presentation of key management information in quarterly reports, while satisfactory, could be made clearer through presentation of management and performance indicators on one or more introductory pages, with more detailed breakdown and explanation section by section later in the report. In this way, program managers can quickly scan key measures of project accomplishment and performance and note areas of delay or over-achievement.
2. The existence now of two H/MIS systems--the older IDP-CIS and the recently received IDMS--is somewhat problematical. Currently, data continue to be entered into the IDP-CIS and then transferred to the GIS because of the compatibility of the D-Base systems. The R-Base IDMS cannot be used with the GIS, unless a conversion program is found. On the other hand, the IDMS has been appropriately designed to receive all project information and some not now currently processed in the former system, such as training records. It also appears somewhat more manageable and user friendly than the former system, although project staff have not complained of problems with the IDP-CIS.

3. Information stored on the two project computers is beginning to exhaust hard disk capacity. This is particularly true for the one holding the H/MIS. Increasing information storage capacity will be necessary in the near future.

Recommendations

1. Project management should decide which information system it wants to use. Because this system will probably be used in the expansion to the national plan, careful consideration should be given to selecting that system promising most efficient and user-friendly operation and data manipulation. If the IDMS is selected, the problem of incompatibility of R-Base and D-Base systems must be resolved. A conversion program should be found to transfer the data to the IDMS and from there to the GIS. If this is not possible without great time and cost or if data cannot be transferred without re-entering thousands of records because of file inconsistencies, it may be more efficient to remain with the previous system.
2. If the IDMS is selected, there are a number of final touches which need to be made to it by its designers in the VBC project. These are:
 - a. The Community Information Record needs to be modified to permit information to be added repeatedly as it becomes available from the various forms used in the field. Currently, one cannot enter some information if preceding information has not already been entered. The program should allow information entry at any point on the screen, much as information on country data can be inputted.

In the Community Information Record, the census update (demographic data) should be amended to include number of lactating mothers and the number of deceased individuals since the last census.

- b. The Epidemiological Evaluation (Rapid Survey) record does not need a place for leopard skin (LS), because this does not exist in Guatemala.

- c. The Ivermectin Reaction Tally record needs to be amended to account for four types of reactions, not three: light, moderate, intense, and serious. The field form also needs to be amended because it continues to be corrected manually to add the fourth class of reactions.
 - d. A means should be found to convert the information entered into the R-Base IDMS to D-Base for transfer to the GIS. Information from the IDP-CIS can be transferred quickly at present.
 - e. The various KAPS records (household, health worker) should provide a means to change questions as the need to test different types of knowledge becomes evident.
 - f. The various Quality Assurance records (household, adverse reactions, health education) also should provide the means to add or subtract questions as the need arises.
3. If the IDMS is selected for future use by the project, this decision should be carefully studied in collaboration with the Malaria Division of the MOH, where acceptance of the former system was somewhat slow and change to a new information system may cause consternation. Currently, SNEM appears to use their own LOTUS system as well as keeping relevant records for project use in the D-Base IDP-CIS.
 4. Each of the two computers used full-time by the project (MITAC-386 and EPSON-286) should receive an additional 100 Mb hard disk. This should be done quickly for the H/MIS computer, where information stored is increasing daily as field records are entered. Currently back-up files must be erased when files are removed in order to create needed space. Information processing completely consumes the RAM memory, so an additional three Mb of RAM memory capacity should be added as soon as possible.

Project Indicators

Background

While not specifically called for in the program description of the cooperative agreement, the use of defined indicators to assess project performance is an integral part of the project proposal and the Detailed Implementation Plan (March, 1992). It is clear from this plan that appropriate project implementation indicators were to be included in the H/MIS then under development. In the annex to the DIP, the following **preliminary indicators** were proposed, subject to further refinement:

- Number of health staff trained
- Number of village health workers trained
- Percent of targeted villages covered by the education campaign
- Number of ivermectin tablets distributed
- Number of tablets missing or in excess
- Number of supervision visits performed
- Number of monthly reports received from the field
- Various cost indicators (to be determined)
- Total number of persons treated
- Population coverage (percent of eligible people treated)
- Village coverage (percent of targeted villages treated)
- Number of adverse reactions recorded and treated
- Percent of adverse reactions recorded and treated

- Microfilarial density and prevalence and nodule prevalence in rapid epidemiological surveys
- Age-specific prevalence of nodules in school nodule surveys
- Age and sex standardized microfilarial density and prevalence and nodule rates in study (sentinel) communities
- Evaluation of transmission and morbidity indices for study communities

Of the various indicators listed above, most are now regularly reported in quarterly reports. Tablets missing or in excess are not being reported, but data are available. Percentage of adverse reactions recorded and treated seems unattainable, but estimates should be made and tracked. Data on the results of the rapid epidemiological surveys were reported in the first annual report and are available from the Department of Onchocerciasis of the MOH. Results of the surveys of schools and sentinel communities are reported as they occur. Ophthalmological surveys, which are not part of this list but which will be conducted every other year by the National Committee for the Blind and Deaf, should be reported when released. Notably missing from this list of potential indicators in quarterly reports, however, are the cost analyses.

Management Versus Performance Indicators

The majority of the indicators proposed and tracked above are management or process indicators. While it is essential to maintain records of various project activities, such as number of communities covered, people treated, tablets distributed or missing, health staff and village workers trained, supervision visits conducted, amount of capital and operational costs incurred, and findings of rapid epidemiological assessments, school surveys, and detailed epidemiological evaluation of sentinel communities, for the purpose of performance monitoring these accomplishments should be continually compared to end-of-project objectives. In this way, progress toward final objectives can be tracked through quarterly reports.

There are two types of indicators that the project H/MIS should monitor: management and performance. Key management indicators provide managers with information to assess whether activities are occurring as planned. Performance indicators make comparisons to the status of the end-of-project objectives. Essential management indicators and some performance indicators are already reported quarterly, but confusion between the two should be eliminated. While both may be reported for different purposes, they should be reported in different contexts. Furthermore, some management indicators, such as number of supervision visits performed, reports received from the field, and estimates of reactions not reported are probably appropriate internal information but of dubious value in monitoring performance toward objectives. They may, nevertheless, continue to be reported quarterly if so desired by management.

Management Indicators

Current quarterly reporting consists of the following:

Population Treated

- Number of people targeted for treatment during the quarter
- Number of people actually treated during the quarter
- Percent of targeted people actually treated
- Number of people receiving first treatment during the quarter
- Total targeted population during life of project
- Total number of people treated to date (one treatment)
- Number of people not treated because of absence
- Number of people not treated because of ineligibility
- Number of communities treated by district
- Number of people treated by dose in all communities

- Number of tablets dispensed by dose in all communities

Side Reactions

- Number of people reporting side reactions
- Number of people reporting serious side reactions
- Percent of people with side reactions compared to total treated
- Percent of treated people reporting side reactions
- Percent of communities reporting side reactions
- Number and percent of side reactions by degree (mild, moderate, severe)
- Number of people treated for side reactions by number of consultations
- Percent of side reactions by type
- Percent of side reactions by number in the same person

Training

- Number of training sessions planned during the quarter
- Number of training session conducted
- Number of personnel trained during the quarter by category of personnel
- Work location of trained personnel
- Training or retraining activities
- Training topics by category of personnel
- Evaluation of training effectiveness (test scores)

Health Education/Motivation

- **Number of communities targeted for health education during the quarter**
- **Number of communities receiving health education**
- **Messages delivered**
- **Method of message delivery**
- **Estimate of attendance**

Epidemiological Studies

- **Number of communities targeted for surveys during the quarter**
- **Number of communities surveyed during the quarter**
- **Number of persons examined during the quarter**
- **Number of individuals found positive**
- **Geographic areas covered by surveys**
- **Type of survey by community and area**
- **Number of persons found positive by type of appraisal (skin snip, blindness, other).**

Record-keeping (Reporting System)

- **Number of reports expected during the quarter by reporting level (health workers, supervisors, field coordinators, headquarters, program director, IEF/Bethesda)**
- **Number of reports received during the quarter**

Tracking these categories of information is useful for effective project management. Such information can continue to be included in quarterly reports with the possibly exception of the section on reports expected and received. Detail on side reactions should be as accurate as possible, particularly with regard to the number of side reactions not reported, which seems highly elusive. Nevertheless, estimates of side reactions and their treatment are required by IEF and the Mectizan Committee).

Elsewhere in the quarterly reports, essential performance indicators should be updated and a running account of progress toward end of project objectives clearly presented. In this way, weak points may be spotted and corrective actions taken in a timely fashion. Explanations of lags can, obviously, accompany such presentation of progress toward ultimate objectives.

Objective-level Performance Indicators

Project performance indicators should compare progress to date with end-of-project objectives to enable managers in Guatemala and in IEF/Bethesda to gauge the rhythm of project accomplishments and the degree of lead or lag time in scheduled progress by project component. These indicators should directly relate to the objectives found in the Detailed Implementation Plan. They can be expressed as percentages of project objective achievements. These are thus periodic checks on progress toward overall objectives and constitute the eventual basis for final evaluation.

Indicators should include:

1. Number of communities in Suchitepequez in onchocercosis endemic areas for which rapid epidemiological data have been gathered compared to the total number of such communities.
2. Number of treated communities rapidly resurveyed epidemiologically compared to the total number of treated communities.
3. Number of sentinel (study) communities fully resurveyed epidemiologically compared to those initially surveyed.

4. Number of project staff trained sufficiently to become supervisors of village health workers compared to the total number of planned supervisors.
5. Number of village health workers trained sufficiently to serve as distributors compared to the planned number of 60.
6. Number of treated communities sufficiently educated and motivated to assure sustained community demand for ivermectin compared to the total of treated communities.
7. Number of eligible people receiving ivermectin at least once during the project compared to the total eligible population.
8. Number of eligible people receiving ivermectin at least twice during the project compared to the total eligible population.
9. Number of eligible people receiving ivermectin at least three times or more during the project compared to the total eligible population.
10. Number of people treated solely by village health workers compared to total number of people treated.

Goal-level Performance Indicators

The project goal is "to establish an effective, safe, and locally sustainable model of the biannual distribution of ivermectin in endemic communities." In addition, the project proposes to "significantly reduce" the intensity of onchocercal infections and morbidity throughout Suchitepequez. The project does not take responsibility for interrupting transmission of the helminthic agent. In this sense, the project cannot at this time serve as a model for the elimination of onchocerciasis, but only for effective, safe, and sustainable control of the disease.

Performance indicators should be devised for the key concepts of the project goal: effective, safe, and locally sustainable delivery of ivermectin on the one hand, and significant reduction of the intensity of infection and population morbidity throughout Suchitepequez on the other. Because interruption of transmission is not a project objective, the

lack of entomological monitoring is not a problem for the evaluation of the Suchitepequez IDP, although it should be an essential condition for the national plan of elimination.

1. Effective biannual distribution of ivermectin implies that at least 85% of the eligible population is receiving treatment every six months with decreased total cost as voluntary distributors and increasingly experienced supervisors replace mobile teams.
2. Safe distribution of ivermectin implies that side reactions are appropriately treated and that, as the population receives further treatments, the incidence and severity of reactions will decrease.
3. Locally sustainable distribution refers to a stable proportion of the eligible population (85%) receiving biannual treatment through the efforts of voluntary distributors and their supervisors.
4. Significant reduction of the intensity of onchocercal infection and attendant population morbidity implies a measurable reduction in microfilarial count and prevalence, decreased side reactions to ivermectin for reusers, coupled with results of rapid ophthalmological assessments conducted by NCBD. Symptoms of morbidity, such as nodules, may serve as an additional indicator.
5. Throughout Suchitepequez province implies that all people in endemic communities are being treated within the biannual schedule established by the project.

Training of Project Staff and Voluntary Health Workers

Background

Training was both explicitly and implicitly targeted as crucial to project success in the original proposal and in the text of the cooperative agreement. The Detailed Implementation Plan offers considerably more detail regarding the nature of training activities during the life of project. Because institutionalization of project activities among public and private organizations in Guatemala is one of the ultimate goals of the ivermectin delivery effort, training must reach all levels of project personnel and encompass all necessary activities, from population outreach and

ivermectin delivery to management information processing and basic record-keeping.

The DIP called for three levels of training:

- a. Core staff to be trained in community education/motivation techniques; ivermectin distribution and monitoring/treatment of adverse reactions; record and bookkeeping; and techniques for further training of community-based distributors (voluntary health workers) and for eventual supervision of these volunteers in the years ahead. Other training sessions were advocated for core staff in supervising personnel engaged in the epidemiological and KAPS surveys. Core staff training was largely seen as training of trainers (TOT).
- b. Health center personnel to be trained in epidemiological and KAP survey techniques; community education/motivation; ivermectin distribution and monitoring/treatment of adverse reactions; record and bookkeeping; further training; and supervision of community-based workers.
- c. Community-based distributors to be trained in community education/motivation; ivermectin distribution; monitoring of adverse reactions, treatment of minor reactions and referral of acute reactions to health centers; and record and bookkeeping for a community-based cost recovery system. Some 60 such CBDs are scheduled to be trained and in place by this project's end.

Formal Training Activities to Date

Training in this project is crucial to the ability of SNEM and IEF/NCBD personnel to stimulate community acceptance and eventual sustained demand for ivermectin and to put in place a network of voluntary village distributors under experienced supervisors capable of sustaining supply for up to a decade.

Training has been of two types, formal and on-the-job, and has included both IEF/NCBD health workers and voluntary distributors. SNEM health workers, while not receiving formal training in distribution and health motivation within their own ministry, have participated in workshops with other project personnel.

1. Training of Project Staff

Formal training for project staff, including the participation of SNEM health workers, has consisted of the following:

a. Community Motivation and Health Education Workshop (March 2-6, 1992)

Ten newly hired IEF/NCBD health promoters (promotion and distribution) and 19 Department of Onchocerciasis (SNEM) promoters ("brigadistas"), nine for promotion and 10 for distribution (including two supervisors), received a one-week training course on community motivation and health education. Speakers were drawn from the three institutions involved—SNEM, UVG and NCBD. The lectures focused on the nature of onchocerciasis, methodology for community participation, motivation, sociodrama of the household interviews, importance of community participation, human relations, knowledge, attitudes, and practices of the population with respect to onchocerciasis, personal experiences of promoters in their community work, and evaluation of results of workshop on participants. According to the first quarterly report, only the 10 newly hired personnel from NCBD were evaluated and results were encouraging but wide-ranging. It appeared that all but a few had grasped the basics of the lectures, but practical experience would still be necessary.

b. Workshop on Community Motivation/Health Education and on Ivermectin Delivery/Adverse Reaction Management (June 6-8, 1992)

This involved the same participants as in the March workshop--10 NCBD promoters and 19 (including two supervisors) SNEM "brigadistas", the latter divided into two teams, one of nine for promotion and one of 10 for distribution. This three-day training

and evaluation workshop focused on community motivation and health education on the one hand and ivermectin delivery and adverse reaction treatment management on the other.

Speakers were from SNEM and UVG. Topics covered by trainees organized into groups centered on the eight phases of the participatory methodology: community penetration and reconnaissance; promotion; sensitization; partial evaluation; consciousness raising; organization; evaluation; and coordination. Final talks were given on ivermectin and on side effects to the drug. A guide was drawn up to assist promoters in their visits to households. A written evaluation was conducted after the workshop, which demonstrated little difference between test scores of the new NCBD promoters and the seasoned SNEM brigadistas.

c. Progress Evaluation Meeting (September 17, 1992)

A meeting was held on September 17, 1992, involving 63 staff participating in the IDP/Suchitepequez project from the Ministry of Health (43), the UVG (10), and the NCBD (10). The objective of the meeting was to review program objectives and activities. Discussions centered on the upcoming National Plan, future activities of the IDP/Suchitepequez, epidemiological activities in the Department of Huehuetenango, technical review of continuing education of health workers in onchocerciasis, and technical review of continuing education of chemotherapy and computer personnel. At this time, an examination was given to all personnel regardless of function in the project to determine general levels of knowledge regarding all important aspects of the IDP. This evaluation of training impact again revealed little difference in knowledge between the new NCBD health workers and the more experienced SNEM employees. This reflects favorably on the quality of training of the NCBD promoters, while revealing retraining needs within the Ministry of Health.

d. Other Training (January 15 - September, 30 1992)

Other, less formal training, was given to three Malaria Division (MOH), two UVG computer specialists, the 13 MOH and two

UVG members of the rapid epidemiological assessment team prior to their activities to identify onchocerciasis endemic communities in Suchitepequez.

2. Formal Training of Project Staff in 1993

There do not appear to have been any formal training or retraining courses, workshops, or meetings since the September 17 refresher course and training impact evaluation. Training of staff on the job is considered sufficient to maintain training lessons learned, although evaluations of knowledge and performance are conducted only for the NCBD employees (10) by the field coordinator from IEF/NCBD. Results of these monthly (sometimes only periodic) evaluations have not been made available to the H/MIS system, although some data have been published in quarterly reports. It is not clear whether knowledge and performance levels of the NCBD and SNEM employees remain sufficient and similar. It is important to retest and reevaluate all of them in like fashion before they become supervisors under the National Plan.

3. Training of Community-based Distributors

Training of CBDs—also known as community health workers (promotores voluntarios)—began during the second treatment campaign, January - July, 1993. Some 60 CBDs were selected early in the campaign by the field coordinator and the SNEM social worker with the assistance of a brief questionnaire. Twenty nine of them are being given on-the-job training by two-person teams composed of the 10 NCBD health promoters and two from SNEM (four NCBD teams and two mixed SNEM/NCBD teams). These teams and their CBDs are under the supervision of the SNEM social worker (Velasquez). Motivation and distribution are being carried out at the same time during this campaign. The seven SNEM two-person "brigades" under the supervision of the Distribution Supervisor (Osorio) do not train CBDs. They are concentrating their efforts only on very small communities (less than 250 residents) and the very large (over 1,000 inhabitants). Under the IDP/Suchitepequez, it appears that no attempt will be made to train CBDs in the SNEM communities, although such a need is particularly manifest in the larger communities where social networks can and should be mobilized to assist in distribution.

The strategy of activities communicated to IEF headquarters from the IDP/Suchitepequez project manager indicated that after selection, a three-day training workshop would be held for CBDs prior to on-the-job training with experienced health workers. It appears that four to five groups of CBDs have received training in field areas prior to participating in motivation/distribution activities. A program syllabus exists for their training and a small manual has been developed entitled, "Promotor Voluntario 1993", authored by the SNEM social worker and the NCBD field coordinator (R. Zea-Flores).

The three-page training syllabus is a guide for trainers of the CBDs, covering objectives of the training, steps to follow, the nature of onchocerciasis and its treatment, discussion points for films and slides, self-motivation and external motivation techniques and materials needed, activities of the community-based workers explained step-by-step and in detail, and forms to complete to account for medicines and activities. The syllabus appears to cover the necessary topics, but the degree of internalization of its lessons by CBDs could not be determined during the evaluation. Volunteers are being evaluated periodically (in principle, monthly) by the field coordinator, but answers are only yes/no and results are not clear. Before the CBDs are allowed to function alone during the next distribution campaign, they must demonstrate sufficient knowledge and interpersonal skills to carry out their distribution and reaction monitoring functions for the years ahead.

The 17-page CBD manual given to the voluntary community distributors after their initial training is a nice first effort, but may need simplification for the educational level of the CBDs. This is particularly true for the section on medicines for treating side reactions to ivermectin. The illustrations are of good quality, but the discussion seems too technical throughout. A rewriting and greater elaboration of materials in the training manual is probably necessary before the third campaign. It is also important to distribute this manual to the SNEM promoters to assist in standardizing the motivation messages and distribution techniques. The manual also contains the names of all 60 CBDs and their communities, although only 29 have yet begun to function during the second distribution campaign.

Conclusions and Recommendations

- 1. The formal initial training and retraining of project staff has largely centered on the new NCBD promoters (10). While an attempt has been made to assure common knowledge of both SNEM and NCBD health workers and standardize motivation/education messages by all types of distributors (SNEM, NCBD, CBDs), it appears that SNEM and NCBD are functioning largely independently of each other. It is true that two teams are mixed and that the supervisor of the NCBD group is the SNEM social worker. Nevertheless, greater efforts should be made to integrate activities to assure a common message and approach to community leaders and household heads. This is particularly true of the motivation and education campaign which has become reduced to a minimum. All teams are now combined to do both motivation and distribution activities in one process. The NCBD workers with their CBDs apparently continue to do some community preparation, while SNEM seems to be employing the traditional vertical mobilization effort it has used in past onchocerciasis (nodulectomy) and malaria programs.**
- 2. Training of CBDs needs to be made clearer. Refresher training should rely on knowledge evaluation and observed behavioral inadequacies in distributing ivermectin. During the current campaign, CBDs appear to be only observing the health workers deliver the message and distribute medicine. They should be getting the chance to function alone during this campaign, if only for one house out of every three or four. The success of the IDP National Plan will depend in large measure on the training of these CBDs. An acceleration of present activities targeting their education and practical competence is required as soon as possible. In addition, the CBD manual requires simplification and greater breadth of subjects covered. All CBDs now functioning should be brought to headquarters for an extensive evaluation and refresher course with new CBDs prior to the beginning of the next distribution campaign.**

Health Education

The sixth objective of the Detailed Implementation Plan for the IDP in the Suchitepequez Department of Guatemala is:

To educate all affected communities to increase the level of public awareness about the disease and the distribution program and to achieve high acceptance of the treatment.

The objective of the IDP/Suchitepequez Health Education component is to provide target communities with the knowledge necessary to understand the nature and cause of onchocerciasis and participate in the ivermectin treatment program. Health education should motivate people to follow the treatment procedures.

Broadly defined four curriculum categories were proposed for onchocerciasis health education (OHE) in the project design: disease, treatment, treatment priority and treatment seeking behavior. Under these categories the following should be addressed:

Disease: The community member should have a simple but accurate concept of onchocerciasis, including its symptoms, cause, development, and deleterious effects.

Treatment: People should understand why they are taking ivermectin, how the drug arrests the disease, as well as potential adverse reactions and their treatment.

Treatment Priority: Participants need to understand the importance of long-term compliance and resulting benefits.

Treatment Seeking Behaviors: Participants must fully understand all aspects of the treatment protocol—diagnosis, treatment, and community compliance, including encouragement of other community members.

Health education poses the greatest challenge to successful ivermectin delivery programs. Changing human behavior over one to two decades is the goal of the IDP and it will be difficult to achieve. Therefore, health education must be well designed, continuously adjusted, thorough, and understandable.

Ideally, the health education campaign and curriculum should be based on a qualitative approach using focus group research to understand the community's knowledge, attitudes and practices regarding onchocerciasis. Alternatively, a more quantitative, formal KAP survey could be conducted. Both would reveal the communities present understanding of the disease and thus direct the education/motivation messages. Unfortunately, it appears that funding and time constraints precluded the implementation of a formal quantitative KAP survey in this project. The health education strategy was thus based on the personal experience of the IDP implementors with the people living in this area of Guatemala.

Present activities in health education/motivation consist of the following:

Motivation Events

Prior to ivermectin distribution by the IDP team, a flyer is posted in the community announcing the upcoming motivation/education/distribution events. On Monday afternoon/evening of the next week, a presentation is made to the community describing the program and events. This presentation is made by the supervising social worker, health workers, and community distributors, if available. The presentation consists of a 20-30 minute motivating talk/slide show in a public place, often the village church or community center. The slide show, consisting of approximately 25 slides, includes topics on the cause of onchocerciasis, its manifestations, and treatment. Using a video recorder, Spanish-speaking movies (usually Mexican "ranchera" films) are shown to attract people to the motivation event. This method of community approach and education is employed, however, only by the NCBD health promoters.

It was found that many community members are not literate, as low as five percent literacy in some areas. They speak primarily indigenous (Mayan) languages and have limited understanding of Spanish. For a successful health education message, it needs to be established immediately what the language-use patterns of the community are. The presentation must be appropriate for the specific community. Although community members seem to nod in understanding of the messages,

actual understanding may be minimal. An evaluation, formal or otherwise, needs to be done to determine what people are actually understanding and retaining.

It was also found that the health education messages, especially by the SNEM workers, were too complicated, inadequate, and not really understood by the community. Messages need to be very simple, describe why people are taking ivermectin, potential adverse reactions to the drug, and where people can get treatment. As a teaching and reminder tool for CBDs and health workers, a simple flyer, preferably with few words, could be used to describe the disease and treatment. Health education theory has found that colorful, attractive flyers best capture audience attention. In the absence of adequate funding, however, a simple black and white flyer that can be easily adapted with time and experience also works very well. These can be photocopied relatively inexpensively and then left with each household. Such educational tools serve to increase disease awareness among community members and act as a guide for those delivering the motivation messages.

Although the initial motivation meeting is excellent in theory, practical improvements would greatly increase its effectiveness. The presentations use somewhat complicated slides of actual worms, nodulectomies, diagrams, and technical concepts adapted to formal education. Other IDP experience has shown that such "medical and conceptualized" presentations are not as effective as simple drawings and photographs of everyday people. Community members were found to understand pictures of people like themselves better as compared to simply viewing medical procedures. The concept of multicolored diagrams with arrows and boxes assumes an experience or sophistication not normally present in these communities. Additionally, expensive, sensitive video recorders and slide projectors may not be very durable on the rough roads of the Guatemalan highlands.

Although simple photographs have been found to be most influential in place of expensive equipment, other alternatives are available. Disease progress can be explained with posters, flip charts, and photographs. Posters can be left with the community. Flip charts can contain the written message on the reverse side to remind CBDs of the most pertinent points.

Interactive games rather than lectures have been found to be highly successful. Many community members are not accustomed to classroom type lectures. Interactive games may work especially well with children. Several such games have been designed by other IDP programs. They include a card game with enlarged playing cards explaining the disease and a large "Monopoly"-type floor game.

Because children are major communicators in a community, a school curriculum including onchocerciasis education could greatly increase community awareness. Eventually one could introduce simple messages into the school curriculum. This would involve designing a package for the school teacher.

Distribution/Education Activities

Following the motivation lecture, ivermectin is distributed house-to-house and from a central location later in the week. During the house-to-house distribution, a brief explanation of the disease and treatment is given. It usually lasts less than five minutes. This is done primarily by the supervising social worker and the health worker, with the "in-training" community-based worker watching. Recipients often inquire about other medical problems the family members may be experiencing at the time. As much help as is feasible is provided by the supervisor. During the central distribution, community members, primarily women and children, arrive at the location and receive their ivermectin dose. A very brief explanation of why they are taking this drug follows, but this explanation is often skipped with children and some adults. Recipients seem to nod in acknowledgment of the explanations, but understanding may actually be very limited.

Because the community-based worker will be distributing ivermectin in the next round of distribution (August-December 1993), he or she (11 of the 60 selected CBDs are women) should be more active in the present distribution round. It was suggested that he/she should begin now to deliver the ivermectin as well as the health message under the supervision of the health worker and/or social worker.

Education for CBWs, Health Workers, and Supervisors

This consists of training sessions and two guides, one for CBDs and one for health workers. The HW guide is fairly technical, describing the

disease, drug, adverse reactions and treatment. The guide for the CBDs is an explanation of what their role is, how they can describe the disease, and the treatment. Both were designed by the project field supervisor.

Another guide designed by the Ministry of Health in 1979 is also available, but this is largely outdated. It needs to be adapted to the present situation.

Issues and Conclusions

Overall, health education has been neglected as a project priority. Reasons for this include:

- 1) Limited funding to develop a thorough health education curriculum;
- 2) Limited time by project implementors to concentrate on this component of the project;
- 3) Limited health education experience; and
- 4) Lack of communication with personnel from other ivermectin delivery programs

Despite these constraints, a health education program was developed as described above. The field supervisor has devoted as much time as possible to this aspect of the program, but cannot do all things at once. This midpoint of project implementation is a good time to re-evaluate what has been achieved and learned from the health education component thus far. A more thorough strategy may then be developed for the remaining half of the project and for inclusion in the National Plan for the Elimination of Onchocerciasis in Guatemala. Lessons learned from the Yepocapa project must also be compared to the experience in Suchitepequez.

The long term success of the IDP in Suchitepequez, and eventually in all of Guatemala, requires a more complete and thorough health education program that results in:

- 1) Better understanding by community members of the disease, effective treatment, and treatment-seeking behaviors.

- 2) An improved and more consistent explanation of the IDP objectives by health workers and eventually community-based distributors.
- 3) Continued support from finca owners and community leaders.
- 4) Better understanding by health promoters of what motivates community members to cooperate in ivermectin distribution programs.

Recommendation

The present health education strategy in Suchitepequez needs to be reviewed in depth and generally redesigned to be given more emphasis before the national plan is implemented. More communication between other groups working on onchocerciasis in Guatemala is essential. In-country health education specialists, perhaps accompanied by an expatriate technical assistant, should be consulted in reformulating the health education activities.

A meeting between key managers of IEF/NCBD/UVG (Project Manager, Field Coordinator, and Chimaltenango Project Manager) and SNEM (Field Coordinator, Field Social Worker, Field Supervisor), with perhaps the technical assistance of a professional health education specialist, can re-establish health education objectives and priorities leading to a clear-cut communication plan. This will then be available for testing prior to its more general use in the third and fourth rounds of distribution.

Distribution of Ivermectin and Monitoring of Adverse Reactions

The objective of this component of the IDP/Suchitepequez is to deliver the appropriate dose of ivermectin on a bi-annual basis to at least 85% of the eligible population of all communities endemic for onchocerciasis, including those located within a five km radius of endemic communities.

The initial operational strategy to deliver the ivermectin dose included distribution only by brigades of two persons each; three from SNEM and two from the NCBD. Four rounds of distribution were programmed for the period 1993-1994. The first two rounds of distribution were planned

to be completed by mobile teams only with rounds three and four making the transition to community-based voluntary distribution through community health workers.

This delivery strategy, estimated to be the least costly and most effective for the project, was aimed primarily at smaller communities (usually under 1,000 inhabitants). The distribution teams followed the motivation/health education teams (two from SNEM and three from NCBD) by about two weeks. Health education/motivation and distribution of ivermectin were, thus, not performed in an integrated, simultaneous way. In addition, this method of mobile distribution was planned to be carried out from a central location in each community. House-to-house delivery was not routinely done.

Eligible ivermectin recipients were screened according to their weight, health, and pregnancy status. Exclusions recommended by the Mectizan Expert Committee included pregnant women, women who have given birth in the past week, the very ill, and children weighing less than 15 kg.

The strategies for treatment of communities varied depending on the size of the local population, whether the communities were smaller or greater than 1,000 inhabitants. In addition, four communities smaller than 1,000 inhabitants were selected as sentinel communities, where a more in-depth approach and time was taken for epidemiological survey, census, motivation, and treatment activities.

The results of overall treatment coverage varied greatly according to the size of the community involved, as can be seen in the following table. A total of 15,613 (79.5%) people were treated in 92 communities from May through September, 1992. The percentage of treated people in 83 communities smaller than 1,000 inhabitants was 70.9%, where the distribution teams followed the motivation/health teams by two weeks. The percentage of eligible people treated increased to 87.0% (sentinel communities) and 91% (communities larger than 1,000 inhabitants) when treatment by the distribution team was conducted simultaneously with the motivation/health education team and all health education and distribution promoters were integrated. Distribution of ivermectin from both a central location and through house-to-house delivery was done in some communities.

**Distribution of Ivermectin in 92 Communities of
Suchitepequez Department, Districts of Chicacao, San
Miguel Panam and Patulul, May to September, 1992**

Communities	No. People in Areas	No. People Eligible	Eligible Treated (%)
A. All 92 communities*	45,189	19,639	15,613 (79.5%)
B. 83 communities <1,000 (excluding sentinel communities)**	14,445	11,124	7,892 (70.9%)
C. 4 communities: <1,000, sentinel communities***	1,143	839	737 (87.8%)
D. 5 communities: >1,000****	29,601	7,676	6,984 (91.0%)

* No census was done in communities >1,000 people.

** Distribution teams followed the motivation/health education teams by two weeks.

*** Distribution teams followed the motivation/health education teams by two weeks. Distribution at central location plus house-to-house delivery.

**** Treatment by distribution team was conducted simultaneously with motivation/health education teams. Health promoters were incorporated. No house-to-house delivery.

In addition, from October to December, 1992 a total of 15,220 (90.9%) out of 16,747 eligible people were treated in 51 communities. Treatment by the distribution team was conducted simultaneously with the motivation/health education team. At the end of 1992, 148 out of 149 (99.3%) communities scheduled for treatment were completed as can be seen in the next table.

Districts	Communities	Treated	% Treated
Chicacao	91	91	100.0
San Miguel Panam	11	11	100.0
Patulul	27	27	100.0
Santa Barbara	16	16	100.0
San Juan Bautista	4	3	75.0
Total	149	148	99.3

The population targeted for treatment in the 149 communities number some 91,169. This figure is based on previous and updated censuses of communities smaller than 1,000 or on the population that attended treatment in communities larger than 1,000 inhabitants. No new census was carried out in these communities and only approximations of the total population were thus obtained. Some 55,809 persons remain unaccounted for and for which the criteria of eligibility for treatment could not be applied.

During the first round of treatment from May through December, 1992 a total of 30,833 (84.1%) persons out of 36,665 eligible were treated. The total population accounted for and reviewed for eligibility was 44,549.

A total of 5,833 (15.9%) out of 36,665 persons eligible for treatment were not treated; of these 3,427 (11.1%) refused treatment, while the remaining 2,406 had either left the community permanently ("absentees") or still live in the community but were temporarily absent and may be treated at another opportunity ("pending").

A total of 7,884 (17.7%) persons were not eligible for treatment. They included:

children < 15 kg body weight	11.5%
pregnant women	1.4%
women breast-feeding < 1 week after delivery	0.1%
sick persons	4.6%

Through December, 1992 a total of 30,833 persons had received 33,610.5 tablets of ivermectin with an average dose of 1.1 tablets per person.

Adverse Reactions

Through December, 1992 a total of 2,228 (7.2%) out of 30,833 persons treated presented side reactions. The total percentage of persons treated presenting side reactions, however, varied greatly by community. There were no side reactions in 30 communities (32.6%), but from 0.34% to 100% of the people in the remaining 62 communities presented side reactions to the ivermectin treatment.

A total of 3,367 distinct side reactions were observed in the 2,228 treated people, but some 786 (8.5%) were not recorded. Of those recorded, 2,356 (70.0%) were classified as mild, 717 (21.3%) were moderate, and 5 (0.2%) were recorded as severe reactions. Those reactions not recorded were due to the lack of a special form for registering adverse reactions at the beginning of the treatment period. Such a form was subsequently provided.

A total of 1,924 (86.4%) people sought assistance for side reactions only once, 265 (11.9%) consulted twice, and 39 (1.8%) consulted three times for treatment. Four persons sought assistance four times.

The most common side reactions (symptoms) were intense itching (38.9%), edema (38.9%) and pain (14.9%). Less frequently observed were fever at $< 39^{\circ}\text{C}$ (3.7%), diarrhea (2.4%), vomiting (0.9%) and adenopathy (0.01%). Eight persons complained of slight dizziness.

Side reactions were normally of one symptom (80.5%), but a combination of two (18.3%) or three (1.2%) reactions in the same persons also occasionally occurred.

These adverse reactions to ivermectin ingestion were detected by household visits and by request of the affected person. Treatment of adverse reactions was properly managed.

A direct relationship was observed in communities with high positivity rates for onchocerciasis and the people presenting side reactions. In communities under 1,000 inhabitants, an overall 11.4% of the people

treated presented side reactions. This figure rose in sentinel communities to 42.9% and fell in large-sized communities over 1,000 inhabitants to 3.2%.

Evaluation of the First Round

Even though the epidemiological survey results had been satisfactory, the method of delivering ivermectin presented some problems:

- 1) It took more time than expected to work in communities over 1,000 inhabitants. This was the first time very large communities had been treated by the Department of Onchocerciasis.
- 2) The health education/motivation campaign failed to deliver the proper message to the communities. This is why a significant number of eligible persons refused to take the drug. A lack of coordination, in fact, between the distribution and health education/motivation teams was found by project management during the evaluation process. Both groups, according to the methodology established, were to follow a schedule of working in the target communities two weeks apart; the health education/motivation teams were to be followed by the distribution teams two weeks later. This methodology was often not carried out.

A decision was made by project management to explore a methodology which allows the health education/motivation and distribution teams to work simultaneously in each target community to improve coordination and obtain better results.

According to the reorganization carried out in January, 1993, the health education/motivation and distribution of ivermectin is now being accomplished in the second round of treatment by seven teams of two members each from SNEM, two mixed teams of SNEM and NCDB promoters, and four teams of two members each from NCBD. The SNEM teams are working in communities smaller than 250 inhabitants and larger than 1,000 inhabitants (114 communities in all). The teams from NCBD are working in communities larger than 250 inhabitants but smaller than 1,000 people (40 communities) and in the four sentinel communities.

Scheduling of Visits

Motivation and distribution activities are occurring as follows:

1) **Communities smaller than 250 inhabitants (SNEM teams):**

Friday: One member of the team arrives and informs the community leaders about the activities that will take place the following week.

Monday: Both team members visit with community leaders and the general population to reinforce the motivation message. They update the census by house-to-house visits and provide ivermectin treatment simultaneously (a small card is left for absentees, directing them to seek treatment in a specified central location).

Tuesday through Wednesday morning: Both team members remain in the community to provide ivermectin treatment to the absentees and for monitoring and treating adverse reactions.

Wednesday afternoon through Thursday: One team member performs house-to-house visits for treatment and monitoring adverse reactions. The other team member remains at the central location to provide the required assistance.

Friday: One team member remains in the community at the central location. The other team member moves on to the next community or communities to begin the motivation activity.

One person of the community—often a finca administrator—is trained to handle adverse reactions on weekends as a "security measure" but few or no side reactions are expected three to four days after treatment.

2) **Communities larger than 1,000 inhabitants (SNEM teams):**

Friday: One member of the team visits community leaders (mayor, school teachers, health personnel, priest, police officer) and explains the objective of the activity to be performed during the following week.

Monday through Friday: One team member delivers the motivation message and ivermectin in house-to-house visits and informs people about the central location established for treating the absentees. Motivation messages for treatment are also delivered by using a vehicle equipped with megaphones.

Tuesday through Friday: One team member remains at the central location to provide the ivermectin treatment and monitor and treat side reactions. The cooperation of health personnel stationed in the community is obtained for treating the adverse reactions.

- 3) Communities between 250 and 1,000 inhabitants and sentinel communities (NCBD teams):

The methodology for distribution of ivermectin described above for the SNEM teams is also being followed by the NCBD teams. Its exact nature will depend on the size of the community, but it will generally resemble SNEM activities in the smallest communities. However, the NCBD teams emphasize the health education/motivation activities by giving a slide show and video tapes to inform the community about the disease, the parasite, the vector, and the drug. Some 29 Community Health Workers (CBWs or CBDs) are currently being trained by this group. They expect to have 60 trained CHWs ready for the third round of treatment (August-December, 1993).

Because both teams from SNEM and UVG/NCBD are using a slightly different methodology to deliver the motivation message and ivermectin, it is recommended that serious attention be paid to comparing and evaluating their respective results. Timely evaluation of these methodological approaches is very important, because the infrastructure, strategies and methodologies developed by the IDP/Suchitepequez are expected to provide an effective model upon which will be built the wider National Plan for the Elimination of Onchocerciasis in Guatemala, scheduled to begin in late 1993. Comparison of this model with activities in the neighboring Yepocapa project should also begin as soon as possible.

Cost Effectiveness and Recovery

A cost analysis of the current distribution round was carried out by the evaluation team. Costs were calculated for the first quarter of 1993 by combining total NCBD/UVG operating budget for the quarter, including per diems for SNEM personnel (\$27,043); salaries for the SNEM health workers, supervisors, and field coordinator (\$8,577); and depreciation (straight-line over five years) of the six project motorcycles (\$475). This total cost of \$36,095 was divided by the number of persons receiving ivermectin during the same period (11,360) to yield a **cost per treatment of \$3.18**. This cost does not include a portion of the salaries of the IEF/Guatemala director (Hernandez-Polanco) or of the IEF/Bethesda coordinator (Witte), nor does it include Onchocerciasis Department supplies, record-keeping salary costs, or vehicle depreciation. A depreciating Guatemalan currency (quetzal) will, however, stretch the dollar contributions further in the future than the Q5.41 = \$1.00 used in these calculations.

It is important to mention that no cost recovery schemes have yet been employed nor even explored in the IDP/Suchitepequez. It is advisable that sustainable financial alternatives be explored under this project for potential wider application in the National Plan. A detailed cost analysis of this project should be made soon to assist in reducing costs. At the same time, an economic analysis of the reduction of onchocerciasis morbidity can be carried out. Finally, an evaluation of the current health education/motivation component should be made and cost-effective alternative strategies explored. The sustainability of ivermectin delivery to the endemic communities will ultimately depend on the creation of a real demand for the medicine. This demand will be based on its perceived benefits and lack of adverse side effects.

Recommendations

- (1) Evaluate the new ivermectin distribution methodology adopted for the second round of treatment, which employs the simultaneous activity of health promoters (and CBDs) in both health education/motivation and drug distribution to the community. Extend this evaluation process to measure the differential effectiveness of delivering ivermectin through the slightly different methodologies of the SNEM and the NCBD teams. Determine

whether these methods are best suited to the environments in which they are being currently employed.

- (2) Review plans to schedule the remaining rounds of ivermectin treatment from August through December, 1993 (third round of treatment) and from February through June, 1994 (fourth round of treatment). Mesoendemic and hyperendemic communities and the four sentinel communities should be given priority for treatment and impact evaluation through an epidemiological resurvey. What should be sought is significant and persistent reduction in both prevalence and intensity of skin infection by microfilaria.

Sustainable Model for the National Distribution Plan

The eighth objective of the Detailed Implementation Plan is:

To develop a distribution plan that can be extended to the whole nation and can be sustained by local structures for as long as it is required to interrupt transmission (at least 10-15 years).

This statement confirms specific statements in the cooperative agreement between IEF and A.I.D. that the IDP/Suchitepequez should:

- (1) *Evaluate the safety and cost-effectiveness of various methods of ivermectin distribution including the mobile team approach and the community-based distributor approach.*
- (2) *Promote communication and collaboration between those agencies in Guatemala...involved in research and control of onchocerciasis. An ultimate goal is to encourage these agencies...to devise programs and a national strategy that will permit ivermectin to be mass distributed in all endemic communities in the country in a concerted effort to eliminate the disease.*

The end purpose of the IDP in Suchitepequez is to assess the feasibility of using a U.S.-based Private Voluntary Organization (PVO) to strengthen the national health system capacity to develop a cost-effective and sustainable activity for delivering ivermectin. In order to attain this objective, the IDP was designed to develop a methodology based on a well-planned epidemiological study of the infection, establishment of a modern and effective information system, and

introduction of an affordable community-based mechanism for distributing the medicine.

The midterm evaluation team found the following favorable points with respect to the question of the usefulness of IDP/Suchitepequez as a model for the National Plan:

- (1) A methodology for accomplishing epidemiological studies employing a Rapid Epidemiological Assessment is being tested through adequately coordinated efforts of the Department of Onchocerciasis of the Ministry of Health, the Universidad del Valle, the National Committee for the Blind and Deaf, and the International Eye Foundation.
- (2) The establishment of a functioning H/MIS at the headquarters of the project in the UVG and SNEM, which currently holds relevant and fairly complete information from the major project components--except health education, training, and KAPS--and which is updated continuously and conscientiously.
- (3) The development of an effective treatment coverage system in the working area. A total of 30,833 persons out of 36,665 (84.1%) eligible have been treated. Through December, 1992, a total of 33,610.5 tablets of ivermectin were distributed with an average dose of 1.1 tablets per person.
- (4) The development of an effective methodology to treat adverse reactions to ivermectin. A total of 2,228 persons treated (7.2%) presented side reactions, which were classified (some missing) as mild (70%), moderate (21%), or severe (0.2%).

- (5) The methodology for delivering ivermectin has become more effective by improving the coordination between the distribution and health education/motivation teams which began to work simultaneously in each target community during the second round of distribution, beginning in January, 1993. According to the initial methodology proposed, both groups worked separately during the first round of treatment and coordination was at times a serious problem.
- (6) Establishment of a program within the health care structure responsible for guiding initial operational research, devising effective methods of drug delivery, training personnel, beginning health education/motivation, and establishing an information and accounting system, all of which will eventually be assumed by the Ministry of Health. There is every reason to believe that SNEM personnel have mastered the knowledge to replicate these systems in future campaigns at the national level.
- (7) Development of a monitoring system capable of tracking (with some further refinement) key indicators of program performance and financial management for use in producing appropriate managerial and evaluation reports on a periodic basis.

One of the major products of the IDP/Suchitepequez has been the experience of cooperation necessary to prepare a detailed—and credible—national plan to eliminate onchocerciasis in Guatemala. The Department of Onchocerciasis, Universidad del Valle, IEF, and NCBD collaborated in the preparation of the "National Plan for the Elimination of Onchocerciasis in Guatemala," as part of a bi-national effort to eradicate this disease in both Guatemala and Mexico. The plan has been developed as part of an even larger hemispheric elimination plan for all six of the endemic countries in Latin America by the year 2011. There are, in fact, many levels of cooperation necessary if the overall plan is to succeed. In Guatemala, at least, the National Plan quite clearly has the political and financial support of the highest level of the Ministry of Health.

The National Plan will be executed through the continued collaborative efforts of the public and nongovernmental organizations implementing the current IDPs in Guatemala. It expects to start its

activities in late 1993, and a donation of US\$100,000 has already been obtained from the Onchocerciasis Elimination Program in the Americas (OEPA) to support initial activities. Further economic support is expected for 1994-95.

According to this midterm evaluation for the IDP/Suchitepequez, most of the objectives are being achieved in timely manner, except for the health education/motivation activities, development of training materials and manuals, and perhaps—although it is too early to tell for sure—the effective training and operationalization of the CBD network of distributors. Therefore, these components should be examined carefully and improved upon as necessary as they are incorporated into the National Plan. The use of a full-time health education specialist on the National Plan staff is advisable in addition to the presence of Ms. Karin Casasola, who will continue to have field operations duties to perform.

Another important lesson learned during the development of this IDP was the need to establish adequate coordination mechanisms between the key players involved in the project to accomplish proposed objectives. Flowing directly from this experience, it is also likely that a problem of roles and relationships will emerge if a proper coordination mechanism is not identified for implementing the National Plan. To resolve this potential problem, it is recommended that a coordination mechanism be established at the highest ministerial level to assure that all institutions participate with equal responsibility.

In the proposed National Plan organigram (cf. organigram), there are two advisory groups. One of these, consisting of the IEF/G, NCBD, and UVG, will collaborate with the Malaria Division of the Ministry of Health. The other, called the "Technical Advisory Board," will provide support directly to the Department of Onchocerciasis.

It is recommended by this evaluation team that the best coordination mechanism for the National Plan would be the establishment of a National Steering Committee for the Onchocerciasis Elimination Plan directly attached to the Minister of Health. It should be presided over by the Vice Minister of Health as direct delegate of the Minister. Functions of this committee will be the analysis and resolution of necessary administrative, technical, and financial issues to facilitate the carrying

out of each annual work plan elaborated by the Technical Advisory Board, National Plan Administrator, and Department of Onchocerciasis.

The composition of this Steering Committee should be as follows: the Vice Minister of Health (coordinator), Director General of the Health Services for the MOH, and one member (with alternate) from the implementing institutions—Department of Onchocerciasis of the Malaria Division; NCBD; Universidad del Valle; IEF/Guatemala; and the Onchocerciasis Elimination Program in the Americas (OEPA). The committee should meet once (or twice) a month in the offices of the Ministry of Health.

This type of coordination will greatly assist the Ministry of Health to be fully informed and participate actively in the solution of administrative, technical, and financial problems affecting the execution of the National Plan. At the same time, it will provide participating institutions the political support necessary for developing the plan's various activities.

Recommendation

Make the necessary provisions for transferring the IDP infrastructure, information, methodologies, and human and material resources developed under the IDP/Suchitepequez to the National Plan for the Elimination of Onchocerciasis in Guatemala. Coordination with lessons learned in Yepocapa should be a pre-requisite for continuation.

Accomplishments To Date

1. Based on the Rapid Epidemiological Assessment, 149 communities were identified in the onchocerciasis transmission zone in Suchitepequez Province. The population of 99 (66%) of these communities were found to be infected by calculating their microfilarial and/or nodule prevalency rates. A total of 148 (99%) communities at risk were treated with ivermectin.
2. Four sentinel communities were selected and parasitological, ophthalmologic, and epidemiologic evaluations were performed on all community members before treatment with ivermectin.

3. A computer database on potentially endemic communities has been established and is used with a Geographical Information System (GIS). The GIS permits viewing the map location and key data of all project communities classified by degree of endemicity.
4. A computerized information system (H/MIS) developed under the project currently holds information on the major project activities and is updated continuously. Information forms yielding data for input have been developed to aid in targeting program resources, epidemiological evaluations, ivermectin distribution activities, and occurrence of ivermectin side effects. The H/MIS effectively supports decision-making at project headquarters at the Universidad del Valle.
5. A total of 46 staff members were trained during the early stages of the project: 15 in onchocerciasis diagnosis using the REA methodology; five in data management and the computerized information system; and 26 in health education/motivation and distribution of ivermectin.
6. A total of 60 persons to be trained as community health workers (CHWs) have been selected, of whom 29 are now in training during the second round of treatment.
7. During the first round of treatment from May through December 1992, a total of 30,833 persons (84.1%) out of 36,665 eligible were treated with ivermectin. They received a total of 33,610.5 tablets of ivermectin, an average of 1.1 tablets per person.
8. A total of 7,884 (17.8%) persons were successfully screened as not eligible for treatment, distributed as follows:

children less than 15 kg	11.5%
sick persons	4.6%
pregnant women	1.4%
women breast feeding	0.1%
others	0.2%

9. A total of 2,228 persons presenting side reactions (7.2% of those taking ivermectin) were successfully diagnosed and treated for their symptoms. Some 70% of these reactions were classified as mild, 21.3% moderate, and 0.2% severe. A small portion of these side effects (8.5%) were not classified, but can be presumed generally mild.
10. For the second treatment round, a more effective methodology for distributing ivermectin has been initiated, which permits more treatment coverage by combining the former motivation and distribution teams in each target community.
11. The design, methodologies, and strategies of the IDP/Suchitepequez are successfully serving as a model for the National Plan for the Elimination of Onchocerciasis in Guatemala. All institutions involved in Suchitepequez are expanding their operations gradually to the whole of Guatemala in 1993.

3. Recommendations

The following action recommendations are grouped according to major project components.

Epidemiological Information

- (1) Complete the statistical analysis of the epidemiological information obtained for classifying the communities by level of endemicity. Because available data show variable prevalence of onchocerciasis in the five districts investigated, communities with highest risk of disease transmission must receive special attention for the third and fourth rounds of treatment.
- (2) Complete the statistical analysis of the ophthalmological information gathered by the group from the National Committee for the Blind and Deaf. This study will provide valuable information to evaluate the impact of ivermectin on onchocerciasis morbidity.
- (3) Refusal to be skin-snipped or to participate in a physical examination for nodules during the epidemiological survey was apparently related to the lack of an adequate health education/motivation program. Program messages should have better presented the health benefits of such examinations for the population. It is recommended that a full review be conducted of the health education/motivation component to structure a consistent and well-designed program and to define strategies and an improved methodology for delivering the appropriate health messages to communities. This requires drawing upon the experience in Yepocapa in order to anticipate a uniform approach in the expansion to the National Plan.
- (4) An study should be made to understand the nature of migration patterns in endemic zones, particularly that of the migrant workers from the highlands (cuadrilleros), and the effect these patterns may have on disease distribution and severity. This should be undertaken prior to the expansion of activities to new areas under the National Plan.

Epidemiological Resurvey

- (1) Evaluate the effects of ivermectin treatments on onchocerciasis prevalence and infection intensity in Suchitepequez by means of the Rapid Epidemiological Assessment using samples consisting of up to 30 males, 15 years of age and above (indicator group). The best moment for this evaluation would be the first quarter of 1994, immediately following the third round of ivermectin treatment.
- (2) Evaluate annually the effect of ivermectin treatments on prevalence and infection intensity in the sentinel communities. These evaluations should be performed in at least four sentinel communities in 1993 and in the seven communities (including three from Acatenango) in May-June, 1994.
- (3) Repeat the ophthalmological study on the mesoendemic and hyperendemic communities previously studied by NCBHD/Hospital Robles staff for evidence of change in ocular damage. This should also be carried out after the completion of the third round of treatment.

Project Information System

- (1) The categories of information collected, stored, and processed by project management for project monitoring and reporting purposes should be augmented by the key performance indicators presented in this evaluation. Management information in quarterly reports, while presently satisfactory, could be made clearer through presentation of management and performance indicators on one or more introductory pages, with a more detailed breakdown and explanation section by section later in the report. In this way, top managers can quickly scan key measures of project activity and assess progress toward final objectives, noting areas of delay or over-achievement.
- (2) The existence of two health management information systems—the older IDP-CIS and the recently received IDMS—is somewhat problematical and a decision should be made to use one or the other. Because this system will probably be used in the expansion to the National Plan, careful consideration should be given to

selecting that system promising most efficient and user-friendly operation and data manipulation. Currently, data continue to be entered into the IDP-CIS and are then transferred to the GIS because of the compatibility of the D-Base systems. The R-Base IDMS cannot be used with the GIS unless a conversion program is found. On the other hand, the IDMS has been designed to receive some information not now entered into the IDP-CIS, such as training records, personnel testing, and monthly (or periodic) field personnel performance evaluations. The new system has been designed to be simpler than the IDP-CIS, but project staff have not complained of problems with the current information system.

- (3) Selection of the appropriate information system must take into the account the wishes of the Malaria Division of the Ministry of Health, where acceptance of the former system was somewhat slow. Change to a new information system may cause consternation. Currently, SNEM appears to use its own LOTUS system in addition to keeping relevant records for project use in the IDP-CIS.
- (4) If the IDMS is selected, there are a number of final touches which need to be made to it by its designers in the VBC project. These are minor and need not require much time to complete if a clear decision is communicated concerning the desire to switch information systems. There is no need to continue tailoring this system to project needs if the former system is retained.
- (5) Information stored on the two project computers is beginning to exhaust hard disk capacity. This is particularly true for the one holding the H/MIS. Increasing information storage capacity will be necessary in the near future. Each of the two computers should receive an additional 100 Mb of hard disk space, and the one used for the H/MIS will need an additional 3 Mb of RAM.

Project Indicators

In addition to the rather complete set of management indicators already reported in quarterly reports, project indicators should include those that compare progress to date with end-of-project objectives to enable managers to gauge the rhythm of project accomplishments and the degree of lead or lag by project component. These indicators should

directly relate to the objectives found in the Detailed Implementation Plan. They should also be expressed as percentages of project objective achievement.

Objective-level Performance Indicators

The following should be considered for inclusion in quarterly or distribution campaign reports:

1. Number of communities in Suchitepequez in onchocerciasis endemic areas for which rapid epidemiological data have been gathered compared to the total number of such communities.
2. Number of community populations treated which are resurveyed epidemiologically compared to the total number of local populations treated.
3. Number of sentinel (study) communities fully resurveyed epidemiologically compared to those initially surveyed.
4. Number of project staff trained sufficiently to become supervisors of village health workers compared to the total planned number of supervisors.
5. Number of village health workers trained sufficiently to serve as distributors compared to the planned number of 60.
6. Number of community populations sufficiently educated and motivated to assure sustained community demand for ivermectin compared to the total of treated communities.
7. Number of eligible people receiving ivermectin by treatment number (1 - 4) during the project compared to the total eligible population found during each round.
8. Number of people treated solely by village health workers compared to total number of people treated during each treatment campaign.

Goal-level Performance Indicators

The project goal, as stated in the proposal and DIP is to establish an effective, safe, and locally sustainable model for the biannual distribution of ivermectin in endemic communities. In addition, the project proposes to "significantly reduce" the intensity of onchocercal infections and morbidity throughout Suchitepequez. The project does not take responsibility for interrupting transmission of the helminthic agent.

Performance indicators should be devised for the key concepts of the project goal: effective, safe, and locally sustainable delivery of ivermectin on the one hand, and significant reduction of the intensity of infection and population morbidity throughout Suchitepequez on the other. Because interruption of transmission is not a project objective, the lack of entomological monitoring need not be included in the Suchitepequez IDP. It will need, however, to be undertaken throughout endemic areas of Guatemala under the National Plan. If this is not done, there will be no way to know if transmission of the disease has been effectively eliminated, even if endemicity drops to 20% or below. The following performance indicators should be addressed in the next annual report and in the final report:

- (1) Effective biannual distribution of ivermectin implies that at least 85% of the eligible population is receiving treatment every six months with decreased total cost as voluntary distributors and increasingly experienced supervisors replace mobile teams.
- (2) Safe distribution of ivermectin implies that side reactions are appropriately treated and that, as the population receives further treatments, the incidence and severity of reactions will decrease due to reduced microfilarial load.
- (3) Locally sustainable distribution refers to a stable proportion of the eligible population (85%) receiving biannual treatment through the efforts of voluntary distributors and their supervisors.

- (4) Significant reduction of the intensity of onchocercal infection and attendant population morbidity implies a measurable reduction in microfilarial count and prevalence, decreased reactions to ivermectin for reusers, coupled with evidence of reduced eye damage in the rapid ophthalmological assessments conducted by NCBD.
- (5) Throughout Suchitepequez province implies that all endemic communities are being treated within the biannual schedule established by the project.

Training

- (1) The formal initial training and retraining of project staff has largely centered on the 10 NCBD promoters. While an attempt has been made to assure common knowledge of both SNEM and NCBD health workers and to standardize motivation/education messages by all types of distributors (SNEM, NCBD, CBDs), it appears that SNEM and NCBD are functioning largely independently.

While it is true that two distribution teams are mixed and that the supervisor of the NCBD group is the SNEM social worker, greater efforts should be made to integrate activities to assure a common message and approach to community leaders and household heads. Integration will involve mixing of teams and common retraining.

- (2) A common training and retraining program for all distributors is particularly necessary with regard to the motivation and education campaign which has become reduced to a minimum, because all teams are now combined to do both motivation and distribution activities in one process. The NCBD workers with their CBDs apparently continue to do some community preparation, while SNEM seems to be employing the traditional vertical mobilization effort it has used in past onchocerciasis (nodulectomy) and malaria programs.
- (3) Training of CBDs needs to be better defined and expanded. Refresher training for these volunteers should rely on the results of frequent evaluation by supervisors. Their approach to households and the quality of the health education message are crucial in

sustaining ivermectin acceptance in endemic communities. During the second campaign, CBDs appear to be only observing the health workers deliver the message and distribute medicine. On-the-job training should give them the chance to function alone during this campaign, if only for one house out of every three or four. The success of the IDP National Plan will depend in large measure on formal and on-the-job training of these CBDs, and an acceleration of present activities to strengthen their education and practical competence is required as soon as possible.

- (4) The current CBD manual requires expansion to include a wider variety of material, while at the same time simplification of language and technical content. Greater use of pictures with simple captions is desirable. The manual should be used as the basis for a three or four day training course at headquarters to which attendance should be mandatory for all CBDs now selected (apparently 60), in order that CBDs currently functioning may assist in training those for future rounds. This should be completed in advance of the third distribution campaign.

Health Education

- (1) Overall health education has been neglected as a project priority. Reasons for this include limited funding, limited time by implementors, lack of health education experience, and lack of communication with the accomplishments of the Yepocapa project. The long term success of the IDP in Suchitepequez and eventually in all of Guatemala, however, requires a more complete and thorough health education program that results in:
 - A better understanding by community members of the disease, its treatment, treatment-seeking behaviors, and the role of health workers and community-based distributors in supplying the treatment.
 - An improved and more consistent explanation of the IDP objectives by health workers and community-based distributors to the treated population.

- (2) To effectively build an uniform education and distribution activity in Suchitepequez capable of serving as model for the National Plan, it is desirable that a renewed health education strategy be designed as soon as possible. A meeting between key managers and field supervisors of IEF, NCBD, UVG, and SNEM, including the technical assistance of a professional health education specialist, should redefine health education objectives and priorities resulting in the formulation of a simple, and effective communication plan. This can then be tested prior to its use in the third and fourth rounds of distribution.

Distribution of Ivermectin and Adverse Reaction Monitoring

- (1) Although distribution of ivermectin and reaction monitoring are probably the most successful components of IDP/Suchitepequez, there are differences in the methods of community approach and health message of the SNEM and NCBD distributors. In consequence, it is recommended that serious attention be paid to comparing and evaluating the efficiency and results of the different groups. Project implementors should determine whether these methods are best suited to the environments in which they are being currently employed. Because integration will be increasingly necessary under the National Plan, an evaluation of these methodological approaches is very important. The infrastructure, strategies, and methodologies developed by the IDP/Suchitepequez will be seen as providing an effective model upon which to build the wider National Plan.
- (2) Evaluate the new ivermectin distribution methodology adopted for the second round of treatment which employs the simultaneous activity of health promoters (and CBDs) in both health education/motivation and drug distribution to the community.
- (3) Comparison of the Suchitepequez experience with distribution methods employed in the neighboring Yepocapa project should also be carried out as soon as possible. A uniform approach to distribution and education activities must be decided upon by the fourth round of treatment in mid-1994, where it can be tested before expansion to other zones.

- (4) No cost recovery schemes have yet been employed nor even explored in the IDP/Suchitepequez. It is advisable that sustainable financial alternatives be explored under this project for potential wider application in the National Plan. A thorough cost analysis of this project should be made soon to assist in reducing costs. Costs until now remain somewhat high, about \$3.18 per person treated, a total of \$12.72 per person for four treatments over the life of the project. These costs should begin to descend, however, with the increasing use of community-based distributors in the final treatment rounds.
- (5) In addition to a cost-effectiveness analysis of IDP/Suchitepequez, a more extensive economic analysis may be undertaken. An economic analysis normally differs from a financial analysis by using unsubsidized, international costs (shadow prices) for inputs to a project. This yields the true cost to the economy of a country. Comparing costs to benefits in the social sectors is, however, often rather difficult. Due to the more benign nature of onchocerciasis in Guatemala compared to Africa, the real benefits of disease elimination are better expressed in terms of human welfare rather than lost production time and economic growth.
- (6) A cost-benefit evaluation of the current health education/motivation component may also be undertaken and cost effective alternative strategies explored. The sustainability of ivermectin delivery to the endemic communities will ultimately depend on the creation of a real demand for the medicine. This will be based on its perceived benefits and lack of adverse side effects. An examination of population absenteeism and refusal rates by SNEM, NCB, and CBW promoters in the second and third treatment rounds will help to reduced costs and increase coverage in the National Plan.

- (7) Review plans to schedule the remaining rounds of ivermectin treatment from August through December, 1993 (third round of treatment) and from February through June, 1994 (fourth round of treatment). Mesoendemic and hyperendemic communities and the four sentinel communities (three more in Acatenango/Chimaltenango are also targeted by the same project) should be given priority for treatment and impact evaluation through an epidemiological resurvey. What should be sought is significant and persistent reduction in both prevalence and intensity of skin infection by microfilaria.

Sustainable Model for the National Plan

- (1) One of the major products of the IDP/Suchitepequez has been the experience of cooperation necessary to prepare a detailed, yet realistic, national plan to control onchocerciasis in Guatemala. The National Plan will be executed through the continued collaborative efforts of the public and non-governmental organizations implementing the current IDPs in Guatemala. Because there are weaknesses in the IDP/Suchitepequez in health education/motivation, training materials and manuals, and perhaps in the effective training and operationalization of the CBD network of distributors, these components should be examined carefully and improved upon as necessary before serving as a model to the National Plan.
- (2) The inclusion of a full-time health education specialist/trainer in National Plan staff is advisable. This person will be in addition to the presence of Ms. Karin Casasola, who will continue to have field operations duties to perform.
- (3) Another lesson learned during the course of the Suchitepequez IDP was the need to establish effective coordination mechanisms between the key players involved in the project to accomplish proposed objectives. It is also likely that a problem of roles and relationships will emerge under the National Plan if a proper coordination mechanism is not identified. A recommended mechanism is a National Steering Committee, in addition to the Advisory Technical Group, directly attached to the Minister of Health, to be presided over by the Vice Minister as direct delegate of the Minister. Functions of this committee will be the analysis

and resolution of necessary administrative, technical, and financial issues to facilitate the carrying out of each annual work plan elaborated by the technical group headed by the National Plan administrator.

- (4) Suggested composition of the Steering Committee is: Vice Minister of Health (coordinator), Director General of Health Services for the MOH, and one member (with alternate) from the implementing institutions—Department of Onchocerciasis of the Malaria Division; NCBD; Universidad del Valle; IEF/Guatemala; and the Onchocerciasis Elimination Program in the Americas (OEPA). The committee should meet once a month (or as necessary) in the offices of the Ministry of Health. This type of coordination will greatly assist the Ministry of Health to participate fully in the solution of administrative, technical, and financial problems affecting the execution of the National Plan. At the same time, it will provide participating institutions the political support necessary for developing the various National Plan activities.

Annex A
Statement of Work

Statement of Work
for the
Midterm Evaluation of the Ivermectin Delivery Program
implemented by the
International Eye Foundation
in Suchitepequez Province of Guatemala

Table of Contents:

1. Description of the Activity to be Evaluated
2. Purpose of the Evaluation
3. Background
4. Statement of Work
5. Methods and Procedures
6. Schedule
7. Evaluation Team Composition
8. Reporting Requirements
9. Contacts

1. Description of the Activity to be Evaluated

- * Cooperative Agreement Number: DPE-5948-A-00-1039-00
- * Title: "Mass Distribution of Ivermectin to Control Onchocerciasis in Suchitepequez Province in Guatemala"
- * Type of Agreement: Cooperative Agreement between AID/R&D/H/CD and the International Eye Foundation
- * Implementing Institution: The International Eye Foundation in collaboration with the Guatemalan Ministry of Health, the Universidad del Valle de Guatemala, and the National Committee for the Blind and Deaf
- * Cooperative Agreement Start Date: October 1, 1991
Completion Date: September 30, 1994
- * Purpose of Evaluation: To provide expertise in determining project strengths and weaknesses at the midterm of implementation and to provide guidance to improve the project in the remaining half of project life
- * Total Amount of Support: \$420,202.

2. Purpose of the Evaluation

The purpose of this midterm evaluation is to determine what progress has been made toward fulfilling the goals of the original grant agreement and to provide guidance for the remaining period of program implementation. The emphasis of the midterm evaluation will be to identify project strengths and weaknesses and make recommendations for improving the project. It is meant as a formative evaluation, with strong participation from project staff as well as cross fertilization among IDP programs in Africa and Latin America. Lessons learned from other IDP projects in Africa will be shared in that the final reports from all projects will be made available.

3. Background

A: General

The U.S. Agency for International Development's (A.I.D.'s) Ivermectin Delivery Program (IDP) is a pilot ivermectin distribution program in targeted countries in Africa and Latin America. The purpose of the three-year IDP is to assess the feasibility of using U.S. based private and voluntary organizations (PVOs) to strengthen the institutional capacity of indigenous health systems to provide cost-effective and sustainable delivery

of ivermectin.

The Foreign Assistance Appropriations Act for FY91 earmarked \$5 million of the health account for activities relating to the control, prevention and eradication of river blindness, or onchocerciasis. The Conference Committee Report suggested that a portion of the earmark be provided to U.S. PVOs to distribute the drug ivermectin, an extremely safe and effective treatment for onchocerciasis. Of the \$5 million earmarked for river blindness, \$2.5 million is intended to be used to support A.I.D.'s Ivermectin Delivery Programs through PVOs. In response to this, in 1991, A.I.D. in collaboration with PVOs developed the "Ivermectin Delivery Program" (IDP). The IDP is a collaborative effort involving PVOs, their national counterparts, the USAID missions and R&D/H. The U.S. PVO is responsible for implementing the IDP within the framework of the host countries national river blindness program. Program management and oversight is the responsibility of the USAID mission, except in Guatemala which is managed directly by the Office of Health. There are an additional four programs located in the West African countries of Nigeria, Cameroon, Niger and Burkina Faso. However, only the programs in Guatemala, Nigeria and Cameroon will be evaluated at this time.

The IDP program is designed to provide support to PVOs implementing a sustainable delivery system for ivermectin in collaboration with local health agencies. It is the intent of the program to integrate the ivermectin activities into the existing health care system thereby expanding and strengthening local capacity to deliver sustainable health care in rural environments. The pilot nature of the program is an effort to test this as a model for development programs using US PVO skills to guide local human resources. It is a three year program, at the conclusion of which, local effort should be the major driving force in sustaining the programs. The challenge for the PVO rests primarily in establishing the program within the existing health care infrastructure. The PVO guides the initial scientific work, establishes the mode of drug delivery, initiates the training of personnel, begins education efforts, and establishes the initial collaborations with the local government and private agencies. The first rounds of drug distribution are initiated by the PVO with eventual complete assumption by local counterparts.

B: Guatemala

The long term goal of the program in Guatemala is to control or interrupt transmission of onchocerciasis through mass treatment of people living in endemic areas with ivermectin. There are an estimated 400,000 people living in endemic areas for onchocerciasis in Guatemala. Of these, approximately 50,000 are thought to be infected. The aim of the project is to establish an effective, safe and locally sustainable health service delivery model for the bi-annual distribution of ivermectin in endemic communities, which

can be replicated on a national scale in order to reduce the prevalence of onchocerciasis and eventually interrupt transmission of the disease.

In Guatemala, this project is being implemented by the U.S. PVO, the International Eye Foundation and executed in direct collaboration with the National Committee for the Blind and Deaf of Guatemala and the Onchocerciasis Control Division of the Ministry of Health (SNEM). The project is based in the Department of Suchitepequez. This department had an original population estimate of 40,000 people dispersed in 117 localities among 5 municipalities.

4. Statement of Work

The basis of the evaluation will be an analysis of the purpose, objectives and outputs as enumerated in the project agreement. Recommendations made to IEF for the remaining life of project should first address issues related to achieving grant outputs and objectives, and secondarily to suggest less essential internal improvements.

The central question of the Ivermectin Delivery Programs for A.I.D. is whether the agency can employ PVOs to install a self-sustaining process of community demand and government or private supply of ivermectin in needful communities. What is most important to the present evaluation, as opposed to any internal evaluation activities IEF may conduct for its own purposes at the same time, is the degree to which this PVO can effectively strengthen the institutional capacity of the state, local and private health systems to carry out "cost effective and sustainable delivery of ivermectin". According to the grant agreement the project goal is to establish an effective, safe, and locally sustainable model for the bi-annual distribution of ivermectin in endemic communities, which can be replicated on a national scale to significantly reduce the prevalence of onchocerciasis and eventually interrupt transmission of the disease. Emphasis will be placed on strengthening capabilities in drug distribution, epidemiological surveillance and record keeping.

How will it be known if IEF has created a cost effective ivermectin delivery organization, one that can leave systems and procedures in place for the long term? To answer these questions we will need to examine the financial, personnel and logistical structures planned or in place and assess whether they can be taken over by the Guatemalan public (or private) sector over the remaining life of the project. The nature and degree of the present involvement of Guatemalan health professional and community workers is key in judging the likelihood of successful institutionalization by September 26, 1994. Evidence of the transfer of skills and organizational procedures to local health officials and CBWs will

be necessary to judge whether IEF has carried out its mandate successfully.

A. The Ivermectin Delivery Program, according to the detailed implementation plan (DIP), consists of eight objectives:

1. To undertake baseline epidemiological studies using indicator groups, school surveys, and study communities to determine and/or reconfirm the prevalence and intensity of onchocerciasis infection at the community level, in all communities of Suchitepequez Province that are located between 500 and 1,500 meters above sea level.
2. To survey each treated community epidemiologically at least once more during the course of the project to facilitate evaluation of the impact of ivermectin treatment on parasitologic indices of onchocerciasis.
3. To develop a system for processing and dissemination of information collected over the course of the project.
4. To assess the project by a set of defined indicators.
5. To capacitate project staff, as well as at least 60 members of affected communities to motivate the communities and distribute ivermectin.
6. To educate all affected communities to increase the level of public awareness about the disease and the distribution program and to achieve high acceptance of the treatment.
7. To deliver the appropriate dose of ivermectin on a bi-annual basis to at least 85% of the eligible population of all communities endemic for onchocerciasis, including those located within a 5 km radius of endemic communities.
8. To develop a distribution plan that can be extended to the whole nation and can be sustained by local structures for as long as it is required to interrupt transmission (at least 10-15 years).

B. Major project activities over the three year grant period are summarized below, but are expanded and explicated in the DIP:

- a. Establishing baseline epidemiological data in all communities suspected of having onchocerciasis.
- b. Training of IEF/NCBD and SNEM staff for community education/motivation and ivermectin distribution.

- c. Establishing a distribution plan that will deliver ivermectin to eligibles in all communities in which onchocerciasis is prevalent, as well as in any community within 5 km of an infected community.
- d. Conducting community education and motivation to prepare the communities for their participation in the upcoming distribution campaign.
- e. Distribution of ivermectin and monitoring of adverse reactions.
- f. Evaluation: Management, treatment, and epidemiological indices will be evaluated on a routine basis.

C. The following questions can guide the evaluation according to the grant objectives and outputs.

- a. Program Institutionalization
- b. Surveys
- c. Distribution
- d. Training/Supervision
- e. Education/Motivation
- f. Record Keeping Capabilities
- g. Financial Management
- h. Project Management
- i. Problems/Solutions

a. Program Institutionalization

- * Were the proper collaborations with host institutions established in a timely manner?
- * Were other NGOs working in the region contacted and collaborated with?
- * Has IEF demonstrated a progressive shift in responsibility from PVO staff to host country counterparts in the implementation of the IDP?
- * Do these counterparts demonstrate the ability to continue executing the IDP at the end of project?
- * What evidence exists in the IEF experience that PVOs have a comparative advantage in institutionalizing systems and procedures at the local government and community levels?
- * Were the proper evaluations planned for and executed?

b. Surveys

- * Was a census done to determine: the population, a profile of the localities, identification of the health resources both government and NGO, identification of community leaders, including religious, civilian, and military authorities and plantation (finca) owners?
- * Were epidemiological surveys undertaken to establish the degree of onchocerciasis prevalence in all communities where the disease might be endemic?
- * Were rapid reconnaissance surveys adequate to the task of classifying communities by degree of infection and were they conducted in time to guide program implementation?
- * Were the targeted communities selected from these results or were other factors considered?
- * Can local officials, health professionals, and other NGO workers continue the use of these surveys to monitor disease prevalence in existing or future project communities?
- * Did the same individual and community receive follow-up surveys and treatment?
- * Were survey results presented back to the community from which they were obtained?

c. Distribution

- * How was the mode of distribution decided upon?
- * What were the various options and their costs for carrying out the desired distribution program?
- * Was the eligible population effectively reached in all endemic communities?
- * Was distribution carried out at least cost?
- * Have cost recovery schemes been employed and with what likelihood for sustainability?
- * What plans have been made to ensure that local transportation and infrastructure can sustain distribution beyond the project?
- * How will repeat distribution be monitored and assured?

- * From the IEF experience, what indicates that PVOs can mount campaigns to distribute ivermectin in a cost-effective, sustainable manner?
- * How will the local plans be extended to the national program?
- * Were the Merck guidelines understood, communicated, and properly observed in all project communities? If not, how can they be more fully observed?
- * What evidence exists that the Merck guidelines will be observed fully after project end?
- * Were adverse reactions handled, treated and reported according to Merck guidelines?
- * Was Mectizan properly obtained and were the proper reports submitted?

d. Training/Supervision

- * What training needs remain and what plans have been made to complete them by project end?
- * Was a training needs assessment conducted to assist in devising the CBW training course?
- * Has the training kept pace with the need for an adequate number of CBWs in all endemic communities by project end?
- * Has the CBW training been appropriate and are the individuals who were trained using their skills on the job?
- * Was a training needs assessment conducted among state and NGO officials prior to the training course?
- * Do the local and state onchocerciasis teams have the capacity to continue this training in the absence of IEF? If not, will this capacity exist at project end? Where and how will it be carried out?
- * Did the training of health supervisors occur in a timely manner and have the new skills been applied appropriately in the field?
- * Do the State MOH officials have the capacity to appropriately supervise Local and NGO officials in the financial and managerial maintenance of the ivermectin delivery system?

- * Will this training continue to be offered after the departure of IEF? If so, who will do it, when, and where?
- * Is the proper evaluation of trainees, trainers and supervisors occurring? Are the results used in feedback?

e. Education/Motivation

- * Was a KAP survey conducted to assess the level and form of public awareness of onchocerciasis and to identify appropriate methods to educate and motivate target communities to sustain participation in the ivermectin distribution program?
- * Has an effective IEC program been mounted to inform communities of onchocerciasis and ivermectin?
- * Has an appropriate IEC program been carried out to promote public acceptance of annual doses of ivermectin?
- * How have the CBWs been involved in IEC activities?
- * Has a sustainable incentive system been created to motivate field work by public and private health workers and CBWs?
- * Will the IEC and incentive system outlive the departure of IEF?

f. Record Keeping Capabilities

- * Is there is a method for tracking health information which collects, processes, analyzes and disseminates the appropriate information?
- * Were quarterly and annual reports submitted which clearly reflect program priorities, progress and problems?
- * Was the information from previous quarters used to guide the upcoming quarters?
- * What are the report forms used by IEF to conduct the program? Do these reports correspond to those indicated in the proposal summary (cf. Record Keeping)?
- * Are the CBWs correctly using the Household Ivermectin Treatment Records (HITRs) and the Report Form for Reactions?

- * What method was implemented to record individual ivermectin consumption? Individual cards?
- * How is the health information generated and transmitted in a timely manner to key program managers? What are the key indicators for this monitoring process? Is this system computerized?
- * To what degree are these techniques of assembling and disseminating information now used by local public and private health workers?
- * Is there a financial monitoring system appropriate for transfer to local government officials and health workers?
- * Is there a monitoring and evaluation system for project impacts separate from ivermectin distribution data for financial and logistical monitoring? Are follow-up surveys of onchocerciasis endemicity planned for being carried out in treated communities?

g. Financial Management

- * Was the budget comprehensive and reflective of the true needs of the project?
- * How will the financial burden be assumed by local institutions and how did IEF assist in this transfer?
- * What long term plans were made to ensure program sustainability with respect to financial responsibility?
- * How were budgetary shortfalls dealt with?
- * Were the costs of delivery operations recovered at an acceptable level?
- * Were treatment costs kept to an acceptably low level?
- * Were the relevant costs and revenues recorded and processed in the monitoring system?
- * What plans were made for program cost-recovery?
- * Has an economic analysis of the program been performed?

h. Project Management

- * Were project managers effective in their guidance of the

project?

- * Were the logistics of establishing an IDP project satisfactory executed?
- * How was communication with headquarters carried out?
- * Were project managers evaluated and given feedback?
- * Were activities planned, executed, and completed at the appropriate time?

i. Problems/Solutions

- * How were project difficulties and unforeseen problems addressed and solved?
- * What problems/challenges are anticipated for the remaining time of project implementation?

5. Methods and Procedures

The following documents will be provided for the evaluation.

1. Project Design and Implementation of the Ivermectin Delivery Program, by J. Madison Seymour, Ph.D., VBC Report No. 81239
2. Proposal for an Ivermectin Distribution Program, "A program for the Control of Onchocerciasis in the Department of Suchitepequez, Republic of Guatemala", submitted by the International Eye Foundation, March 1991
3. Mass Distribution of Ivermectin to Control Onchocerciasis in Suchitepequez Province Guatemala, A Detailed Implementation Plan, March 1992
4. Mass Distribution of Ivermectin to Control Onchocerciasis in Suchitepequez Province Guatemala, The first 6-months report, March, 1992
5. Quarterly Reports for the Mass Distribution of Ivermectin to Control Onchocerciasis in Suchitepequez Province, Guatemala
6. First Annual Report for the Mass Distribution of Ivermectin to Control Onchocerciasis in Suchitepequez Province, Guatemala January , 1993
7. Ivermectin Delivery Program, Workshop Report, J. Madison Seymour, Ph.D., VBC Report No. 81239

8. Workshop on Future Direction in Health Education for Ivermectin Delivery Programs, VBC Report No. 81340
9. Africare River Blindness Program in Kwara State, third year Evaluation and KAP survey report, Kwara State Project, Nigeria

6. Schedule

April	Finalize Scope of Work and team composition, develop outline of the final report
April	Request and review needed documents
May 4	Conduct team planning meeting in Washington
May 7-19	Conduct field interviews and evaluation in Guatemala
May 20-26	Finalize evaluation report
May	Debrief A.I.D./Washington

7. Evaluation Team Composition:

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