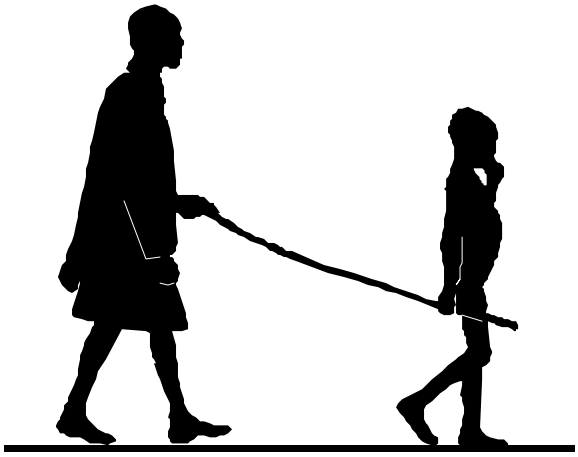

**Summary**
**2001 Program Review for The Carter Center/Lions SightFirst**
**River Blindness Programs**
**Cameroon, Ethiopia, Nigeria, OEPA, Sudan, and Uganda**
**13-15 March, 2002**
**The Carter Center**
**Atlanta, GA**

THE CARTER CENTER
RIVER BLINDNESS PROGRAM

LCIF
LIONS CLUBS INTERNATIONAL FOUNDATION

July 23, 2002

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***And to many others, our sincere gratitude***

## TABLE OF CONTENTS

## Acronyms

arv ..... at-risk villages (villages requiring community-wide active mass therapy)
ATO ..... Annual Treatment Objective
APOC ..... African Programme for Onchocerciasis Control
CBD ..... Community-Based Distributors (pre-APOC strategy)
CDC ..... Centers for Disease Control and Prevention
CDD ..... Community-Directed Distributors (APOC strategy)
CDTI ..... Community-Directed Treatment with Ivermectin
CFA ..... Central African Francs
CNS ..... Central Nervous System
earp ..... eligible at-risk population
DEC ..... diethylcarbamazine
FMOH ..... Federal Ministry of Health of Nigeria
GOS ..... Government of Sudan
GRBP ..... Global 2000 River Blindness Program of The Carter Center
GSK ..... GlaxoSmithKline
HE ..... Health Education
HNI ..... HealthNet International
HQ ..... Headquarters
hrv ..... (OEPA term) highest risk villages for morbidity, prevalence of microfilaria in skin greater than 59%
ICT ..... immunochromatographic card test
IDB ..... Inter-American Development Bank
IDP ..... Ivermectin Distribution Program
IEC ..... Information, Education, and Communication
IACO ..... InterAmerican Conference on Onchocerciasis
LCIF ..... Lions Clubs International Foundation
LF ..... Lymphatic Filariasis
LGA ..... Local Government Area (Nigeria)
MDP ..... Mectizan® Donation Program
MEC ..... Mectizan® Expert Committee
Mectizan® ..... Ivermectin (Merck & Co. product name)
MOH ..... Ministry of Health
NGDO ..... Nongovernmental Development Organization
NOCP ..... National Onchocerciasis Control Program
NOTF ..... National Onchocerciasis Task Force
OEPA ..... Onchocerciasis Elimination Program for the Americas
OLS ..... Operation Lifeline Sudan
OV ..... *Onchocerca volvulus*
PAHO ..... Pan American Health Organization
PCC ..... Program Coordination Committee of OEPA
PCR ..... Polymerase Chain Reaction
PHC ..... Primary Health Care
RBF ..... River Blindness Foundation
REA ..... Rapid Epidemiological Assessment
REMO ..... Rapid Epidemiological Mapping of Onchocerciasis

SH .....*Schistosomiasis haematobium* (urinary schistosomiasis)
SMTC ..... Sustainable Management Training Center, Jos, Nigeria
SRRA ..... Sudan Relief and Rehabilitation Association
SSOCP..... South Sudan Onchocerciasis Control Program
SSOTF ..... South Sudan Onchocerciasis Task Force
TCC..... Technical Consultative Committee of APOC
TX..... treatments
UNICEF.....United Nations Children's Fund
UTG..... Ultimate Treatment Goal
WHO ..... World Health Organization
WVI .....World Vision International
ZOA.....Zud Ost Asia

## ABSTRACT

The vector born parasite *Onchocerca volvulus* (causing river blindness) infects about 18 million people in 37 countries, 770,000 of whom are blinded or severely visually impaired. Periodic mass treatment with ivermectin (Mectizan®) in disease-endemic communities prevents eye and skin disease caused by this infection. As part of a global effort to eliminate onchocerciasis as a public health problem by the year 2007, the Global 2000 River Blindness Program (GRBP) of The Carter Center collaborates with the ministries of health of 11 countries, maintains field offices in Guatemala, Cameroon, Nigeria, Sudan, Kenya, Ethiopia and Uganda, and belongs to international coalitions that include the Centers for Disease Control and Prevention (CDC), the World Health Organization (WHO), the World Bank, the Inter-American Development Bank (IDB), Merck & Co., international bilateral donors, and other nongovernmental development organizations (NGDOs). Special GRBP partners include the Lions Clubs International Foundation (LCIF), and the African Programme for Onchocerciasis Control (APOC). In October 1999, The Carter Center and Lions Clubs announced the Lions-Carter Center Sight First Initiative to increase our collaboration in the global effort for onchocerciasis control, including the establishment of a new river blindness control program in Ethiopia.

The Carter Center hosted its sixth annual Review for 2001 program activities of its GRBP on March 13-15, 2002 in Atlanta. The objectives of the Program Review were to: 1) assess the status of each program, 2) identify impediments and problems in program implementation and potential solutions, and 3) promote sharing and standardization of information. Each GRBP-assisted program reported on the number of assisted Mectizan treatments provided, training, research and development activities, and surveillance for adverse reactions to treatment. The African programs also reported on their APOC experiences. The Nigeria program reported on the pilot initiatives for combining lymphatic filariasis elimination and schistosomiasis control with onchocerciasis control activities in Plateau and Nasarawa States. Key aspects of the discussions are summarized in this report.

Since its launching in 1996, GRBP has assisted in providing over 36.4 million Mectizan treatment encounters. In 2001, 8,019,378 persons were treated (95% of the 2001 annual treatment objective [ATO]) in GRBP-assisted programs, a 10% increase in treatments over 2000. This represents 82% of the Ultimate Treatment Goal (UTG) for GRBP-assisted programs. As in previous years, most (60%) GRBP treatments were in Nigeria. Of the treatments in 2001, most (97%) were accomplished in partnership with the LCIF SightFirst Program in Nigeria, Cameroon, Uganda, Sudan, Ethiopia and the Onchocerciasis Elimination Program for the Americas (OEPA). The GRBP ATO for 2002 is almost 10 million treatments, a 14% increase over 2001 treatments. Priorities for GRBP in 2002 include: 1) maximizing treatment and health education efforts to reach ATOs and UTGs, 2) monthly reporting of Mectizan treatments, 3) documenting interruption of transmission in the Americas, 4) sustainability of treatment coverage and 5) adapting Mectizan distribution and health education methods to lymphatic filariasis elimination and schistosomiasis control.

## EXECUTIVE SUMMARY

### The Program Review

The GRBP hosted its sixth annual Program Review on March 13-15, 2002 at The Carter Center in Atlanta, Georgia. The review is modeled after similar reviews developed for national Guinea Worm Eradication Programs by the Carter Center's Global 2000 program and CDC, beginning with Pakistan in 1988. The main purposes of the review, which was chaired by Dr. Frank Richards (Technical Director, GRBP), were to assess the status of each program and to determine impediments and problems in program implementation. In attendance (Annex 1) were GRBP country representatives Dr. Albert Eyamba (Cameroon), Mr. Teshome Gebre (Ethiopia), Dr. Moses Katabarwa (Uganda), Drs. Emmanuel Miri and Kenneth Korve (Nigeria), Dr. Mauricio Sauerbrey (Onchocerciasis Elimination Program for the Americas [OEPA]), Mr. Mark Pelletier (Sudan/Khartoum), Ms. Kelly Callahan (Sudan/Nairobi), as well as Prof. Mamoun Homeida, (Chairman, National Onchocerciasis Task Force [NOTF], Sudan), Ms. Irene Mueller (Program Manager, HealthNet International [HNI], Sudan), and Global 2000 Atlanta headquarters staff. Special guests included Ms. Rebecca Teel-Daou (LCIF), Dr. Mark Eberhard (Acting Director, Division of Parasitic Diseases, CDC), Dr. Steve Blount (Director of Global Health, CDC), Mr. Ross Cox (Deputy Director of Global Health, CDC), Dr. Ed Cupp (Professor of Entomology, Auburn University, Auburn, Alabama), Dr. Tom Unnasch (Professor of Immunology, University of Alabama at Birmingham), Dr. Bjorn Thylefors (Director, Mectizan® Donation Program), and Dr. Charles Mackenzie (Professor of Pathology, Michigan State University), among other observers.

Each program was formally presented (Annex 2), with subsequent discussions focused on treatment and training activities, 2001 and 2002 ATOs, UTGs, health education, sustainability issues, Mectizan security, epidemiological assessment activities, operations research, reporting burdens, and administrative issues. Key aspects of the Program Review, supplemented by updated treatment data provided since the meeting, are summarized in this report, as are recommendations for GRBP actions in 2002.

### River Blindness: The Disease and its Control

Infection with the vector-borne parasite *Onchocerca volvulus* (causing human onchocerciasis) is characterized by chronic skin and eye lesions. The World Health Organization estimates that at least 17.7 million people are infected, 500,000 are visually impaired and another 270,000 are blinded from onchocerciasis in the 37 endemic countries. Approximately 123 million people live in endemic areas worldwide and are therefore at risk of infection; over 95% reside in Africa. Onchocerciasis is transmitted by small black flies that breed in rapidly flowing rivers and streams, thus leading to the common name for the disease, "river blindness." The adult parasites are long-lived (between 8-15 years), and the prelarval forms (called *microfilaria*) released by the thousands by female worms enter into the skin and eyes and cause inflammation and disease. Mectizan (ivermectin) a microfilaricidal drug that can be given as a single oral dose annually in "mass" community-based treatment programs, while not being curative can prevent disease from developing in those who are infected. In 1987, Merck

& Co. decided to donate Mectizan, for as long as necessary, to all people affected by onchocerciasis. This donation was an important stimulus for the current initiative to globally control onchocerciasis using a strategy of community-based treatment.

***The Carter Center and River Blindness:*** In 1987, Merck approached then executive director of The Carter Center Dr. William Foege for assistance in organizing the global distribution of Mectizan. The MEC/MDP was created in 1988 and housed at the Atlanta-based Task Force for Child Survival and Development, an independent partner of The Carter Center. The global initiative has grown to one that has enabled about 30 million treatments per year since 1996 and over 250 million treatments since the MDP began. Indeed, the donation has stimulated what is widely considered a model of how industry, international organizations, donors, national ministries of health and affected communities can successfully work together toward a common goal.

In 1996, The Carter Center expanded its role in the coalition fighting river blindness by acquiring most of the operations of the River Blindness Foundation (RBF), a nongovernmental development organization (NGDO) founded by John and Rebecca Moores in 1990. The GRBP was established at The Carter Center to assume the field activities of the RBF. GRBP's primary aim is to help residents of affected communities and local health workers establish and/or sustain optimal Mectizan distribution and related health education (HE) activities, and monitor that process. The Carter Center also serves OEPA, which coordinates activities to completely eliminate the infection in all six onchocerciasis-endemic countries in the Americas (Brazil, Colombia, Ecuador, Guatemala, Mexico and Venezuela). In 1997, GRBP expanded to a collaborative program in Sudan (with support of Lions Clubs SightFirst Program) as part of the Carter Center's peace initiative and Guinea worm disease eradication efforts there. In 1999, with expanded support from LCIF (under a new Lions-Carter Center Sight First Initiative), The Carter Center accepted an invitation to assist in onchocerciasis control activities in Ethiopia, and treatments and HE began there in 2001.

**Partnerships:**

The GRBP of The Carter Center works through partnerships at all levels. The primary partners are the ministries of health (MOHs) and their national onchocerciasis control programs executed within and through the indigenous primary health care system. GRBP and MOH staff work in the field with the rural communities using information, education, and communication techniques (IEC) to improve understanding and empowerment of people to be full partners in the program and the drug delivery process. As mentioned above, GRBP has a long and evolving partnership with Lions Clubs and the Lions' SightFirst Program. Another key partner is the Division of Parasitic Diseases at the CDC, where GRBP technical staff members are housed. GRBP works closely with the MDP, at the Task Force for Child Survival and Development, also in Atlanta.

***Partners in the African Programs:*** In Africa, GRBP partners include the MOHs in host countries (Cameroon, Ethiopia, Nigeria, Sudan, and Uganda), United Nations organizations (WHO, UNICEF, and the World Bank), and other NGDOs. GRBP is a

member of the NGDO Coalition for Mectizan Distribution that includes (among others) Christoffel Blindenmission, Helen Keller Worldwide, Interchurch Medical Assistance, HealthNet International, Lions Clubs International Foundation, l'Organisation pour la Prevention de la Cecite, Sight Savers International, and the US Committee for UNICEF. Another important partner is the African Programme for Onchocerciasis Control (APOC), which is executed by WHO and funded through a trust fund housed at the World Bank. APOC was launched in 1995, and aims to establish, by 2010, "community-directed" river blindness treatment programs in an estimated 19 African countries. The APOC provides funds and technical/managerial support to six-year Mectizan distribution projects carried out by ministry of health/NGDO partnerships. The Carter Center currently has 13 projects assisted by APOC, in five African countries.

***Partners in the American Programs:*** GRBP/The Carter Center provides the administrative framework for OEPA. Headquartered in Guatemala, OEPA is the technical and coordinating body of a multinational, multiagency coalition working for the elimination of all onchocerciasis morbidity and transmission from the Americas by the year 2007. Through the OEPA initiative, GRBP partners with the national programs and MOHs of all six endemic countries of the Americas (Brazil, Colombia, Ecuador, Guatemala, Mexico, and Venezuela). Regional technical and programmatic goals are developed by a Program Coordinating Committee (PCC) with representation from key members of the initiative (and on which The Carter Center holds two institutional seats). GRBP works with the Pan American Health Organization (PAHO), the CDC, and several US and Latin American universities. The Carter Center received partial funding for OEPA from the InterAmerican Development Bank. In 2000, The Carter Center's partnership with Lions Clubs expanded to include OEPA, and LCIF now holds an institutional seat on PCC.

**Assisted Treatments**

***Nomenclature used by the GRBP program:*** A major focus of GRBP is on routine reporting by assisted programs. The reader is referred to Annex 3 for a discussion of the GRBP reporting process, and treatment indices used by the program and in this report. Important terms include the treatments achieved (TX), ultimate treatment goal (UTG), twice the UTG (UTG[2]), annual treatment objectives (ATO), eligible at-risk population (earp), at-risk villages (arv), and full coverage (defined as 85% achievement of the UTG, or for OEPA, the UTG[2]).

***Treatments Assisted by the Program:*** By 2001, the GRBP program had reached 82% of its overall UTG of 9,913,120 by assisting in Mectizan treatments of 8,019,378 persons (Figure 1). The Nigerian and Ugandan programs reached 96% of their UTGs and OEPA reached 80% of its UTG(2). Programs in need of additional growth included Cameroon (67% of UTG), Sudan (60%), and Venezuela (53%).

In 2001, a total of 8,019,378 eligible at risk persons were treated in 16,065 arv's (95% of the 2001 treatment objective) in the 11 GRBP-assisted country programs, which represented a 10% increase in treatments over 2000 (Figure 2). Summary tables of monthly treatments of eligible at-risk populations (earp) and arv's by program are

provided for the years 2000 and 2001 (Tables 1 and 2). Most (60%) treatments in 2001 were in Nigeria (Figure 3), and treatments in Ethiopia just started in March of 2001. The partnership between LCIF and GRBP has been growing since 1996 and in 2001, 7,790,957 treatments (97%) were accomplished in partnership with LCIF (Figure 4). Since its launch in 1996, GRBP has assisted in providing over 36.4 million treatments with Mectizan (Figure 5), 80% of which have been in partnership with LCIF.

The GRBP Annual Treatment Objective (ATO) for the eligible at-risk population (earp) projection for 2002 is 9,137,672 million treatments with Mectizan (Figure 2). Table 3 shows GRBP ATOs in recent years. GRBP has shown an average growth rate of 14.5% per year since it was launched in 1996, and the program projects a 14% increase in 2001-2002. Many GRBP-assisted programs (Nigeria, Uganda, Mexico, Ecuador, Brazil and Colombia) have reached or are approaching their UTG in their areas of operation, and thus theoretically have attained full treatment coverage. (Once the UTG is reached no further growth would be expected in future years, other than that represented by routine population growth of 2-4% annually). GRBP-assisted areas in need of considerable ATO expansion toward the UTG include Cameroon, Sudan, Venezuela, and Ethiopia. The overall 2002 ATO of 9,137,672 will aim to reach 92% of the GRBP UTG of 9,913,120 treatments (Figure 2 & Table 4). Attaining full coverage quickly is especially urgent in Venezuela because of the goal to interrupt onchocerciasis transmission and eliminate morbidity by 2007 in the Americas.

The cost per treatment in GRBP-assisted African programs was approximately $0.17 in all African countries except Sudan (Figure 6) due to the war. Cost per treatment decreased in 2001 compared to 2000 in Nigeria, Cameroon, and Uganda, but increased in Sudan.

***Sustainability of treatment activities:*** In Africa, Mectizan delivery must be sustained indefinitely since the APOC program strategy (annual treatment only in highly endemic villages) does not aim to interrupt all transmission of the *O. volvulus* parasite. Fundamental to APOC, therefore, is establishing “sustainable” Mectizan delivery systems that will continue after the withdrawal of external funding. APOC advocates “Community Directed Treatment with Ivermectin” (CDTI) as the favored distribution method over “community-based” or “mobile distribution.” CDTI focuses on the empowerment of community residents to make informed decisions regarding the mass treatment process (timing, location, distributors, remuneration, etc). It is thought that such empowerment will result in Mectizan distribution that will continue long after external support ceases. The interested reader is referred to the special volume on the Mectizan program that appeared as a supplement to the *Annals of Tropical Medicine and Parasitology*, 2002: 96, Supplement 1. Monitoring progress toward sustainability is an important element of APOC’s program evaluation. GRBP also is trying to monitor indicators of the ability of the program to continue after external funds are withdrawn (see Annex 3), particularly government support for the program, and estimates of costs per treatment. In the Americas, establishing indefinitely sustained treatment programs is not the goal of OEPA, since the strategy (twice per year community-wide active mass therapy in all endemic villages) is designed to interrupt the transmission of the onchocerca parasite. If OEPA is successful, at some point mass Mectizan treatments

can be halted.

***Adapting Mectizan distribution and health education methods to lymphatic filariasis and schistosomiasis:*** The main strategies for the control of onchocerciasis and schistosomiasis morbidity and the elimination of lymphatic filariasis transmission are health education and annual mass chemotherapy with the safe oral drugs Mectizan, albendazole, and praziquantel. GRBP is assisting the Federal Ministry of Health of Nigeria in an initiative to incorporate lymphatic filariasis (LF) elimination and urinary schistosomiasis (SH) control into the onchocerciasis control program in Plateau and Nasarawa States. Interventions for SH with praziquantel commenced in villages with a SH prevalence of over 20% in October 1999, and by the end of 2000, 52,480 cumulative praziquantel treatment encounters had been provided since the launching of that intervention. In 2001, the program expanded by two more LGAs (one each in Plateau and Nasarawa States) and 84,147 persons were given praziquantel and health education. Treatment for both onchocerciasis and LF has been carried out since March 2000 with a combination of Mectizan and albendazole. In 2001, the program expanded to 12 LGAs and a total of 675,681 persons received combination therapy. There were no adverse reactions, and so far no negative impact on the coverage of the onchocerciasis program by the addition of LF and SH activities.

## GRBP PRIORITIES for 2002

***Coverage:***

- Seek to reach the UTGs that define "full treatment coverage" of GRBP-assisted areas, especially in Venezuela, and sustain maximum health education and treatment coverage of the earp's and at-risk villages in areas of GRBP-assisted activity.

***Elimination:***

- Move toward the goal of interruption of onchocerciasis transmission throughout the Americas, promoting a strategy of semiannual treatment and coverage of at least 85% of UTG in each of two treatment rounds per year.
- Help PAHO/WHO to establish a process by which to certify onchocerciasis elimination.
- Document the impact of Mectizan distribution on transmission in Africa, and promote the idea that the APOC program should focus more on the opportunities to interrupt transmission (and so eliminate) onchocerciasis.

***Reporting:***

- Continue to emphasize monthly reporting of Mectizan treatments, using GRBP established nomenclature and indices.
- Improve financial reporting to APOC and complete the final report to the IDB.

***Sustainability:***

- Encourage and monitor government (local, state, and federal) contribution to onchocerciasis programs.

***Mectizan Accountability:***

- GRBP ATOs should be the same as those on file with the MDP.

***Lymphatic Filariasis and Urinary Schistosomiasis:***

- Expand the lymphatic filariasis elimination (Mectizan/albendazole) and urinary schistosomiasis control (praziquantel) efforts in Nigeria.
- Seek donation of praziquantel and financial support.
- Establish baseline information in sentinel areas for LF.

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

Table 1

Table 2

Table 3

Table 4

## NIGERIA

Nigeria is probably the most highly endemic country in the world for river blindness, having as much as 40% of the disease global burden. It is estimated that 27 million Nigerians need treatment with Mectizan® for onchocerciasis (i.e., the Ultimate Treatment Goal [UTG] is 27 million). The National Onchocerciasis Control Program (NOCP) began in 1989 with Mectizan® treatments of about 49,566 persons, progressing to provide over 16 million treatments by 2001.

The Global 2000 River Blindness Program (GRBP) in Nigeria has offices in Jos, Lagos, Owerri, Benin City, and Enugu. The primary activities consist of: 1) direct assistance for treatment activities in nine of the 32 onchocerciasis endemic states in Nigeria (Abia, Anambra, Delta, Ebonyi, Edo, Enugu, Imo, Nasarawa, and Plateau States) (Map 1), 2) helping to implement nationwide onchocerciasis control in partnership with the Nigerian government and the National Onchocerciasis Task Force (NOTF) through a coalition of nongovernmental development organizations (NGDOs) including GRBP, Helen Keller Worldwide, Christoffel Blindenmission, MITOSATH**,** International Eye Foundation, SightSavers, and UNICEF, 3) working to implement and evaluate the African Program for Onchocerciasis Control (APOC) strategy of Community-Directed Treatment (CDTI) programs. A major GRBP-partner in Nigeria has been the Lions Club International Foundation (LCIF) SightFirst Program. The Lions Clubs District 404, with LCIF support, is actively involved in mobilization, health education, and treatment activities.

***Treatment Activities:*** In 2001, GRBP Nigeria helped provide health education and Mectizan® to 4,782,280 persons (Table 5), 102% of the ATO for 2001 (4,676,586). GRBP-assisted treatments represented 29% of the 16,512,550 treatments provided in Nigeria in 2001 (Figure 7)**.** Mass treatment activities took place in 10,085 at-risk villages. The number of persons being treated annually in GRBP-assisted projects in Nigeria is approaching the UTG for those areas. Treatments by state are shown in Figure 8. The 2002 annual treatment objective (ATO) earp for GRBP is 4,793,500 Mectizan® treatments. Since the UTG for GRBP Nigeria program is 5,000,000 treatments, the 2002 ATO aims to reach 96% of that full coverage goal.

***Training/Retraining:*** Training for 18,697 health workers involved in Mectizan® distribution and health education activities was conducted in all nine states in 2001. This represented 95% of the training target for the year. Most of those trained (15,913 or 85%) were community-level distributors. Also trained were 42 State Onchocerciasis Coordinators, 602 Local Onchocerciasis Control Coordinators, and 559 District Health Staff. In addition, numerous advocacy visits were made to decision makers in all assisted states and Local Government Areas (LGAs) to solicit their support for the program. Training of staff was conducted at three different levels: state (for training of SOCTs); LGA (for training of LOCTs, DHSs, and HFS); and community (for training of CDDs). The use of the IEC materials improved the performance of CDDs, as seen by improved recording and reporting. CDDs were taught in 2001 to calibrate their measuring sticks used in determining dosage. Also new in the training curriculum for 2001 was an overview of the importance of counterpart funding and financial control.

***Mectizan®:*** All Mectizan® for mass treatment in Nigeria is imported by UNICEF and stored at the UNICEF warehouse prior to distribution to the various partners, including GRBP. In 2001, GRBP received a total of 14,030,000 3-mg Mectizan® tablets. The (3-mg) tablet per person index was calculated to be 2.99 for the Nigeria GRBP program. There were no severe adverse reactions reported in GRBP-assisted programs in Nigeria, including in Delta State, where the filarial parasite *Loa loa* is known to occur (Note: persons heavily infected with *Loa loa* are at risk of having more adverse reactions when treated for the first time with Mectizan® - see Annex 4). A total of 10,197 mild adverse events were reported or 0.21% overall (Figure 9 and Table 6). No severe adverse events were reported. Close monitoring for secondary reactions according to MDP recommendations will continue in these states, although all these areas are now entering into fourth and fifth round therapy, so the risk of reaction is low.

***Impact of Mectizan on transmission:*** In May of 2001, 11 onchocerciasis endemic villages in Plateau and Nasarawa states were assessed by onchocerciasis antibody (against Ov-16) card tests and lymphatic filariasis ICT antigen tests (using Og4C3). Most of these villages had been receiving Mectizan for nine years. All children age 2-5 were selected from each village. Overall, 747 children were examined and only 7 (1%) were found to be positive for onchocerciasis antibodies. Only four of the 11 villages had young children with antibodies: three villages had only one child positive, and one village (Bayan Dutse) had four children positive. In 1994, 20% of the children in these villages were positive by skin snip (a much less sensitive test). In Bayan Dutse, where transmission of onchocerciasis was once particularly intense, infection rates in young children have decreased from 18-20% to 6% (Table 7). *The low level of onchocerciasis antibodies detected in children in 2001 suggests that mass treatment with Mectizan may have interrupted O. volvulus transmission in some, but not all, villages.*

These same 747 children were tested by the LF ICT card test, and 17 (2%) were positive for LF antigen. This suggested that Mectizan alone might not be interrupting transmission of LF. In addition, the prevalence in this age group was not sufficient to allow it to be used as an indicator group to measure impact of combined treatment. Further assessments need to be carried out to determine the appropriate age range to measure impact (see Annex 5).

***APOC:*** All GRBP projects in Nigeria have now transitioned to the APOC CDTI strategy.

***Jos Training Center:*** The Sustainable Management Training Center (SMTC) is a project carried out in collaboration with the CDC and Emory University with the goal of developing better management skills for project planning and implementation (e.g., problem solving, financial management, the use of data in decision making, and logistics). To date, the SMTC has trained 268 participants in all states of Nigeria, with the exception of Akwa Ibom and Rivers. SMTC was supported by a grant by the Shell Oil Company Foundation through 1998. Unfortunately, as a result of decreased funding, the SMTC held few management training workshops in 2001, although it continued to provide follow-up support to ongoing student projects.

***Sustainability Indices:***

***Community support:*** In previous years, the degree of participation of community members to the CDTI process has been a challenge, and communities have seen the program as belonging to the government rather than to them. However, in 2001, 100% of the communities were involved in planning and implementation of CDTI. Lack of community support for CDDs remains a problem, as only 45% of the communities supported their CDDs. CDD attrition has also been a problem, with 34% of CDDs not returning to CDTI in 1999, and 36% of CDDs not returning in 2000 (Figure 10).

***Government support:*** All CDDs, selected by their respective communities, were supervised by governmental primary health care (PHC) workers in 2001. Generally, Local Government Areas (LGAs) made more monetary contributions than did the States (Figure 11). In addition, some GRBP-assisted LGAs included a line item for onchocerciasis control in their 2001 budgets, but only 44% of these endemic LGAs released funds for onchocerciasis control activities. The best GRBP experience with LGA support has come in Delta, Ebonyi, Enugu, and Edo States (Figure 12). Of the 66 LGAs in those states under mass treatment, 33 (50%) have released at least some funds towards the support of Mectizan® treatment activities. Although the LGAs in Imo State contributed less than the LGAs in most other states, all 24 of their LGAs contributed something. State government support for onchocerciasis control activities has been especially poor. Of the nine GRBP-assisted states, only five budgeted for onchocerciasis activities. Actual releases of funds only occurred in four of those states (Figure 13).

***Cost per treatment:*** The overall cost per treatment in GRBP-assisted states in Nigeria was US $0.20 in 2001. This was a slight decrease compared to 2000 at US $0.21 (Figure 6).

***Lymphatic filariasis/schistosomiasis initiative in Plateau and Nasarawa States:*** With financial support since 1998 from GlaxoSmithKline, the manufacturer of albendazole, GRBP Nigeria has worked with the Federal Ministry of Health of Nigeria (FMOH) and local and state governments to provide annual combination Mectizan® /albendazole treatment for lymphatic filariasis (LF) and praziquantel treatment for urinary schistosomiasis (SH) in Plateau and Nasarawa States. Health education is an integral part of both components of this initiative. A discussion of the 2001 assessment activities for LF and schistosomiasis treatment activities in Plateau and Nasarawa is provided in Annex 5.

***Challenges to the Onchocerciasis Program:***

- State and LGA financial support for the program remains a serious problem for future sustainability of onchocerciasis control in Nigeria. Without government commitment, the challenges remain to devolve the program to state and local governments and to maintain treatment coverage.

- Other primary health care programs pay community based heath workers. This puts the CDTI strategy of APOC at a disadvantage, and threatens the sustainability of the program.

**RECOMMENDATIONS 2002 for GRBP NIGERIA**

***Treatments:***

- Monitor CDD attrition and replacement.
- Continue to monitor adverse reaction reports, especially in areas where *Loa loa* is highly prevalent.

***Lions*:**

- Work with the local Lions District 404 to maintain their active role in the Nigeria program.

***Government support:***

- Nigeria should provide more financial and material support for the program from all levels of Nigerian government, (federal, state and local) which (with few exceptions) has contributed only minimally to the national onchocerciasis effort so far.
- Publish the analysis of the contributions.

***Transmission impact:***

- Prepare ICT study for publication in the near future.
- Continue to analyze data from the sentinel village evaluations in Plateau and Nasarawa States, supplemented by additional field observations and studies, with focus on the impact of treatment on reducing the transmission of onchocerciasis. Some of this work could be linked to the LF transmission evaluation impact studies.

**Map 1**

**Figure 7**

**Figure 8**

**Figure 9**

**Figure 10**

**Figure 11**

**Figure 12**

**Figure 13**

**Table 5**

**Table 6**

**Table 7**

## UGANDA

Onchocerciasis affects about 1.8 million persons residing in 18 (out of 39) districts in Uganda. Currently, GRBP-assisted programs are active in 11 endemic districts: Kisoro, Kabale, Kanungu[1], and Kasese in the Southwest focus bordering the Democratic Republic of Congo (DRC); Nebbi, Moyo and Adjumani in the West Nile focus bordering Sudan and DRC), Gulu and Apac (the Middle North focus); and Mbale (now including Sironko District) in the Mount Elgon focus in the east, bordering Kenya (Map 2, which does not show the new districts of Kanungu and Sironko). GRBP-assisted districts in Uganda operate at full coverage.

***Treatments:*** The program helped to treat 932,147 persons, which represents 99% of its 2001 ATO, which is the equivalent of the ultimate treatment goal (UTG) (Table 8). GRBP assists 65% of all Ugandan treatments (1,466,562) (Figure 14). Mass treatment activities took place in 1,977 at risk villages. All eleven districts achieved over 90% coverage of the eligible population in 2001, compared to eight in 2000. In 2002 GRBP plans to assist in treating 974,900 persons in Uganda with Mectizan®, an increase of 3% compared to the 2001 ATO (Table 3). In addition, 11,869 persons were treated passively (clinic-based) and 12,677 visitors were treated.

**Training/Retraining:** A total of 21,276 community heath workers were trained in 2001, 52% of whom were female (Figure 15). Most of those trained (20,334) were community-directed distributors (CDDs). Of the 942 community supervisors, 30% were women.

Health education was carried out at the kinship level through drama groups, posters, radio, and video.

***Mectizan®:*** In 2001, a total of 2,855,492 3mg Mectizan® tablets were distributed by GRBP. The overall average (3 mg) tablets used per person treated in 2001 was 2.98.

***Lions Club International*:** In 2001, former President Jimmy Carter traveled to Uganda and met with members of the Lions Clubs of Uganda in Kampala. They discussed issues relating to the Global 2000 River Blindness Program, including the history of Lions' involvement in onchocerciasis control activities. He thanked the Lions for their involvement in monitoring the program and advocacy issues at the district level through local Lions Clubs.

[1] Rukunjiri district was divided into two districts: Kanungu and Rukunjiri. All oncho endemic communities are located in Kanungu.

***Sustainability indices:***

***Community support****:* Community involvement in 2001 is believed to have exceeded year 2000 levels due to the increased recruitment and training of community supervisors. The ratio of community supervisors to kinship zones was 1:6 (compared to 1:12 in 2000). People are more willing to volunteer their time to work within their own kinship zones. Use of kinship zones within individual communities as centers for decision making and health education reduced the need for monetary incentives for CDHWs and the number of days for treatment to less than a week with improved coverage.

***Government support****:* The need for districts to begin disbursing their own funds to support onchocerciasis control activities is considered critical to achieving sustainability. Currently, all funding requirements are met by external agencies, yet APOC stipulates that external funding must decrease over time. Most districts and the central government have not yet begun to contribute funds towards CDTI activities, although budgets for onchocerciasis were considered adequate. As in Nigeria, disbursement of funds in some cases was not done within the expected time.

***Cost per treatment****:* Overall, cost per person during 2001 was US $0.11 (down from US $0.14 in 2000). This index ranged from US $0.07 to 0.74, primarily due to economies of scale (Table 9).

***Operations Research:*** In 2001, the program completed a study supported by APOC on the involvement of women in CDTI. The final report concluded that the involvement of women in CDTI activities is important in sustaining the program. The report is being prepared for publication.

Funds have been secured from APOC to conduct a training course in research methods, basic statistics, and computer skills for health workers.

***Constraints:***

- There was a shortage of training materials for community supervisors and CDDs.
- There is need to further enhance involvement of community members in decision-making at the kinship level.
- New districts and communities were carved out of onchocerciasis endemic areas.
- There is a need to secure monetary contributions from districts for onchocerciasis control activities.

**RECOMMENDATIONS 2002 for GRBP UGANDA**

- Continue to select new CDDs and supervisors. Monitor attrition rates of male and female CDDs.

- The program could easily integrate LF and SH activities into CDTI, as is being done in parts of the Nigeria program.

- Continue to encourage districts to provide monetary support to the program.

- Complete the training of district onchocerciasis coordinators in computer skills and research methods.

- Continue to publish GRBP operations research work with a focus on sustainability issues.

Map 2

Figure 14

Figure 15

Table 8

Table 9

## CAMEROON

Onchocerciasis is widespread in Cameroon, with some 5.1 million people infected, and about 62% of its population of 15 million at risk of infection. About 60,000 people are estimated to suffer some degree of visual impairment, and perhaps 1 million persons have onchocercal skin disease. Mectizan treatment using CDTI has been accepted as the principal strategy for onchocerciasis control. However, the Cameroon ministry of health (MOH) strategy for Mectizan distribution uses a "cost recovery" system in which 100 central African francs (CFA) (about US $0.20) are charged for each Mectizan treatment to cover distribution costs. The money is used to pay for supervision (per diem), the maintenance and fueling of motorcycles, and other costs, some indirectly related to Mectizan distribution.

Children under the age of 15 pay only 10 CFA and the indigent pays nothing. The distribution of funds obtained from the cost recovery system is as follows:

| | |
|---|---|
| 5% | Drug procurement for treating minor side effects |
| 25% | Oncho fund to be saved for post APOC support |
| 25% | Incentives for community distributors |
| 15% | Distribution activities (including adverse reaction drugs) |
| 15% | Operation expenses at the MOH |
| 15% | Supervision |

Although it has been postulated that the cost recovery system was contributing to low rates of treatment coverage in Cameroon, there has been no change in the MOH mandate for cost recovery in the Mectizan program.

The River Blindness Foundation (RBF) began assisting the MOH in North Province (the most highly endemic area for blinding onchocerciasis in the country) in 1992. North Province, which obtained APOC support in 1999, is the only GRBP project not currently assisted by LCIF (Map 3). In August 1995, the Lions SightFirst launched a project, supervised by Lions District 403B and in partnership with the MOH and four NGDOs (RBF, Helen Keller Worldwide, International Eye Foundation, and Sight Savers International), to distribute Mectizan in 3 other provinces (Centre, Adamaua, and West) over a 5-year period. GRBP became responsible for assisting West Province in 1996. The original SightFirst Cameroon project ended in early 2001, when an extension was granted to supplement new APOC projects in the LCIF-assisted zones, including West Province.

***Treatment Activities:*** The total number of GRBP-assisted treatments in Cameroon for 2001 was 926,644, which was 86% of the GRBP annual treatment objective (ATO) (Table 10). Of these, 228,421 (97% of province ATO) treatments were achieved in North Province, while 698,223 in were achieved in West (83% of province ATO). Compared to 2000, GRBP-assisted treatment activities in Cameroon increased by 11%. Treatment activities took place in 2,673 at-risk villages. As in previous years, GRBP provided over 60% of all treatments in Cameroon (Figure 16). The ultimate treatment

goal for GRBP Cameroon is 1,615,216 treatments per year, meaning that the 2002 ATO (1,291,112) aims to reach 80% of that full coverage goal.

Treatment activities in North Province in 2001 increased by 7% to 228,421 treatments from 214,254 (Figure 17). All targeted health districts in the North achieved at least 80% of their ATO in 2001. The North program increased its 2002 ATO to 239,550, an increase of 12% from 2001 (235,864). The UTG for North Province is 239,550.

The treatment activities in West Province increased by 13% to reach 698,223 (Figure 17). Expansion through the three phases of the original 1996 action plan was completed in September 1998, and now all targeted health districts are under Mectizan treatment. The West Province program showed dramatic improvement in meeting its ATO in 2001 (Figure 18). The 2002 ATO for West Province is 1,051,562, an ambitious 21% increase over 2001 (843,325). The 2002 ATO will be 76% of the UTG for West Province (1,375,666).

The West Province program faces challenges of obtaining good treatment coverage in urban districts where the mean ATO coverage is 75%, compared to 109% in rural districts (Figure 19). Two observations made during the review were: 1) ATO figures in rural areas consistently exceeded 100% and 2) CDTI is more difficult to implement in urban areas due to challenges related to less rigid traditional social structure and difficulty in assessing census numbers. As a result, the primary strategy used in the urban areas of West Province is health center outreach. In need of further study are options to adapt the CDTI strategy to urban communities.

***Training:*** In the North in 2001, training activities took place at all levels: provincial, district, and community. A total of 19 provincial staff, 54 district staff, and 1,259 community-directed distributors (CDDs) in 528 endemic communities (an increase in CDDs of 70%) received training. This increase reflects that the program has ”reoriented” itself such that now 100% of the communities are implementing CDTI (Figure 20).

In the West in 2001, training activities also took place at the provincial, district, and community levels. A total of 10 provincial staff, 27 district staff, and 1,992 community-directed distributors (CDDs) in 894 endemic communities received training.

***Mectizan:*** In 2001, a total of 2,014,688 tablets were distributed in the West Province and 560,094 in the North. As of December 2001, the West Province had 29,376 Mectizan tablets on hand and the North had 88,573 Mectizan tablets. Orders need to be submitted soon to the MDP for 2002 tablet needs.

***Loa loa:*** Loiasis is endemic in the forested areas of west central Africa, including Cameroon. Compared to the filarial parasites that cause onchocerciasis and lymphatic filariasis, *Loa loa* causes no serious disease, although the occasional subconjunctival migration of a worm across the eye can be disconcerting to the infected person. Unlike onchocerciasis, where the microfilariae (mf) are found in the skin and eyes, those of *L. loa* are found in the blood, and can occur in spectacular concentrations. The

effectiveness of Mectizan® against *L. loa* remains a subject of research. At doses used for onchocerciasis (150-200 ug/kg), Mectizan® reduces *L. loa* microfilaremia to about 14% of its pretreatment level for up to one year after treatment. It is unlikely that Mectizan® kills adult *L. loa* parasites in humans. The concern with *Loa loa* is the occurrence of a rare central nervous system (CNS) reaction (resulting in a stupor or coma) that is related to the rapid killing of *Loa loa* microfilaria in the blood. Persons with 'heavy infections,' (e.g., numbers of *L. loa* mf $\geq$30,000 mf per milliliter of blood) are at greatest risk of a CNS event. The risk of CNS reaction in this individuals is almost always on their first exposure to Mectizan. The Mectizan Donation Program (MDP) requests that programs distributing ivermectin for onchocerciasis control programs follow recommendations (see Annex 4) where *L. loa* is known to be endemic to allow for rapid identification of coma events and appropriate management of patients in referral peripheral health care settings. Peripheral care settings are preferred since it is there where their families can remain close by to provide nutrition and nursing care. GRBP assisted programs adhere closely to the recommendations of the MDP.

To date, there have been 63 patients meeting the case definition of Loa CNS reactions post ivermectin treatment reported to MDP (Dr. Nana Twum-Danso, MDP, personal communication). Fifty-seven of these cases (90%) have occurred in Cameroon, and most of these (82%) in Center Province. The GRBP-assisted program in Cameroon has had a total of seven CNS cases potentially related to *Loa loa* since 1996, all of which have occurred in West Province. Of these seven patients only two were native to West Province, and both of these were from Malantouen Health District, in the northeastern part of the province. The other five persons with CNS events post Mectizan treatment originated from provinces other than West (four were from Northwest Province and one from Adamaoua). There have been two deaths (one in 1998 and another in 1999).

In 2001, there were five cases of probable *Loa* CNS reactions post Mectizan treatment, all of whom were successfully managed with peripherally based nursing care. All patients recovered without long-term sequellae. Overall, CNS reactions in West Province are extremely rare, occurring at the rate of 3 cases per 1 million treatments. However, the rate of CNS cases in 2001 more than doubled, compared to previous years, to 7 cases per million treatments (Figure 21). The reason for this increase is not clear.

Surveillance structures for monitoring adverse reactions in all GRBP-assisted areas will be maintained and strengthened in 2002. The provincial health delegates and the provincial chiefs of community health have been informed about *Loa loa*-related reactions, and the risks associated with treatment. The referral and treatment program for patients with such reactions, which is integrated into the primary health care system, will be retrained and re-supplied. As mentioned above, both nursing care and nutrition are key to the patients recovery. Patients are therefore managed in district hospitals, so that their families remain near to help with their nursing care.

***APOC:*** In 1999, 40% of the communities in North Province trained CDDs to carry out the CDTI strategy of APOC. In 2000, 70% of communities had made this transition, and

in 2001 all had conducted Mectizan distribution using the CDTI strategy (Figure 20). In 2000, GRBP Cameroon obtained APOC support for West Province to fund a similar transition process into CDTI. In 2001, 35% (894) of the communities implemented CDTI. In 2002 the program plans to add 982 villages, a 10% increase from 2001. All GRBP-assisted villages will be under CDTI by the end of 2003.

***Sustainability Indices:***

***Community involvement:*** In the North province in 2001, all communities treated had village health committees that assisted in Mectizan distribution. The communities were also involved in the design and implementation of the program in all but two districts (Lagdo and Touroua). Community-based workers have become more involved with delivering treatment. A local NGO in West Province, MOJE, has shown itself to be a promising channel for sustainability, playing a role in community mobilization/sensitization. Use of local NGOs still needs operational research, as well as additional APOC funding.

***Government involvement:*** The integration of the program into the National Primary Health Care system has been relatively successful, but little money has been released by the government in support of the program.

The cost recovery system in the North and West provinces resulted in the collection of 17,619,920 CFA (USD 25,171) in the West, and 4,992,550 CFA (USD 7,132) in the North. GRBP is not involved in the management or accountability of these funds.

***Cost per treatment:*** Cost per treatment in 2001 averaged US $0.19 (US $0.17 in the West and US $0.24 in the North). However, this figure excludes cost recovery monies and the Ministry of Public Health contribution. Compared with 2000, costs decreased slightly overall (from US $0.20 to $0.19). They were stable in the West but decreased in the North (from US $0.29 to $0.24).

***Challenges & Constraints:***

- *Loa loa* coendemicity in West Province.
- Heavy APOC and Lions administrative burden on NGDOs and MOPH staff.
- Insecurity in the North (bandits).
- Poor population for calculating ATOs and UTGs.
- Mass treatment of urban communities.
- Increased demand for incentives by community members, health personnel, and local authorities.

**RECOMMENDATIONS 2002 for GRBP CAMEROON**

***North Province (APOC):***

- Consider an evaluation of the effectiveness of the cost recovery policy.

***West Province:***

- Maintain surveillance for *Loa loa*-related adverse experiences; patients identified should be managed in accord with TCC/MEC guidelines.
- Expand program to reach the UTG. Monitor ATO figures carefully (noting that in 2001 rural districts treatments commonly exceeded ATO in 2001).
- Establish the needed administrative structure to allow full and effective utilization of APOC and Lions resources.
- Consider new approaches to meet the challenges of urban mass treatment.

***Mectizan:***

- Early completion and submission of Mectizan orders to MDP is critical. The Cameroon program should avoid requests for “amendments” and repeated shipments of Mectizan.

Map 3

Figure 16

Figure 17

Figure 18

Figure 19

Figure 20

Figure 21

Table 10

## SUDAN

There are an estimated two million persons at risk of onchocerciasis in Sudan, and 10,000 cases of onchocerciasis-related blindness. Of the several endemic areas in the country, the southern (principally southwestern) focus is the most significant and is characterized by high prevalence of blinding onchocerciasis (Map 4). Some of the highest rates of blindness due to onchocerciasis in the world occur in southwest Sudan.

The decades-old civil war in Sudan continues, and as a result, channels of communication between the Government of Sudan (GOS) and the non-government held areas in the south remain key to coordinating and accelerating progress in the onchocerciasis control program. Operation Lifeline Sudan (OLS) is a consortium of non-governmental development organizations (NGDOs) working in the contested southern part of the country, led by the United Nations Children's Emergency Fund (UNICEF). Within the structure of the OLS, Health Net International (HNI) is the NGDO that coordinates the distribution of Mectizan® in OLS areas in a program known as the South Sudan Onchocerciasis Control Program (SSOCP). HNI orders and stores Mectizan for NGDOs with onchocerciasis control activities in areas served by OLS. HNI works to standardize training and reporting formats for the NGDOs engaged in treatment activities. In 2001, a total of 22 NGDOs expressed interest in distributing Mectizan® treatment in southern Sudan (Table 11). Since 1996, 35 NGDOs have participated in onchocerciasis activities in southern Sudan, however insecurity and funding issues have made continuous long-term assistance difficult (Table 12). All parties work closely with the Sudan Relief and Rehabilitation Association (SRRA), which is the humanitarian arm of the resistance group, the Sudan People's Liberation Movement. In 1997, Sudan established a National Onchocerciasis Task Force (NOTF) that includes both the GOS and SSOCP. The NOTF receives support for Sudan's campaign against onchocerciasis from the Lions Clubs International Foundation (LCIF) (through The Carter Center) and the African Program for Onchocerciasis Control (APOC). In 2001, the Southern Sector Onchocerciasis Task Force (SSOTF) was established by SRRA to respond to the technical and management issues that arise within the treatment areas under opposition control. The Carter Center has a seat on both the NOTF and the SSOTF.

***Treatment Activities:*** Treatments in Sudan have been steadily increasing, despite the war, since former US President Jimmy Carter negotiated a four month long "Guinea worm cease fire" in 1995, that also helped to launch Mectizan® treatments in conflict areas. In 2001, LCIF funds, provided through The Carter Center, helped support the GOS and two NGDOs active in the SSOCP: Zud Ost Asia (ZOA) and International Medical Corps (IMC). A total of 443,082 persons received health education and Mectizan® treatment in Sudan, a 2% decrease compared to the 2000 total of 451,573. This represented 79% of all treatments administered (Figure 22).

Of the 2001 GRBP-assisted treatments (443,082), 80% (352,269) were administered by GOS with support from LCIF, GRBP and APOC, and represented 77% of the GOS ATO of 458,744. The remaining treatments (90,813) were administered in OLS areas, by ZOA and IMC, with assistance from GRBP. This represented 54% of the ATO for the

GRBP-assisted NGDOs in Operation Lifeline Sudan (166,889). Another 119,986 treatments were given by other NGDOs operating within the SSOCP (Table 13). Thus, the total treatments provided by SSOCP in rebel held areas in Sudan in 2001 numbered 210,799, an increase of 31% compared to 2001 (160,529 treatments). The total number of treatments administered in all of Sudan was 563,068, a 1% increase over 2000 (559,437). The distribution of treatments by area is shown in Figure 23. The 2002 ATO for Sudan was given as 402,481 for GRBP-assisted GOS areas and 247,468 for GRBP-assisted NGDOs in SSOCP. Thus, the 2002 ATO for GRBP in Sudan is 649,949. The crude ultimate treatment goal (UTG) for GRBP Sudan affiliated programs is an estimated 743,230, meaning that the 2002 ATO (649,949) aims to reach 87% of that full coverage goal. Revisions of the ATO and UTG are expected, given the country's complex situation.

***Training/Retraining:*** In 2001, in GOS areas, training occurred for a total of 751 community-directed distributors (CDDs) and health workers (Figure 23). The SSOCP areas trained 687 CDDs and health workers. Overall, a total of 1,438 CDDs and health workers were trained in Sudan.

***Mectizan®:*** In 2001, GOS received 1,227,000 3mg tablets of Mectizan. The OLS area received 1,800,000 tablets. The logistical demands of monitoring Mectizan tablets in the field are a major difficulty for HNI. By the end of the year, 1,000,000 tablets had yet to be accounted for in the south.

***Loa loa*:** Two serious reactions were reported in 2001 in areas assisted by GRBP (both in Yambio) where 49,017 treatments were administered. Both cases had a central nervous system component, and both were in patients later determined to have co-infection with *Loa loa* (see Cameroon section and Annex 4 for a discussion on *Loa loa*). The patients recovered.

Surveillance structures for monitoring adverse reactions were strengthened in 2001 with technical assistance from a consultant supported jointly by health officials, HNI and The Carter Center. Surveillance for *Loa loa*-related adverse experiences will continue, and patients identified managed in accord with TCC/MEC guidelines.

***Sustainability indices:***

> ***Community involvement:*** In general, communities are committed to the distribution of Mectizan® using CDTI. Many communities select their CDDs, and some community leaders promote ownership of the program and contributions to CDDs for their efforts. More women have been participating in workshops and as CDDs. In 2001, community involvement in onchocerciasis control activities included: Oncho Day in Juba; support of "oncho-clubs;" and "CDD of the year" recognition awards.

***Government involvement:*** The onchocerciasis control program is viewed at the highest governmental levels as an example of a successful health delivery system. Onchocerciasis control supervisors are knowledgeable and work well with the community health department. CDTI fits well into the Sudanese health policy that now stresses maximizing community ownership and participation.

The integration of the onchocerciasis control program into the primary health care system has progressively strengthened the PHC system, despite the war. Due to a shortage of health staff, onchocerciasis coordinators are often coordinators of other programs, and many of the CDDs are also volunteers for Guinea worm disease eradication and other disease eradication or control programs. Such integration has also strengthened the onchocerciasis program.

As a show of support to The Carter Center's efforts (including the onchocerciasis control program), Mr. Elvin Hilyer, Carter Center Resident Technical Advisor in Khartoum, was honored in November 2001 by the Vice President of Sudan with the "Order of the Two Niles," Sudan's highest civilian honor. In addition to Mectizan distribution efforts, Mr. Hilyer worked on the Guinea worm eradication effort and trachoma control activities.

***Cost per Treatment:*** The cost per treatment in 2001 was considerably above that recommended by APOC, and calculated at US $0.74. The high cost underscores the principle that distribution in conflict areas will be more expensive.

***Constraints:***

- Accessibility problems due to the civil unrest, flood, famine, drought, and mass population displacement (Map 5).

- Continuous reshaping of the population and the CDDs.

- Demand by the CDDs for remuneration (and comparisons by CDDs to monies received from other programs)

- Treatment activities required in areas devoid of any health infrastructure, or in areas where the Primary Health Care system is non operational.

- To facilitate Mectizan® coverage in remote areas, frequent travel to the affected zones by government officials and supervisors is necessary. Often agencies and programs do not have vehicles on site, and therefore must share available resources with other programs. Vehicles are often lost to the warring parties. Air travel is the normal method of transportation into southern Sudan from the OLS base in northern Kenya.

- In 2001, the program recognized that some areas of southwestern Sudan were coendemic for *Loa loa.*

**RECOMMENDATIONS 2002 for SUDAN**

- Flexibility and creativity must be employed whenever possible when applying WHO/APOC guidelines and Mectizan® delivery strategies under the conditions that currently exist in Sudan. Some creative activities may include: training of military personnel to be distributors; oncho clubs; "CDD of the year;" and certificates of appreciation.

- APOC should provide more technical assistance to the Sudan program, especially in the south. A Sudan technical advisor was suggested for SSOCP/SSOTF.

- Health education materials should be established with the aim of reducing the fear of potential side effects from Mectizan®.

- Refine the eligible at-risk, total population, ATOs, and UTGs as a continuous exercise.

- Improve monthly reporting of data by GRBP-assisted programs in Sudan, perhaps through clear reporting guidelines, schedules, and a Memorandum of Understanding with participating NGDOs.

- Monitor the impact of the demands on CDDs by other programs and higher health priorities.

- Implement (as best as the situation on ground permits) MEC guidelines for *Loa loa* coendemic areas.

**Map 4**

**Map 5**

**Figure 22**

**Figure 23**

**Figure 24**

**Table 11**

**Table 12**

**Table 13**

## ETHIOPIA

Ethiopia is the largest, most populous country in the Horn of Africa, with over 60 million people and an area of 435,000 square miles. Onchocerciasis was first reported in southwestern Ethiopia in 1939 by Italian investigators. The northwestern part of the country was reported to be endemic in studies conducted in the 1970's. Onchocerciasis endemicity was further evaluated in Rapid Epidemiological Mapping of Onchocerciasis (REMO) exercises conducted in 1997. REMO was completed in 2001, and the results indicated that out of 6 regions surveyed, all regions were endemic for onchocerciasis and 4 out of the 5 had areas that were meso- or hyperendemic (Map 6). Currently, it is estimated that 7.3 million persons are at risk of onchocerciasis, and 1.4 million are infected.

The National Onchocerciasis Task Force (NOTF) was established in 2000 and functions through the Ministry of Health's (MOH) Malaria and Other Vector Borne Disease Control Unit (MOVDCU). Mr. Teshome Gebre, Global 2000 country representative, is secretary of the NOTF. A National Plan of Action for onchocerciasis control activities in Ethiopia was drafted at a workshop in Nazareth on September 14, 1999, with assistance of many partners, including The Carter Center. The plan proposed phasing the delivery of Mectizan® tablets and health education into onchocerciasis endemic areas identified in the 1997 REMO exercise. Table 14 shows the schedule for CDTI project development by phase in Ethiopia, according to the National Plan. In December 1999, the MOH invited The Carter Center to be its partner in an application to the African Programme for Onchocerciasis Control (APOC) for support of treatment activities in Kaffa/Sheka zones of the Southern Nations Nationalities and Peoples' Region (Map 6).[2] The proposal, which was approved in 2000, targeted 50% of the eligible at-risk population in the zone (209,512) for 2001, with expansion to the Ultimate Treatment Goal (478,872) by year 2003. Programmatic activities began in 2000, including mobilization and training of distributors to carry out treatment activities using the CDTI strategy, and treatment was initiated in 2001. Currently, there are no other mass treatment onchocerciasis activities in Ethiopia.

A strong relationship with the local Lions Club contributes greatly to this effort. The Lions have played an active role in attending and sponsoring meetings, including the official launching of onchocerciasis control activities on December 5, 2000, in Addis Ababa. High-level attendance at that launching included Dr. Lamisso Hayesso (Vice Minister of Health), Dr. Ebrahim Samba (Regional WHO Director), Dr. Tebebe Y/Berhan (Vice Governor, Lions Clubs District 411), Dr. Mitchel Jancloes (WHO Representative for Ethiopia), among others.

***Treatments:*** Ethiopia launched its onchocerciasis control efforts in a GRBP-assisted area in 2001. It provided Mectizan and health education to 233,352 persons, which represented 111% of its 2001 ATO (Table 15 and Figure 25). Mass treatment activities

[2] Following the application to APOC, Kaffa Sheka zone was divided into two separate zones, Kaffa and Sheka zones.

took place in 504 endemic villages in 5 different woredas and two zones. In 2002, GRBP plans to expand the program in Kaffa and Sheka zones and to treat 548,437 persons. This is 78% of the ultimate treatment goal for Kaffa Sheka of 700,000 treatments.

***Training:*** Training in 2001 was carried out at the regional, zonal, and woreda levels. The first CDTI workshop was conducted for the region, with 39 participants. Two training sessions were conducted in Kaffa Zone and three sessions in Sheka Zone for zonal health staff. A total of 144 health care workers attended these training sessions. In both zones, a total of 934 CDDs were trained, which represents 95% of the objective (977). Health education materials provided included: training manuals, onchocerciasis information brochures, treatment registers, individual treatment cards, CDD bags, reporting pads, measuring sticks, and posters for health education activities. In addition, copies of the CDTI manual have been translated into Amharic and printed.

***Assessments:*** In November of 2001, APOC, in collaboration with the MOH, completed REMO throughout the endemic areas in Ethiopia. A total of 247 villages were selected from the SSNPR, Gambella, Oromiya, and Amhara regions. Of these, 97 were inaccessible. REMO was conducted in 150 communities. Of these, 105 (70%) were endemic for onchocerciasis. Overall, 65 communities (62%) had nodule rates less than 20%; 24 (23%) communities had nodule rates between 20-39%; and 16 (15%) communities has nodule rates $\geq$ 40%. Onchocerciasis was absent in 45 (30%) of the examined communities. Most of the meso- and hyperendemic communities were located on the western lowland zones (Map 6). Of note, North Omo was found not to be onchocerciasis endemic. (GRBP had pledged to assist North Omo in the National Plan.)

***Mectizan®:*** A total of 1,258 bottles (629,000 3mg tablets) of Mectizan were received from MDP in November 2000 and delivered to Kaffa and Sheka zones. At the end of the treatment period, 98% were used, with only 0.4% wastage, and 7,556 tablets remained in storage. The average dose was 2.6 tablets per person.

***Challenges to the Onchocerciasis Program:***

- The restructuring of zones and woredas.
- Few collaborating NGDOs (only GRBP currently participates in onchocerciasis activities).
- Competing health programs demand the time of MOH personnel.
- Remoteness of some of the CDTI areas, and transportation difficulties.
- Recent concerns that some parts of Ethiopia assisted by GRBP and targeted for CDTI may be coendemic for *Loa loa*. These concerns are based on remote sensing

data from satellites, and have not been validated as yet through field parasitologic surveys.

**RECOMMENDATIONS 2002 for GRBP ETHIOPIA**

- Expand treatment and health education in line with objectives set for 2002.
- Encourage more frequent NOTF meetings.
- Ethiopia team to visit Uganda to observe best practices in that program.
- Assist MOH in submission of new APOC proposals for Bench-Maji and North Gondar.
- Follow MEC and APOC recommendations for verification of presence or absence of *Loa-loa* in GRBP-assisted areas.

Map 6

Figure 25

Table 14

Table 15

## ONCHOCERCIASIS ELIMINATION PROGRAM FOR THE AMERICAS (OEPA)

The Onchocerciasis Elimination Program for the Americas (OEPA) is a regional coalition working to eliminate both morbidity and transmission of onchocerciasis in the Americas through sustained, semi-annual (i.e., every six months) distribution of Mectizan. The OEPA initiative began shortly after passage in 1991 of Resolution XIV of the 35th Pan American Health Organization (PAHO) Assembly, which called for the elimination of onchocerciasis as a public health problem in the Americas by the year 2007. The OEPA coalition includes ministries of health of the six countries (Brazil, Colombia, Ecuador, Guatemala, Mexico, and Venezuela), The Carter Center, PAHO/WHO, the Inter-American Development Bank, the Mectizan Donation Program (MDP) and the Centers for Disease Control and Prevention (CDC). A Program Coordinating Committee (PCC) gives representation for all of these partners, and broad directives to the OEPA office, which is based in Guatemala City, and staffed through The Carter Center. The Center also coordinates the financial assistance to the coalition as part of the Carter Center-Lions SightFirst Initiative.

***Treatment Activities:*** Treatment coverage in 2001 was reported to OEPA as a percentage of the total number of persons estimated to be eligible for treatment (the Ultimate Treatment Goal [UTG]). For the current UTG of 439,887 for the American region, 369,093 persons were treated in the first half of the year (a UTG coverage of 84%), and 332,780 persons (75.7%) were treated in the second half (Table 16). Records are not kept at the individual level, so it is impossible to calculate how many persons received treatment in the first, second, or both rounds. However, at least 369,093 persons (those treated in the first half of the year) were treated at least once (Figure 26). Figure 27 shows coverage by community, by semester in the region. Fewer endemic communities reached 85% coverage of eligibles in the second round (1,133) compared to the first round (1,499). All untreated endemic communities were in Guatemala and Venezuela.

Since 2000, OEPA has used the UTG(2) to monitor the success of programs in providing two treatments per year to all at-risk eligible individuals. The UTG(2) is defined as the number of individuals in the region who require ivermectin treatment (the Ultimate Treatment Goal) multiplied by two (since each individual should be treated twice during the course of a calendar year). A total of 701,873 ivermectin treatments were provided in 2001, resulting in an overall UTG(2) coverage for the region (using the denominator of 879,774) of 80% (Table 16). The region made considerable progress during 2001 by increasing UTG(2) coverage by 12.5% compared to 2000 (Figure 28), and reaching the coverage goal of 85% in four of the six countries (Colombia, Ecuador, Brazil, and Mexico). Only Guatemala and Venezuela were unable to reach the 85% coverage goal.

Country details of the 2001 treatment accomplishments follow:

- Brazil provided 11,488 ivermectin treatments to its eligible population of 6,382 in the northern states of Roraima and Amazonas. Coverage for the first time exceeded the 85% UTG(2) coverage goal (Figure 28), demonstrating the feasibility of delivering

treatment to migratory Yanomami communities in the remote jungle areas. Coverage during the first semester was 88%, and during the second semester 92%. The distribution strategy utilized health care centers, staffed by MOH and NGDO personnel and situated in accessible base camps ("polos"). Treatments took place in all 17 endemic polo bases (Table 17).

- For years, Colombia has effectively maintained optimal semiannual (six-monthly) treatment, despite civil unrest, in the single known endemic community (Naicioná, in the municipality of López de Micay, Department of Cauca). For the year 2001, the UTG(2) coverage was 100% (2,192 treatments of its 2,202 UTG(2)). In addition, the program was able to perform the epidemiological impact evaluations postponed due to security concerns in 2000. Results of the evaluation are pending.

- Ecuador dramatically improved its treatment coverage in 2001 over 2000 (Figure 28). The UTG(2) coverage was 91% (35,986 treatments of 39,576). Coverage was 88% in the first round and 93% in the second. All 119 endemic communities received treatment (Table 17).

- Guatemala provided a total of 264,617 treatments, reaching 83% of its UTG(2). The program reported 83% coverage during both treatment rounds as well (132,526 and 132,091 persons received treatment in the first and second rounds respectively). Seventeen (3%) of the 518 endemic communities were not treated in 2001.

- Mexico provided 297,502 treatments and achieved a coverage of 88% of its UTG(2). In the first six months, 154,914 persons (92%) were treated, with 142,588 persons (85%) reached in the second half of the year. All 670 endemic communities received treatment (Table 17).

- Venezuela had by far the lowest coverage (53%) in the region (Figure 28), providing a total of 90,088 treatments in the two endemic foci in the north of the country, and the smaller southern Amazon focus. However, performance was improved over 2001, when the Venezuelan program reached only 41% of its UTG(2). In the first semester of 2001, 57,473 persons (68%) were treated; during the second half of the year, 32,615 treatments (39%) were administered. Only 427 (70%) of 609 endemic communities received treatment, and second semester performance was particularly poor (Figure 29).

**Impact on transmission of onchocerciasis**: The thirteen foci in the Americas may be divided into three groups (Map 7): four foci currently are suspected to have no known transmission, three foci are very close to ending transmission, and six foci are still significantly endemic. The suspected non-endemic foci include Huehuetenango, Guatemala; Escuintla, Guatemala; Santa Rosa, Guatemala; and Northern Chiapas, Mexico. Onchocerciasis immunochromatographic antibody tests (ICT) were used in 2000 and 2001 to evaluate exposure to *O. volvulus* in six of the 13 foci (Figure 30). ICT conducted on 448 persons (including 286 persons under 11 years old) in 12 communities of Huehuetenango, Guatemala in 2001 were all negative; absence of

antibody positivity in children suggests little to no active transmission (adults may have antibody from exposure decades ago). ICT tests conducted on 936 persons in 23 communities of Northern Chiapas, Mexico in 2001 were also all negative. No recent evaluations have been conducted in the Escuintla and Santa Rosa foci in Guatemala (and unfortunately, the manufacturer of the ICT test kits has decided to no longer produce this useful tool). Further data are needed to officially pronounce Huehuetenango, Escuintla, Santa Rosa, and Northern Chiapas as having no transmission.

The three foci that are close to ending transmission are Oaxaca, Mexico; Lopez de Micay, Colombia; and Esmeraldes, Ecuador. In Oaxaca, Mexico, none of 210 ICT tests conducted in 2001 were positive. ICT studies conducted in Colombia showed 0% antibody prevalence in 99 children under 14 years of age. In Esmeraldes, Ecuador, of 430 persons examined by ICT test only 4 were positive: 3 in one of the two communities with positive entomological results in 2000, and 1 in one of the communities where no positive entomological evidence of residual infection was found. Earlier studies of children born in 1980-85 and in 1990-96 in one of the now negative areas of this focus documented reductions in prevalence of infection (from 64.3% to 0.0%), prevalence of microfilariae in the skin (from 4.5 mf/mg to 0.0 mf/mg), and prevalence of nodules (8.8% to 0.0%).

The six foci where onchocerciasis is still significantly endemic are southern Chiapas, Mexico; Solola-Suchitepequez-Chimaltenango, Guatemala; the north-central, north-eastern and southern foci in Venezuela; and the Roraima, Amazonas focus in Brazil. ICT studies were only carried out in southern Chiapas. Results from one community there showed 13% *O. volvulus* antibody positivity in children (Figure 30).

**IACO 2001:** OEPA and the Pan American Health Organization (PAHO) have convened InterAmerican Conferences on Onchocerciasis (IACOs) annually since 1991. The eleventh annual conference (IACO'01) was held in Mexico City, Mexico on November 26-29, 2001. In addition to representatives of the six national programs, the meeting was attended by representatives of WHO/PAHO, nongovernmental development organizations (NGDOs), the Centers for Disease Control and Prevention (CDC) and other interested parties. Key personalities addressing the theme of the conference ("How close are we to the elimination of onchocerciasis?") included former US President Jimmy Carter (The Carter Center); Dr. Maria Neira (WHO, Geneva); and Dr. Julio Frenk Mora (Secretary of Health, Mexico). The IACO meetings receive financial support from The Carter Center/Lions Clubs International Foundation, the Inter-American Development Bank (through 2002), and PAHO.

IACO'01 heard encouraging results from Dr. John Davies (formerly Liverpool School of Tropical Medicine) on his simulation model of onchocerciasis in the Americas (SIMONa). The model, using data gathered from a hyperendemic sentinel community in Ecuador that has been under ivermectin mass treatment since 1991, predicted that *O. volvulus* would be eliminated from that community (i.e., no risk of recrudescence) by 2005. However, scientists at IACO'01 noted that, prior to stopping mass ivermectin

treatments in an endemic area, new diagnostic tests were needed that could confirm the model predictions that viable adult *O. volvulus* worms had been completely eliminated.

**The most important recommendations from IACO'01:**

(1) All programs should reach or sustain two treatments per year [with at least 85% coverage of the UTG(2)] in all communities known to be endemic by the end of 2002. Special support is needed for Guatemala and Venezuela to reach that goal.
(2) OEPA should focus monitoring on communities where treatment coverage is below 85%.
(3) The SIMONa mathematical model should be adapted to the transmission dynamics and vector species in other countries.
(4) Additional financial and political support is needed to help the country programs reach the goal to stop new transmission of onchocerciasis throughout the region by year 2007, and maintain this state through the certification process.

**OEPA effort reviewed by the International Task Force For Disease Eradication**

At its June 2001 session of the International Task Force For Disease Eradication (ITFDE) convened at The Carter Center in Atlanta, Georgia. The OEPA regional initiative was carefully reviewed by the committee. They concluded:

1. The scientific feasibility of eliminating ocular morbidity and interrupting onchocerciasis transmission in the Americas, using currently available tools, is clear.

2. The primary remaining concern is whether all six programs can reach and maintain at least 85% coverage of the UTG(2). This is particularly a concern in southern Venezuela, where access to the at-risk population is an issue, but which contains only 1% of the persons at risk in the Americas.

3. The OEPA needs to address specific operational, political, and financial constraints in order to escalate its advocacy and help the endemic countries to intensify interventions against onchocerciasis in all remaining endemic foci. Consideration should be given to selective use of vector control, and to making nodulectomy available on a voluntary basis (separate from Mectizan distribution) when prevalence of onchocerciasis becomes low.

4. Priority research needs include an effective macrofilaricide, an antigen serological test for onchocercal infection, and better understanding of the significance of low transmission levels.

5. It is important that ICT antibody tests continue to be available in order to facilitate evaluation of onchocerciasis in the Americas.

**RECOMMENDATIONS 2002 for OEPA:**

***Treatments:***

- All programs should provide two treatments per year (with at least 85% coverage of eligible populations in each round). This would require that all programs report their treatment data by treatment round and by community.
- OEPA should continue to develop data management processes so as to evaluate treatment coverage in each of the known endemic communities in the Region.
- Guatemala should strengthen community-based ivermectin delivery (through the use of community volunteers) in areas where transmission continues, and attain >85% of its UTG (2). Such community-based ivermectin delivery might also be applicable to Chiapas State, Mexico, where transmission continues.
- Venezuela desperately needs additional political will and funding to strengthen the program in 2002.

***Funding:***

- Some core support for OEPA Headquarters is provided under the expanded Lions/Carter Center partnership, but this is not sufficient. New funding is crucial for OEPA, particularly considering that the Inter-American Development Bank (IDB) grant expires in 2002. OEPA needs to secure resources to help support country program field activities (that could not be provided under the IDB agreement, which only supported technical assistance).

***Transmission:***

- Further documentation of the "suppression" of transmission in certain areas of the Americas using the new ICT test for onchocerciasis antibody.
- Continue to apply polymerase chain reaction (PCR) techniques to measure infection rates in all major American black fly vectors in countries (by University of Alabama Birmingham).
- Use SIMONa to model transmission dynamics in other areas besides Ecuador. Determine the importance of low level infection in vectors to transmission and predictions of parasite elimination.
- Seek ways to escalate the attack on onchocerciasis using other interventions in combination with Mectizan and health education. In particular, use of antibiotics against the *Wolbachia* endosymbionts should be explored in collaboration with CDC.

***Certification:***

- Carry out new "preparatory exercises towards certification of elimination" in suspected non-endemic foci of Escuintla and Santa Rosa in Guatemala.
- Increase political support with the assistance of President Carter in Venezuela.
- Availability of rapid serologic testing for antibody (such as the ICT) or the development of a rapid adult antigen testing system (such as is available for LF) are extremely important for certification in the Americas.
- The presence of punctate keratitis in ocular examinations may not be as specific for onchocerciasis as previously believed. Its use as an indicator for morbidity of ocular onchocerciasis should be critically reviewed.

Map 7

Figure 26

Figure 27

Figure 28

Figure 29

Figure 30

Table 16

Table 17

# *ANNEXES*

## ANNEX 1: LIST OF PARTICIPANTS

### GRBP Headquarters

Dr. Rachel Barwick
Mrs. Nwando Diallo
Mrs. Sara Hodgson
Dr. Donald Hopkins
Mrs. Nicole Kruse
Mrs. Dana Lee
Ms. Wanjira Mathai
Mr. Stanley Miano
Ms. Lindsay Rakers
Dr. Frank Richards (Chair)
Dr. Ernesto Ruiz-Tiben
Ms. Shandal Sullivan
Ms. Stacy Taylor
Mr. Craig Withers
Dr. James Zingeser

### Country Representatives

Dr. Bellario Ahoy Ngong - SRRA Sudan
Ms. Kelly Callahan - Sudan
Dr. Albert Eyamba - Cameroon
Mr. Teshome Gebre - Ethiopia
Dr. Mamoun Homeida - NOTF Sudan
Dr. Nimzing Jip - Nigeria
Dr. Moses Katabarwa - Uganda
Dr. Kenneth Korve - Nigeria
Dr. Emmanuel Miri – Nigeria
Ms. Irene Mueller - HNI, SSOCP
Dr. Jeremiah Ngondi - Sudan
Mr. Mark Pelletier - Sudan
Dr. Mauricio Sauerbrey - OEPA

### Mectizan Donation Program

Dr. Mary Alleman
Dr. Bjorn Thylefors
Dr. Nana Twum-Danso

### Other participants

Dr. David Addiss – Division of Parasitic Diseases, CDC
Dr. Steve Blount – Office of Global Health, CDC
Dr. Jack Bunn - Ophthalmologist

Mr. Ross Cox - Office of Global Health, CDC
Dr. Ed Cupp - University of Alabama, Birmingham
Dr. Ali Khan - Division of Parasitic Diseases, CDC
Dr. James Maguire - Division of Parasitic Diseases, CDC
Dr. Rebecca Teel Daou - Lions Clubs International Foundation
Dr. Tom Unnasch - University of Alabama, Birmingham

**ANNEX 2:**

**AGENDA**
**Sixth Annual Program Review Meeting**
**Global 2000 River Blindness Program**
**The Carter Center, Cecil B. Day Chapel**
**March 13-15, 2002**

## Wednesday, March 13

| | | |
|---|---|---|
| 8:00 | Shuttle pickup at hotel | |
| 8:30 - 9:00 | Continental Breakfast | |
| 9:00 - 9:15 | Welcome, introductions and remarks | Dr. Frank Richards (Chair) |
| 9:15 - 9:30 | The 'State' of GRBP: Reporting | Dr. Richards |

Nigeria

| | | |
|---|---|---|
| 9:30 - 10:30 | Nigeria (oncho) Presentation | Dr. Emmanuel Miri/ Dr. Kenneth Korve |
| 10:30 - 11:00 | Coffee Break | |
| 11:00 - 12:00 | Nigeria (oncho) Presentation | Dr. Miri/Dr. Korve |
| 12:00 -1:00 | Oncho: Discussion/Recommendations | |
| 1:00 - 2:00 | Lunch in Allen Foyer | |
| 2:00 - 3:00 | Nigeria LF Presentation | Dr. Miri/Dr. Richards |
| 3:00 - 3:30 | LF Discussion/Recommendations | |
| 3:30 - 4:00 | Coffee Break | |
| 4:00 - 5:00 | Nigeria Schisto Presentation | Dr. Miri/Dr. Richards |
| 5:00 - 5:30 | Schisto Discussion/Recommendations | |

## Thursday, March 14

| | | |
|---|---|---|
| 8:00 | Shuttle pickup at hotel | |
| 8:30 - 9:00 | Continental Breakfast | |

Cameroon

| | | |
|---|---|---|
| 9:00 - 10:30 | Cameroon presentation | Dr. Albert Eyamba |
| 10:30 - 11:00 | Coffee Break (Group Photo) | |
| 11:00 - 12:00 | Cameroon: Discussion/Recommendations | |

Ethiopia

| | | |
|---|---|---|
| 12:00-1:00 | Ethiopia presentation | Mr. Teshome Gebre |

| | | |
|---|---|---|
| 1:00 - 2:00 | Lunch in Allen Foyer | |
| 2:00 - 3:00 | Ethiopia: Discussion/Recommendations | |

Sudan

| | | |
|---|---|---|
| 3:00 - 4:00 | Sudan presentation (Part 1, GOS) | Dr. Mamoun Homeida |
| 4:00 - 4:15 | Khartoum Office Reporting Issues | Mr. Mark Pelletier |
| 4:15 - 4:30 | Coffee Break | |
| 4:30 - 5:30 | Sudan presentation (Part 2, SSOCP) | Ms. Irene Mueller |
| 5:30-5:45 | Nairobi Office Reporting Issues | Ms. Kelly Callahan |
| 5:45-6:30 | Sudan: Discussion/Recommendations | |

**Friday, March 15**

| | | |
|---|---|---|
| 8:00 | Shuttle pickup at hotel | |
| 8:30 - 9:00 | Continental Breakfast | |

Uganda

| | | |
|---|---|---|
| 9:00 - 10:30 | Uganda | Dr. Moses Katabarwa |
| 10:30 - 11:00 | Coffee Break | |
| 11:00 - 12:00 | Uganda: Discussions/Recommendations | |

OEPA

| | | |
|---|---|---|
| 12:00 - 1:00 | Onchocerciasis Elimination Program for the Americas (OEPA) (Part 1) | Dr. Mauricio Sauerbrey |
| 1:00 - 2:00 | Lunch in Allen Foyer | |
| 2:00 - 3:00 | OEPA (Part 2) | Dr. Sauerbrey |
| 3:00 - 4:00 | OEPA: Discussion/recommendations | |
| 4:00 - 5:00 | Coffee Break | |

Other items

| | | |
|---|---|---|
| 5:00-5:30 | Mectizan® Issues | MDP/GRBP staff |
| 5:30-5:45 | IRB issues | Dr. Rachel Barwick |
| 5:45-6:15 | General conclusions/reflections | Dr. Richards |
| 6:15 | Closure of sixth session | Dr. Donald R Hopkins |

## ANNEX 3: GRBP REPORTING PROCESSES

**At Risk Villages (arv's)** An epidemiological mapping exercise is a prerequisite to identifying at-risk villages (arv's) for mass Mectizan treatment programs. The assessment techniques used in the mapping exercise in Africa varies from those used in the Americas. Although detailed discussion of the mapping processes is beyond the scope of this document, a summary of the two approaches follows:

In much of Africa, a staged village sampling scheme called Rapid Epidemiological Mapping of Onchocerciasis (REMO) is recommended by WHO to define endemic "zones" that should capture most or all villages having onchocercal nodule rates $\geq$ 20% for mass treatment. The mapping strategy is based on studies that show that the morbidity from onchocerciasis occurs primarily in villages with nodule prevalences of > 20%. In the first stage of REMO, survey villages are selected from areas, which are environmentally likely to support black fly breeding and therefore transmission of *O. volvulus*. In the second stage, the survey villages are visited and a convenience sample of 30-50 adults are examined (by palpation) for onchocercal nodules. The mean nodule prevalence for each village sample, along with the latitude and longitude coordinates for that village, are entered into a geographic information system that then is used to define endemic zones (surrounding the sample villages having nodule prevalences of $\geq$ 20%). All villages falling within the treatment "zone" are considered "at-risk" and offered mass Mectizan treatment annually. In the Americas, the goal is to eliminate both morbidity and transmission from *O. volvulus*, and as a result all villages where transmission can occur are considered "at-risk" and offered mass Mectizan treatment activities every six months). It is recommended that every village in known or suspected endemic areas have a rapid epidemiological assessment of 50 adults, who would have both nodule examinations and superficial skin biopsies to identify *O. volvulus* microfilariae in skin. Villages where one or more persons are positive (sample prevalence >3.3%) are considered 'at risk,' and recommended for the mass treatment campaign. Thus, the cutoff prevalence for treatment also varies between Africa and the Americas.

**Data Reporting:** GRBP program offices are asked to submit reports monthly to Carter Center headquarters in Atlanta. These reports include 1) numbers of villages and persons treated during the previous month (reporting of treatments are updated quarterly for the Americas), 2) the status of the Mectizan tablet supply, 3) training and health education activities, 4) epidemiological assessment, research, and program monitoring activities, and 5) administrative issues. The treatment data that are reported originate from records prepared during mass treatment activities carried out by village distributors and/or national ministry of health personnel. The accuracy of these reports is routinely confirmed with random spot checks performed primarily by ministry of health personnel, supplemented by site visits by GRBP/OEPA staff, and Lions Clubs members. Summary reports of numbers of villages and persons treated are compiled at the district level and forwarded (whenever possible through ministry of health surveillance and reporting channels) to both headquarters of the national onchocerciasis programs and the national GRBP offices in Jos (Nigeria), Kampala (Uganda), Yaounde (Cameroon), Khartoum (Sudan), and Nairobi (for rebel-held areas of south Sudan). In the Americas, the ministries of health in the six countries report

treatments quarterly to the OEPA office in Guatemala City, which then provides a combined regional report to PAHO and GRBP.

The data from monthly reports are supplemented with additional information, at annual GRBP Program Reviews held the first quarter of each year. At these Reviews, all GRBP program directors and other partners convene to finalize treatment figures for the previous year, and establish new treatment objectives for the coming year. Data on Mectizan treatments provided by other programs operating in other parts of the countries GRBP assists, when available, are also discussed.

**GRBP Treatment Indices:** Treatments are reported as the numbers of persons or villages (communities) treated (TX) by state or province for the month. Cumulative treatment figures are compared to annual treatment objectives (ATOs). GRBP uses two ATOs, both of which are established based on projections of program capacity. Communities targeted for active mass distribution (arv) are to receive community wide Mectizan treatment for all eligible to take the medicine. The ATO for mass drug administration in arv's [ATO(arv)], is the total number of at-risk villages in which a program projects it will provide mass treatment during the year. The ATO for eligible at-risk population [ATO(earp)] is the number of persons who can receive Mectizan who are known or thought to be living in arv's. The eligible at-risk population (earp) are all persons living in arv's who can receive Mectizan (e.g., who are over five years of age and in good health, and excluding pregnant women). In practice, the ATO is established in projections based on age-eligible estimates, and its accuracy is expected to improve with time. The ATO(earp) is expected to be the same figure used in the annual request for tablets submitted to the Mectizan Donation Program. Program directors are urged to define their ATOs using the latest epidemiological mapping information and village census data from the most recent treatment rounds. Given the complex emergency in Sudan (characterized by war, famine, and displacement), only a rough estimate of the ATO(earp) can be made, and reporting of an ATO(arv) has not yet been established.

**Full Geographic Coverage and the Ultimate Treatment Goal:** Full geographic coverage is reached when the program is able to extend mass treatment services to all arv's in the assisted area. The ultimate treatment goal (UTG) is defined as the sum of the eligible populations living in all arv's in the assisted-area. That is, the UTG is that number of persons estimated to ultimately require Mectizan treatment once a program has the capacity to provide full geographic coverage. At the point when the program can demonstrate that it has treated the UTG, it is said to have reached full coverage; in other words full coverage is defined by the point TX(earp)=ATO(earp)=UTG. GRBP program progress is judged by the ability to meet ATO objectives, and to increase those objectives over a reasonable time period to reach full geographic coverage and the ultimate treatment goal.

## INDICES OF SUSTAINABILITY

GRBP programs are asked to report annually on three sets of indices for sustainability, including: Community involvement, national and local government involvement, and costs (expressed as cost per treatment). The guidelines for the reporting follow:

***Community involvement:*** Is the community involved in the design and implementation of the treatment program and in the selection of their community-based distributor (CBD)? If data are available on monetary or in-kind community support for CBDs, formation of village health committees, and community support for CBDs to collect Mectizan from a central point, these should also be reported.

***Government involvement:*** Is the program supervised by the primary health care system. Does the local and central government have a line item for onchocerciasis control in its budget? If so, how much of this budget has been released to the program?

***Cost:*** This calculation includes all costs, including: a) country GRBP HQ costs, overhead, and salaries, b) delivery of Mectizan from the port of entry to community, including collecting the drug from a central point by CBD, c) training, d) MOH/PHC supervision and monitoring of the program, and e) remuneration/incentives paid to CBDs by the community, which could include cost recovery mechanisms.

## ANNEX 4: *LOA LOA* and MECTIZAN

### Recommendations for the treatment of onchocerciasis with Mectizan in areas co-endemic for onchocerciasis and Loiasis

[Adapted from a communiqué from the Mectizan Expert Committee, May 2000]

Infection with *Loa loa* can cause central nervous system (CNS) dysfunction both spontaneously and following treatment. In 1999, four deaths in which serious CNS events followed treatment with Mectizan were reported in *Loa*-endemic regions of Cameroon. In past years, similar cases may have occurred in Gabon, the Central African Republic, and the Democratic Republic of Congo, but not in Nigeria or Sudan. It is not known why the deaths have occurred almost exclusively in Cameroon and not in other *Loa*-endemic countries.

The precise distribution of *Loa loa* in Africa is not known. It is known, however, to be endemic in humid forest areas of the following countries: Angola, Benin, Cameroon, the Central African Republic, Congo, the Democratic Republic of Congo, Equatorial Guinea, Gabon, Nigeria, and Sudan. Map 8 is based on environmental data (vegetation and remote sensing for humidity/vegetation) and can be used as an indicator of presumptive *Loa*-endemic areas. Unfortunately, complete data are not yet available for Sudan, Nigeria, or Benin. The map will be updated when the data become available. GRBP-assisted areas have been crudely sketched into the map.

The Mectizan Expert Committee recommends that for onchocerciasis control programs operating in areas known to be endemic, or potentially endemic as indicated by the map, for *Loa loa* one of the following strategies be followed:

**A. Program areas where the following apply:**

- **Two or more rounds of annual treatment with Mectizan with at least 60% treatment coverage in each community have been carried out.**

- **No cases of serious CNS dysfunction following treatment with Mectizan have occurred.**

    a. Continue community-based mass treatment, or the Community Directed Treatment with Ivermectin (CDTI) strategy if an African Programme for Onchocerciasis Control-supported program, and maintain careful surveillance for adverse reactions.

    b. Enhance community awareness and education with regard to recognizing and responding to adverse reactions following treatment of Loa-infected people with Mectizan.

c. Enhance awareness and training of community distributors and all health personnel involved in the program with regard to recognizing and responding to adverse reactions following treatment of *Loa*-infected people with Mectizan.

**B. In all other program areas where one or more of the following apply:**

- **No previous treatment with Mectizan.**
- **Fewer than two rounds of annual treatment with Mectizan have been carried out.**
- **Two or more rounds of annual treatment with Mectizan have been carried out but with coverage of less than 60% in each community.**
- **Cases of serious CNS dysfunction following treatment with Mectizan have occurred.**

a. Prior to mass treatment with Mectizan, a Rapid Epidemiological Assessment (REA) should be done in each community to document the endemicity of onchocerciasis as hyper-, meso-, or hypoendemic. If a community is hypoendemic (nodule prevalence under 20%), mass treatment should not be done.

b. If the community has hyper- or meso-endemic onchocerciasis, treatment with Mectizan should be carried out over a fixed period of time with a defined period of careful observation by community distributors for days 2-8 after treatment and surveillance by medical personnel for days 3-5 after treatment (where day 1 is the day of treatment).

c. Enhance community awareness and education with regard to recognizing and responding to adverse reactions following treatment of *Loa*-infected people with Mectizan.

d. Enhance awareness and training of community distributors and all health personnel involved in the program with regard to recognizing and responding to adverse reactions following treatment of *Loa*-infected people with Mectizan. The objective of this effort should be early identification of serious CNS dysfunction and prompt referral of patients to a district hospital or designated center where staff is appropriately trained and supplied for case management. Family members should be encouraged to accompany the patient and provide care.

## C. Programs that give individual treatments with Mectizan to people with proven onchocerciasis

- **Clinic-based treatments:**

    a. After confirming infection with *Onchocerca volvulus*, but prior to treating with Mectizan, possible co-infection with *Loa loa* should be assessed. In the absence of hematologic diagnostic methods, patients should be asked questions to determine if *Loa loa* is probably present in their community of residence or employment.

    b. Prior to treating with Mectizan, the possibility of adverse reactions after treating *Loa-i*nfected people should be discussed with the patient.

    c. If the patient is at risk of severe adverse CNS dysfunction following treatment with Mectizan, he/she should be monitored by medical personnel as described above in section A, item 2b.

These recommendations are intended to minimize complications following treatment with Mectizan, in known and suspected *Loa*-endemic areas, should they arise. The risk of complications will be further reduced when the distribution of *Loa loa* is delineated and a practical means for determining the intensity of infection is available.

The ultimate decision on how to proceed with community-based mass treatment of onchocerciasis with Mectizan, in a given country, should be made by the National Onchocerciasis Task Force (NOTF) and the Ministry of Health, which has final authority and responsibility for all decisions. Moreover, the decision on how to proceed with the treatment of individuals with onchocerciasis in clinic-based settings is the responsibility of the individual physician.

Map 8

## ANNEX 5: THE GRBP NIGERIA LYMPHATIC FILARIASIS (LF) ELIMINATION AND URINARY SCHISTOSOMIASIS CONTROL INITIATIVE

Background:

Lymphatic filariasis (LF) in Africa is caused by *Wuchereria bancrofti*, a filarial worm that is transmitted in rural and urban areas by *Anopheline* and *Culex sp*. mosquitoes, respectively. The adult worms live in the lymphatic vessels, and cause dysfunction often leading to poor lymphatic drainage. Clinical consequences include swelling of limbs and genital organs (lymphoedema and "elephantiasis"), and painful recurrent attacks of acute adenolymphangitis. Microfilaria, which circulate nocturnally in blood, can be almost completely suppressed by annual single-dose combination therapy, with either Mectizan (also donated by Merck & Co. for LF in Africa) and albendazole (donated by GlaxoSmithKline), or diethylcarbanazine (DEC) and albendazole. Annual mass treatment with the combination of Mectizan and albendazole prevents mosquitoes from being infected and, when given for 4-6 years can interrupt transmission of *W. bancrofti* (which has no animal reservoir).

Schistosomiasis is acquired from contact with fresh water. Cercariae, released from infected snails, penetrate the skin and develop into adult worms that reside in venules of the intestines (*Schistosoma mansoni*) or bladder (*S. hematobium*). Female worms lay thousands of eggs that exit the body in feces or urine to hatch in fresh water and infect snails, continuing the lifecycle. The presence and passage of these eggs in tissues leads to inflammation and organ damage. School-aged children (5-14 years old) are the most heavily infected and also tend to be the main disseminators of this infection through their urination and defecation in or near fresh water. Mass drug distribution of praziquantel (40 mg/kg) every 1-3 years can significantly reduce schistosomiasis morbidity. Praziquantel (which is not being donated by pharmaceutical companies to control programs in large amounts as are Mectizan and albendazole) costs about US $0.08 per 600 mg tablet.

Nigerians suffer a disproportionate share of the disease burden from these two parasitic diseases. The country is thought to have the greatest numbers of persons at risk for LF in Africa, and globally is ranked third behind India and Indonesia in human suffering from this parasite. One recent review estimated that 22% of Nigerians (over 25 million) are infected with LF, although mass drug administration for LF in Nigeria will need to reach many times this number. The geographic distribution of the disease appears to show a gradient increasing from north to south in the country, coincident with increasing tropical climate. For schistosomiasis, an estimated 20 million Nigerians (the greatest of any country in the world) need to be treated every 1-3 years with praziquantel. The distribution of urinary schistosomiasis (schistosomiasis hematobium-SH) in Nigeria was explored in a FMOH survey, conducted in 1990-91, that showed that infection was most prevalent in the north-central and southeast areas of the country. The main goal of the 1997-2001 Nigeria National Plan of Action on Schistosomiasis Control is to reduce the prevalence of the disease by 50% within 5 years, but few treatments had been given because of the expense of praziquantel.

The Carter Center is working with the ministry of health in Nigeria to establish LF elimination and SH control programs in Plateau and Nasarawa States (Map 9). For LF, the effort is based on a strategy of health education (HE) and annual combination therapy with the oral drugs albendazole and Mectizan. The manufacturers of these drugs have global donation programs for LF: GlaxoSmithKline donates albendazole, Merck & Co donates the Mectizan. For SH the strategy is similar: HE and mass annual treatments with the oral drug praziquantel. Praziquantel however is not being routinely donated to the program, although in past years The Carter Center has received limited gifts of praziquantel from pharmaceutical companies including Bayer AG, Medochemie, and Shin Poong Pharmaceutical Company, Ltd. The Carter Center has purchased the remainder through funds raised from other donors.

Working with federal, state, and local ministries of health, the GRBP LF effort assists in: 1) ascertaining the distribution of LF and SH in Plateau and Nasarawa States, 2) implementing HE and mass treatment where appropriate, and 3) documenting the impact of these interventions. The states' GRBP-assisted onchocerciasis control programs (which are partially funded by APOC) have been the launching point for the LF and SH programs. Dr. Abel Eigege directs the GRBP assistance activities. Dr. M.Y. Jinadu, the National Program Coordinator for the LF and SH Programs in Nigeria, is actively involved in the GRBP-assisted program.

In 2001, The Carter Center received funding from the Bill and Melinda Gates Foundation for support of its Lymphatic Filariasis Elimination Program. Plateau and Nasarawa States are now 'demonstration projects' that will be important for showing 'proof of concept' that LF transmission can be interrupted on a large scale in Africa.

## Progress in 2001

LF: Plateau and Nasarawa were completely "mapped" for disease endemicity in 2000, and it was determined that LF mass treatment was required in all cities and villages of the 30 local government areas (LGAs) of the two states (estimated population 4 million). In 2001, the program therefore began a rapid scale up of treatment activities in a four-phased implementation plan. Phase 1 in 2000 piloted the combined treatment activities in two LGAs coendemic for LF and onchocerciasis, where albendazole was added to Mectizan treatment (which has been ongoing since 1993). Phase 2 in 2001 encompassed reaching the remainder of the LGAs endemic for both LF and onchocerciasis (Map 9). Thus, 2001 treatment activities reached a total of 12 LGAs (Phase 1 and Phase 2 LGAs). A total of 675,681 people received combination therapy in 2001, and increase of 323% over 2000 Phase 1 treatments (no unexpected or severe adverse reactions occurred) (Figure 31). More treatments could have been given, but semi-urban areas (not treated under the onchocerciasis programs) were excluded. A cumulative total of 835,236 albendazole/Mectizan treatments have been given since the program was launched.

One important criterion of success of interrupting transmission of LF will be demonstration of the absence of infection in young children who are born into the program area. Children free of infection show that the program has prevented

transmission from occurring. Baseline information on infection status in children at the beginning of the program is essential to assess impact at a later date. In May 2001, the Nigerian team carried out ICT assessments for LF in 2,518 children in thirty-four villages in the project area. Children age 2-5 years from each village were tested by the immunochromatographic card test (ICT) for *Wuchereria bancrofti* filarial circulating antigen. Overall, we found that only 2.6% of the children in this age group were positive by ICT, with a prevalence ranging among the villages from 0-12.5%. This low baseline prevalence in this age group was a surprise and will make it difficult to determine statistically significant changes in prevalence over time. Additional data must be collected in older age groups to evaluate impact of the program.

SH: By the end of 2001, six (20%) of the 30 local government areas (three in each state) had been mapped for SH. The slow progress is the result of a lack of an approved rapid mapping approach for large areas of Africa. The current GRBP approach to SH mapping involves a tedious and expensive process of village-by-village urine dipstick assessments for hematuria in samples of school-aged (6-14 years) children. Based on these survey results, villages are stratified as: 1) no treatment intervention (survey hematuria prevalence less than 20%), 2) treatment of school aged children (sample prevalence 20-49%), or 3) treatment of the entire population (prevalence $\geq$ 50%). Despite these challenges, and the relative lack of funds, in 2001 the SH program expanded health education and praziquantel treatments by 87%, from 44,830 in 2000 to 84,147 in 2001 (Figure 32). Since its launching in 1999, 138,098 cumulative praziquantel treatments for SH have been assisted.

The impact of praziquantel treatment on hematuria was measured in two SH sentinel villages in Pankshin LGA that had been offered full community treatment due to baseline hematuria prevalence assessments (Mungkohot village with a prevalence of 83.3% and Timjim village, 50%). Prior to the third round of treatment in 2001, all school-aged children in the village were asked to provide a urine sample for testing. Significant differences (Figure 33) in pre and post treatment observations were made (Chi square>50, $P < 0.001$).

## Plans for the future

In 2002, the LF program has a major challenge of increasing treatments into Phase 3 areas, where there is no onchocerciasis treatment infrastructure to build upon. In 2002, an ATO of 2.4 million albendazole/Mectizan treatments, with HE, is projected. The UTG for the program, 3.6 million treatments, should be reached by the end of 2003. With support from the Bill and Melinda Gates Foundation, there will be sufficient epidemiological and entomological data available to judge the impact of this effort on LF transmission.

Expansion of the SH program is more challenging for a number of reasons:

1) The aforementioned process of village-by-village urine dipstick assessments for hematuria.

2) The inability to give simultaneous combination therapy with praziquantel, Mectizan, and albendazole (studies are needed to demonstrate safety).
3) Praziquantel drug costs are considerable (an average 2.6 tablets per treatment, costing about US $0.21). If we extrapolate our experience in these six LGAs to all 30 LGAs of the two states' populations, one million persons would require treatment, with praziquantel drug costs alone requiring US $210,000 per year. Currently, The Carter Center hopes to expand its SH program by one LGA per state per year, or an estimated 50,000 treatments per year (Figure 32), until additional support can be secured.

## LYMPHATIC FILARIASIS AND SCHISTOSOMIASIS RECOMMENDATIONS 2002

***Lymphatic Filariasis***:

- *Going to scale:* In addition to continuing treatment and HE in the twelve Phase 1 and Phase 2 LGAs, expand treatments into 10 non-onchocerciasis endemic LGAs. Projected treatments will increase by 358%, from 670,000 to the 2002 ATO of 2.4 million. The UTG of approximately 3.6 million is projected by the end of 2003.
- *Drug supply:* There must be earlier ordering of the 2003 Mectizan and albendazole supply. The GRBP order should be placed by the end of May, 2002.
- *Monitoring of impact on transmission:* There is a great need to strengthen monitoring, assessment and evaluation infrastructure in Jos. The following needs were identified:

    1) Additional dedicated personnel and transport vehicles need to be hired and trained in 2002.
    2) Obtain baseline epidemiological information from new sentinel villages (never before exposed to Mectizan) in Phase 4 areas. Include nocturnal microfilarial prevalence and density determinations, as well as ICT on LF antigen prevalence in all age groups. It is essential for program to determine the correct age group by which we can ascertain changes in transmission and define impact of the intervention program.
    3) Obtain baseline entomological data in new sentinel villages. Expand mosquito collections and dissections to measure impact of treatments on LF infection rates in the vector into these new sentinel areas.

- *Alleviation of suffering:* Although the workload to go to scale and establish baseline data is extremely heavy on staff, some consideration must be given to a program to alleviate morbidity stemming from LF, if possible.
- *Urban LF:* The approach to mass treatment in urban areas (a great challenge) will be deferred until 2003 or 2004. Epidemiological assessments of prevalence and transmission might be considered in 2003.

***Urinary Schistosomiasis:***

- Re-treat all SH villages (prevalence >20% in baseline survey of school aged children), and expand assessment, health education, and treatment activities to two more LGAs in 2002 (an estimated 50,000 praziquantel treatments will have to be purchased).
- Work with partners to find better methods for rapid assessment for SH that do not require sampling every village.
- Seek praziquantel and funding for the SH program.

***Analysis and Publications:***

- Improve data management/handling in Jos by hiring a data manager and establishing a rigorous data management protocol needed to evaluate the impact of the LF effort.

- Follow-up LF KAP studies are needed to judge if the HE messages are understood.
- A summary report of this project has been accepted for publication in 2002 in the *Journal of the America Society of Tropical Medicine and Hygiene*. Other important studies should be prepared for publication (entomology, ICT study, hydrocele study).

# TRANSMISSION MONITORING: USE OF ICT CARD TESTS TO SIMULTANEOUSLY DETERMINE PREVALENCE OF LF ANTIGENEMIA AND ONCHOCERCIASIS ANTIBODIES IN YOUNG NIGERIAN CHILDREN

Barwick R, Eigege A, Korve K, Mackenzie C, Alphonsus K, Umaru J, Jinadu M, Miri ES, Richards F

Onchocerciasis and lymphatic filariasis (LF) are two important filarial infections and are extremely prevalent in Nigeria where approximately 100 million people are infected with one or both of these parasites. Onchocerciasis can cause loss of vision and blindness, severe pruritus, and disfiguring dermatitis. LF can cause lymphoedema, elephantiasis, hydrocele and periodic lymphadenitis. Mass drug treatment programs for both of these diseases are underway. For onchocerciasis control, ivermectin has been used for over ten years and WHO has recently targeted the elimination of LF in sub-Saharan Africa through annual distribution of ivermectin and albendazole. One criterion of success in these programs is the absence of infection in children who are born into program areas; children free of infection show that the program has prevented transmission from occurring. The objective of this study was to collect onchocerciasis and LF data from children living in 10 villages located in two states included in Nigeria=s onchocerciasis control and LF elimination programs. Eight of these villages have been receiving mass distribution of ivermectin since at least 1993 but combination of ivermectin and albendazole has only been given since 2000. Children aged 2-5 years from each village were simultaneously tested with two immunochromatographic card tests (ICT). One for Wuchereria bancrofti filarial circulating antigen and the other for O. volvulus Ov 16 antibody. Overall, we found 0.8% of children were antibody positive for onchocerciasis, ranging among the villages from 0-5.7%. For LF, we found 2.5% of the children positive by LF ICT, with a prevalence ranging from 0-7.1%. This low baseline LF prevalence may make it difficult to determine impact of the program on LF transmission over time. The low onchocerciasis antibody prevalence will be discussed with respect to skin snip data obtained from children in the mid 1990s.

Map 9

Figure 31

Figure 32

Figure 33

**Annex 6: Publications by or assisted by GRBP staff (underlined)**


Amazigo UV, Brieger WR, Katabarwa M, Akogun O, Ntep M, Boatin B, N'doyo J, Noma M, Seketeli A. The challenges of community-directed treatment with ivermectin (CDTI) within the African Programme for Onchocerciasis Control (APOC). *Annals of Tropical Medicine and Parasitology* 96(Supp 1): S41-S58, 2002.

Anonymous. Onchocerciasis, Nigeria. *Weekly Epidemiological Record* 71:213-5, 1996.

Anonymous. Onchocerciasis, progress towards elimination in the Americas. *Weekly Epidemiological Record* 71:277-80, 1996.

Anonymous. River blindness (onchocerciasis): Progress in ivermectin distribution, Nigeria. *Weekly Epidemiological Record* 72:221-228, 1997.

Anonymous. Dracunculiasis and Onchocerciasis: Sudan. *Weekly Epidemiological Record* 72:297-301, 1997.

Anonymous. Annual Onchocerciasis Report from the InterAmerican Conference on Onchocerciasis in Oaxaca, Mexico. *Weekly Epidemiological Record* 72:215-218, 1997.

Anonymous. Report from the seventh InterAmerican conference on onchocerciasis in Cali, Colombia. *Weekly Epidemiological Record* 74:9-16, 1999.

Anonymous. Report from the eighth InterAmerican conference on onchocerciasis in Caracus, Venezuela. *Weekly Epidemiological Record* 74:377-9, 1999.

Anonymous. Report from the ninth InterAmerican Conference on Onchocerciasis, Antigua, Guatemala. Weekly Epidemiological Record 2001; 76:18-22

Anonymous. Report from the tenth InterAmerican conference on onchocerciasis, Guayaquil, Ecuador. *Weekly Epidemiological Record* 76:205-212, 2001.

Anonymous. Report from the eleventh InterAmerican conference on onchocerciasis, Mexico City. *Weekly Epidemiological Record* 2002 (in press).

Blanks J, Richards F, Beltran F, Collins R, Alvarez E, Zea Flores G, Bauler B, Cedillos R, Heisler M, Brandling-Bennett D, Baldwin W, Bayona M, Klein R, and Jacox M. The Onchocerciasis Elimination Program of the Americas: A history of partnership. *Pan American Journal of Public Health* 3:367-74, 1998.

Dean M. *Lymphatic Filariasis: The Quest to Eliminate a 4000-Year Old Disease,* Hollis Publishing Co, 2001. (Chapter 5, "Dual Campaigns—the Piggy Back Option" focuses on the GRBP effort in Nigeria.)

Drameh PS, Richards FO, Cross C, Etya'ale DE and Kassalow JS. Ten years of NGDO action against river blindness. *Trends in Parasitology* (in press), 2002.

Eigege A, Richards F, Blaney D, Miri E, Umaru J, Jinadu MY, Mathai W, Hopkins DR. Rapid Assessment for Lymphatic Filariasis in Central Nigeria: A Comparison of ICT and Hydrocele Rates in an area of high LF endemicity. *Journal of the American Society of Tropical Medicine and Hygiene* (submitted).

Homeida MA, Goepp I, Magdi A, Hilyer E, MacKenzie CD. Medical achievements under civil war conditions. *Lancet* 354:601, 1999.

Hopkins D, Richards F. Visionary campaign: Eliminating river blindness. *Encyclopedia Britannica Medical and Health Annual*: 9-23, 1997.

Hopkins DR, Eigege A, Miri ES, Umaru J, Jinadu MY, Mathai W, Richards F. Lymphatic filariasis elimination and schistosomiasis control in association with onchocerciasis control in two states of Nigeria. *Journal of the American Society of Tropical Medicine and Hygiene* (in press) 2002.

Katabarwa MN, Mutabazi D. The selection and validation of indicators for monitoring progress towards self-sustainment in community-directed, ivermectin-treatment programmes for onchocerciasis control in Uganda. *Annals of Tropical Medicine & Parasitology* 92(8): 859-868, 1998.

Katabarwa MN. Modern health services versus traditional engozi system in Uganda. *Lancet* 354(9175): 343, 1999.

Katabarwa MN, Mutabazi D. Community-directed, ivermectin-treatment programmes for onchocerciasis control in Uganda: the selection and validation of indicators for monitoring sustainability at the district level. *Annals of Tropical Medicine & Parasitology* 93(6) 653-658, 1999.

Katabarwa MN, Mutabazi D, Richards FO. Ivermectin distribution for onchocerciasis in Africa. *Lancet* 353: 757, 1999.

Katabarwa MN, Onapa AW, Nakileza B. Rapid epidemiological mapping of onchocerciasis in areas of Uganda where S*imulium neavei sl* is the vector. *East Africa Medical Journal* 76(8), 1999.

Katabarwa MN, Mutabazi D, Richards FO. Monetary incentives and community-directed health programmes in some less-developed countries. *Lancet* 354: 1909, 1999.

Katabarwa MN, Mutabazi D, Richards FO. The community-directed, ivermectin-treatment programme for onchocerciasis control in Uganda – an evaluative study (1993-1997). *Annals of Tropical Medicine & Parasitology* 93: 727-735, 1999.

Katabarwa MN, Mutabazi D, Richards FO. Controlling onchocerciasis by community-directed, ivermectin-treatment programmes in Uganda: Why do some communities

succeed and others fail? *Annals of Tropical Medicine & Parasitology* 94(4): 343-352, 2000.

Katabarwa MN, Richards FO, Ndyomugyenyi R. In rural Ugandan communities, the traditional kinship/clan system is vital to the success and sustainment of the African Programme for Onchocerciasis Control. *Annals of Tropical Medicine & Parasitology* 94(5): 485-495, 2000.

Katabarwa MN, Habomugisha P, Richards FO. Community views on health programmes in Uganda. *Lancet* 355:2167-2168, 2000.

Katabarwa M.N, Habomugisha P, Richards FO. Implementing community-directed treatment with ivermectin for the control of onchocerciasis in Uganda (1997-2000): an evaluation. *Annals of Tropical Medicine and Parasitology* 96(1):61-73, 2002.

Miri ES. Problems and perspectives of managing an onchocerciasis control programme. *Annals Trop Med Parasitol* 92: S121-8, 1998.

Mutabazi D, Duke BOL. Onchocerciasis control in Uganda: How can self-sustaining community-based treatment with ivermectin be achieved? *Annals Trop Med Parasitol* 92:195-203, 1998.

Richards F, Gonzales-Peralta C, Jallah E, Miri E. Community-based distributors in the delivery of ivermectin: Onchocerciasis control at the village level in Plateau State, Nigeria. *Acta Tropica* 61:137-44, 1996.

Richards F, Miri E, Meredith S, Guderian R, Sauerbrey M, Remme H, Packard R, Ndiaye JM. Onchocerciasis. In Global Disease Elimination and Eradication as Public Health Strategies. *Bull WHO* 76(2): 147-9, 1998.

Richards FO, Hopkins DR, Cupp E. Onchocerciasis control strategies (Reply to commentary: "Varying programmatic goals and approaches to river blindness") [letter]. *Lancet* 256: 1523-4, 2000.

Richards FO, Hopkins DR, Cupp E. Commentary: Varying programmatic goals and approaches to river blindness. *Lancet* 255:1663-4, 2000.

Richards FO, Carter K, Cupp E, Sauerbrey M, Klein R. Monitoring for the emergence of new foci of onchocerciasis (river blindness) in the Americas [letter]. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 94:108-9, 2000.

Richards F, Boatin B, Sauerbrey M, Sékétéli A. Control of Onchocerciasis Today: Status and Challenges. *Trends in Parasitology* 17:558-63, 2001.

Richards FO, Miri ES, Katabarwa M, Eyamba A, Sauerbrey M, Zea-Flores Guillermo, Korve K, Mathai W, Homeida MA, Mueller I, Hilyer E, Hopkins DR. The Carter Center's assistance to river blindness control programs: Establishing treatment objectives and

goals for monitoring ivermectin delivery systems on two continents. *American Journal of Tropical Medicine and Hygiene* 65(2): 108-14, 2001.

Seketeli A, Adeoye G, Eyamba A, Nnoruka E, Drameh P, Amazigo UV, Noma M, Agboton F, Aholou Y, Kale OO, Dadzie KY. The achievements and challenges of the African Programme for Onchocerciasis Control (APOC). *Annals of Tropical Medicine and Parasitology* 96(Supp 1), S15-S28, 2002.

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