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CARTER CENTER



Waging Peace. Fighting Disease. Building Hope.

Summary
2004 Program Review for The Lions-Carter Center SightFirst
River Blindness Programs
Cameroon, Ethiopia, Nigeria, OEPA, Sudan, and Uganda
3-5 March 2005
The Carter Center
Atlanta, GA



THE CARTER CENTER
RIVER BLINDNESS PROGRAM

August 2005

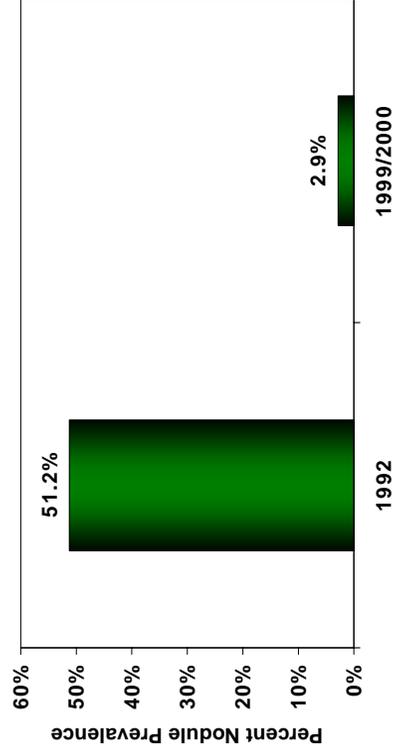
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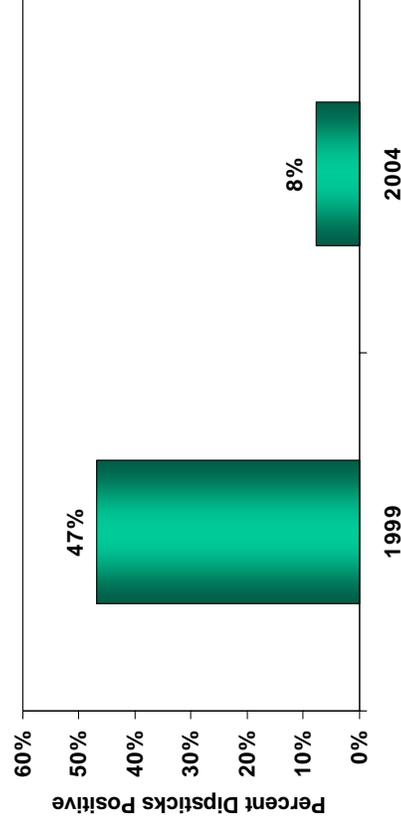
And to many others, our sincere gratitude

Figure A: Impact on Onchocerciasis, Schistosomiasis and Lymphatic Filariasis in Plateau and Nasarawa States of Nigeria

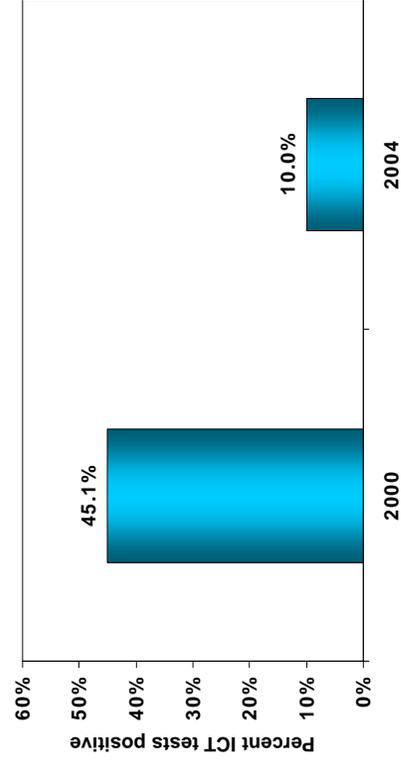
Onchocerciasis Nodule Prevalences in 23 Villages (1992: n = 30, 1999/2000: n = 50)



Average Schistosomiasis Dipstick Positivity, Pankshin and Akwanga LGAs (n = 300)



Average Lymphatic Filariasis ICT Results in Seven Sentinel Villages (n = 2,000)



Average Lymphatic Filariasis Mosquito Infection Rate (*W. bancrofti*) in 9 Sentinel Villages (n > 1,000)

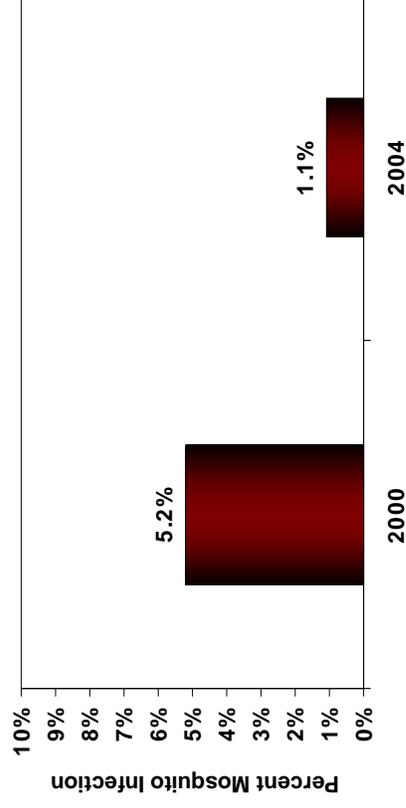
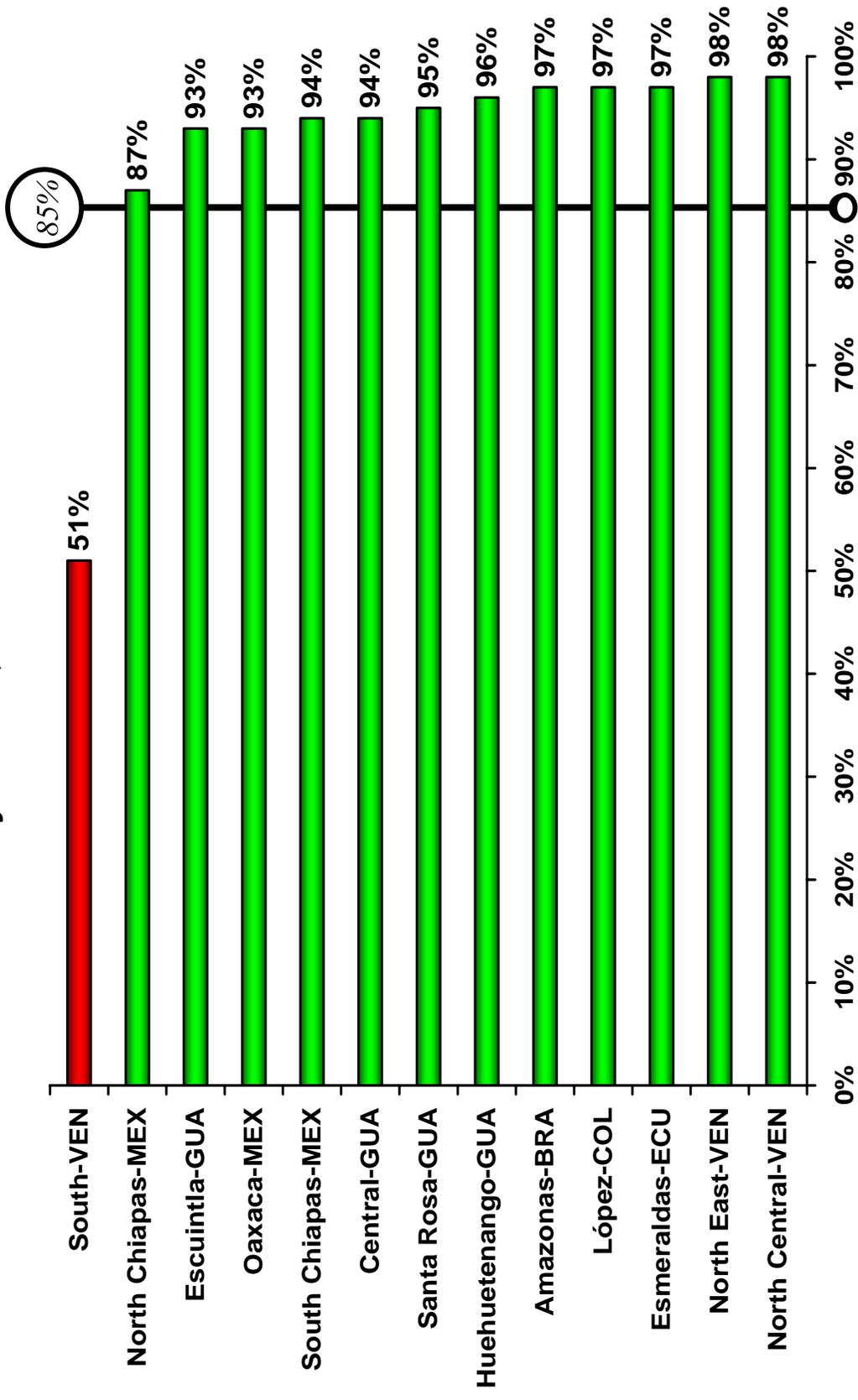


Figure B: OEPA: Percentage of the Ultimate Treatment Goal(2) by Focus, 2004



*UTG(2): UTG multiplied by two.



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INTRODUCTION AND OVERVIEW

The River Blindness Program of The Carter Center assists the ministries of health of 11 countries (Map 1) to distribute Mectizan® (ivermectin, donated by Merck & Co., Inc.) through programs that aim to control or eliminate onchocerciasis. Human onchocerciasis is caused by the parasite *Onchocerca volvulus*. The infection is characterized by chronic skin and eye lesions. Onchocerciasis is acquired from the bite of small black flies that breed in rapidly flowing rivers and streams, thus leading to the common name for the disease, "river blindness." The World Health Organization (WHO) estimates that about 17.6 million people are infected and 770,000 are blinded or severely visually impaired in the 37 endemic countries. Approximately 123 million people live in endemic areas worldwide and are therefore at risk of infection; more than 99% of those at risk reside in Africa. Periodic mass treatment with Mectizan® prevents eye and skin disease caused by *O. volvulus* and may also be used to interrupt transmission of the disease.

Local Lions Clubs and the Lions Clubs International Foundation (LCIF) are special partners of The Carter Center in the battle against river blindness (RB). When The Carter Center assumed the functions of the River Blindness Foundation (RBF) in 1996, we also entered into RBF's former collaboration with local Lions Clubs in Cameroon and Nigeria for community mobilization, health education, and supervision of Mectizan® distribution activities. LCIF generously provided a special grant to The Carter Center in 1997 to begin assisting efforts to control river blindness and trachoma in Sudan, even though there were no Lions Clubs in Sudan. In October 1999, LCIF pledged a five year grant of \$16 million to The Carter Center, which established the Lions-Carter Center SightFirst Initiative. Through this Initiative, LCIF and The Carter Center expanded their partnership to encompass controlling river blindness in five countries in Africa (Cameroon, Ethiopia, Nigeria, Sudan, and Uganda) and eliminating river blindness altogether in the six endemic countries of the Americas (Brazil, Colombia, Ecuador, Guatemala, Mexico, and Venezuela). President (and Lion) Jimmy Carter acknowledged his gratitude for international Lions' support of the SightFirst Initiative in his public address to the World Health Assembly in Geneva in May 2004. Lion Dr. Moses Katarwa, formerly The Carter Center's country representative in Uganda, has been the epidemiologist for river blindness control at Carter Center headquarters since 2003.

In 2003, the Bill & Melinda Gates Foundation made a \$10 million challenge grant to The Carter Center in support of our efforts to accelerate elimination efforts in the Americas. The grant provided \$5 million as an outright contribution and challenged the Center to raise an additional \$5 million, which would be matched dollar-for-dollar by the Gates Foundation. In 2004, LCIF responded to the challenge grant with a pledge of \$2 million, joining The Carter Center and the Gates Foundation in the final push to eliminate river blindness in the Americas. President Carter announced the grant during a press conference at The Carter Center in November 2004 (see OEPA section).

Other partners in Africa and the Americas include the U.S. Centers for Disease Control and Prevention (CDC), WHO, the African Program for Onchocerciasis Control (APOC),

and The World Bank, as well as other foundations, industries, international bilateral donors, and other nongovernmental development organizations (NGDOs).

The River Blindness Program hosted its ninth annual Program Review on March 3-5, 2005, at The Carter Center in Atlanta, Georgia. The review is modeled after similar reviews developed by The Carter Center and CDC for national Guinea Worm Eradication Programs, beginning with Pakistan in 1988 (See Annex 1 for background information on Carter Center activities). The main purposes of the review were to assess the status of each program, celebrate successes, and determine impediments and problems in program implementation.

Program review attendants included the following: Carter Center country representatives Dr. Albert Eyamba (Cameroon), Mr. Teshome Gebre (Ethiopia), Ms. Peace Habomugisha (Uganda), Dr. Emmanuel Miri (Nigeria), and the resident technical advisors of Sudan (Ms. Glenna Snider in Nairobi and Mr. Raymond Stewart in Khartoum). Dr. Mauricio Sauerbrey, director of the Onchocerciasis Elimination Program for the Americas (OEPA), presented progress made in the six endemic countries in the Americas. Other technical staff members included Ms. Alba Lucía Morales Castro (Guatemala), Ms. Alice Bosibori-Onsarigo (Kenya), Drs. Abel Eigege and Emmanuel Emukah (Nigeria), and Mr. Abate Tilahun (Ethiopia). The Mectizan® Donation Program (MDP) was represented by Dr. Mary Alleman (Associate Director) and Dr. Nana Twum-Danso (Associate Director). Special guests included Dr. Tony Ukety (NGDO Coordinator for Onchocerciasis Control, representing APOC), Dr. Bellario Ahoy Ngong (Southern Sudan Onchocerciasis Task Force), Ms. Sonia Pelletreau (Lions Clubs International Foundation), Ms. Catherine Cross (SightSavers International), Dr. Ed Cupp (Professor of Entomology, Auburn University), Dr. Jonathan Jiya (Nigerian Federal Ministry of Health), Dr. Deborah McFarland (Rollins School of Public Health), Dr. Eric Ottesen (Emory University), Dr. Gail Thomas (consultant surgeon, hydrocelectomy), Dr. Tom Unnasch (Professor of Immunology, University of Alabama), and numerous representatives from the Division of Parasitic Diseases at CDC, including Dr. Ali Khan (Associate Director for Science), Dr. Pat Lammie (Head, Elimination and Control), and Dr. Robert Wirtz (Chief Entomology Branch). Dr. Frank Richards (Technical Director of The Carter Center's River Blindness Program, Lymphatic Filariasis Elimination Program and Schistosomiasis Control Program) chaired the meeting. See Annexes 2, 3 and 4 for a complete participant list, contact list, and the agenda of this meeting.

A major focus of The Carter Center is routine reporting by assisted programs. The reader is referred to Annex 5 for a discussion of The Carter Center reporting process and for treatment indices used by the program and in this report. Important terms include the number of treatments provided (TX); the Ultimate Treatment Goal (UTG); twice the UTG (UTG[2]), as used by the OEPA program where semiannual treatments are delivered; Annual Treatment Objectives (ATOs); eligible at-risk population (earp); at-risk villages requiring mass treatment (arvs); and full coverage, which is defined as 85% achievement of the UTG, or for OEPA, the UTG[2].

SUMMARY OF THE MEETING:

In 2004, The Carter Center assisted ministries of health (MOHs) to provide a total of 11,109,611 Mectizan® treatments for onchocerciasis (Table 1 and Figure 1), compared to 9,658,793 treatments in 2003. This number constituted 93% of the UTG in the assisted areas (Figure 3), and brought the cumulative number of treatments assisted by the Program since its inception in 1996 to 66,203,985. Forty-five percent of treatments were provided in Nigeria (Figure 4). Nearly all treatments (97%) were supported by LCIF (Figure 5). Carter Center-assisted regions continued to assist in a significant portion of their countries' overall treatments. In line with its rapid expansion, Ethiopia once again had the highest increase in treatments (135% increase over 2003). For the first time, four countries exceeded one million treatments: Uganda (the newcomer), Ethiopia, Cameroon, and Nigeria. The ATO for 2005 is 11,468,397. With the exception of Sudan, all Carter Center-assisted programs are now aiming for full coverage of their geographic operational areas, which means they will use the UTG denominator when reporting treatment results. OEPA is focused on accelerating onchocerciasis elimination in the Americas. The African programs are focused on sustaining annual Mectizan® delivery at UTG coverage rates of 90% or more as financial investment from APOC is withdrawn. The Nigerian program also reported on efforts to integrate lymphatic filariasis elimination and schistosomiasis control with onchocerciasis control activities.

In the Americas, Mectizan® treatments are given twice per year with the goals being to both eliminate clinical manifestations of onchocerciasis by 2007 and to interrupt transmission of the disease so that Mectizan® treatment programs can ultimately be stopped. Overall coverage has improved from 86% in 2002, to 93% in 2003, to 94% in 2004. It was reported that the Mexican program is actively seeking ways to accelerate impact on transmission in a trial of four-times-per-year treatment in the Chiapas focus of Mexico. Similarly, CDC is conducting short course antibiotic trials in Guatemala to try to kill the *O. volvulus* bacterial endosymbiont *Wolbachia*.

In Africa, the goal in assisted areas is to help programs sustain annual Mectizan® treatment with UTG coverage rates of 90% or more in the post-APOC era. About half of Carter Center–assisted projects received funding from APOC in 2004, but by the end of 2005, only five of the 15 project areas will still be receiving APOC funding (Annex 6). In 2003, most African programs assisted by The Carter Center had an external sustainability evaluation using a tool designed by APOC. The Northern Sector of Sudan was evaluated in 2004. Mean scores can be seen in Figure 2. Not one project evaluated using the APOC monitoring tool has been determined to be fully sustainable, and the tool itself may not be configured to properly measure sustainability. An explanation of the monitoring criteria is included in Annex 5, and an assessment of the prospects for sustainability of the different African states assisted by The Carter Center is provided in Annex 6.

The Program Review concluded that the lack or paucity of government financial support by national and local governments for Mectizan® distribution programs is the major

obstacle to achieving sustainability. The Carter Center reiterated its position that it will not abandon its assisted projects, but it also will not fill the funding gap left by the cessation of APOC funding in project areas.

In several post-APOC project areas, The Carter Center (after advising partners) also stopped providing funding for implementation activities in mid-2004 to test what could happen when activities are turned over to the full responsibility of the federal, state, and local governments. Included in The Carter Center's 'post-APOC scenario trial' are North Province in Cameroon, Kisoro and Mbale Districts in Uganda, and Imo and Abia States in Nigeria. Some of these areas (Imo, Abia, Kisoro, and Mbale) showed emerging evidence of program dysfunction by the end of 2004; however, in Cameroon's North Province, where government funding is considered adequate, program functions were maintained. Further discussion of each trial can be found in the country sections under the heading *Post-APOC Scenario*. The Program Review recommended that The Carter Center continue to monitor the outcome of the 'post-APOC scenario trial' in a more systematic fashion in 2005 and beyond. The Carter Center will continue to seek to stimulate governmental contributions to program activities in an effort to promote sustainability and ownership.

Integration of Mectizan® distribution for onchocerciasis with other similar interventions has been shown to be an excellent way for public health programs to reduce costs, strengthen healthcare systems and infrastructure, and make the best use of scarce human and material resources. In two of its states, Nigeria has successfully adapted the infrastructure for Carter Center- and APOC-assisted health education and annual mass drug treatment against onchocerciasis to also provide similar combined interventions against lymphatic filariasis and schistosomiasis. Most of the additional support for this pioneering work has been provided by GlaxoSmithKline and the Bill & Melinda Gates Foundation, with some of the praziquantel used for schistosomiasis donated by Shin Poong Pharmaceutical Co., Ltd. Evidence of the impact of combined interventions against these three diseases has been observed (Figure A). Further details can be found in the Nigeria section of this document.

OTHER OBSERVATIONS

The Lions noted during the meeting the importance of a demonstration of program impact on disease manifestations, particularly blindness.

The Carter Center remains very interested in determining whether onchocerciasis is eradicable in Africa so that programs would not have to be sustained indefinitely.

A new presentation format was used at the 2004 Program Review in an attempt to focus discussion and standardize presentation of data. The new format was considered by the audience to be an improvement over previous years.

The Mectizan® Donation Program reaffirmed its pledge to donate Mectizan® as long as needed. The MDP also advised that 1) it would approve a two-year supply of medicine

in the Americas to reduce the administrative challenges of importation; 2) it was phasing in a new procedure to require a national order from each country rather than individual NGO or project orders; and 3) there would be a combined lymphatic filariasis and onchocerciasis order form used in the near future.

GENERAL RECOMMENDATIONS 2005 FOR THE CARTER CENTER'S RIVER BLINDNESS PROGRAM

“Information systems that do not change are dead.” (Rafe Henderson). More work should be done to improve and refine reporting and extract the most important information. A theme should be that The Carter Center tries to provide useful data both for itself and for APOC.

Continue post-APOC scenario trials in 2005 in order to better refine data and understand dynamics of funding (details of previous investment by APOC, the government, and The Carter Center, and investment after APOC and Carter Center funding were halted) and treatment processes (including treatment numbers, % of UTG attained, tablet supply, logistical chain issues, duration of village treatment exercises, community-directed distributor (CDD) and health worker training, and number of communities promptly reporting). There also is the need to analyze data and compare it with the sustainability evaluation scores given by APOC.

All Carter Center-assisted projects testing the post-APOC scenario need to refine their reported APOC and Carter Center funding figures for 2004 as a number of errors were noted in the reports submitted.

Withholding Carter Center support could result in decreased reporting. All efforts must be made to ensure that the decrease in treatments that might be reported is not a result of withholding data or reports of treatments that were actually delivered.

All external partners (APOC and NGOs) are encouraged to undertake their own post-APOC scenario trials.

WHO should publish its new information on safety of the three-drug combination (Mectizan®, albendazole, and praziquantel).

The importance of demonstrating the impact of Carter Center-assisted programs on ocular disease was stressed by Lions as being very important for the second phase of SightFirst fundraising. Carter Center programs need to review all available data from past sentinel areas that may have baseline data pertaining to visual impairment or ocular disease due to onchocerciasis.

Seek to increase training, supervision, involvement of kinship groups, and improve gender balance among CDDs.

Indices for CDDs should include CDDs/village, CDDs/population targeted, CDDs/persons treated, and CDDs/kinship group.

Carter Center program staff are encouraged to complete the Emory IRB ethics test, and are required to do so where research on human subjects is or will be taking place.

The presentation format should be streamlined next year to simplify data presented on each slide, using more graphs and fewer tables.

Map1: Carter Center-Assisted Onchocerciasis Control Programs

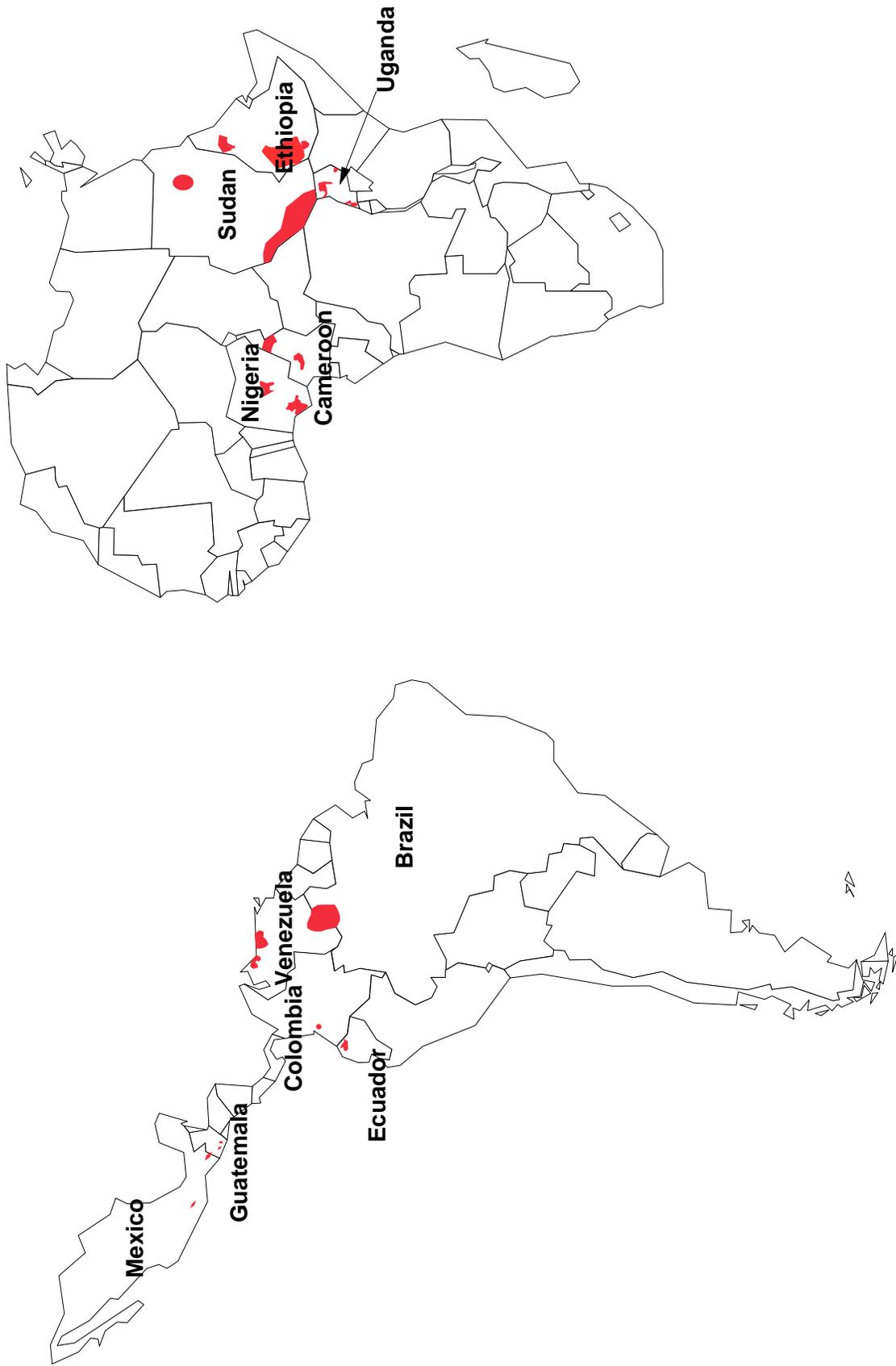


Figure 1: Carter Center-Assisted Programs: Annual Mectizan Treatments 1996 - 2004

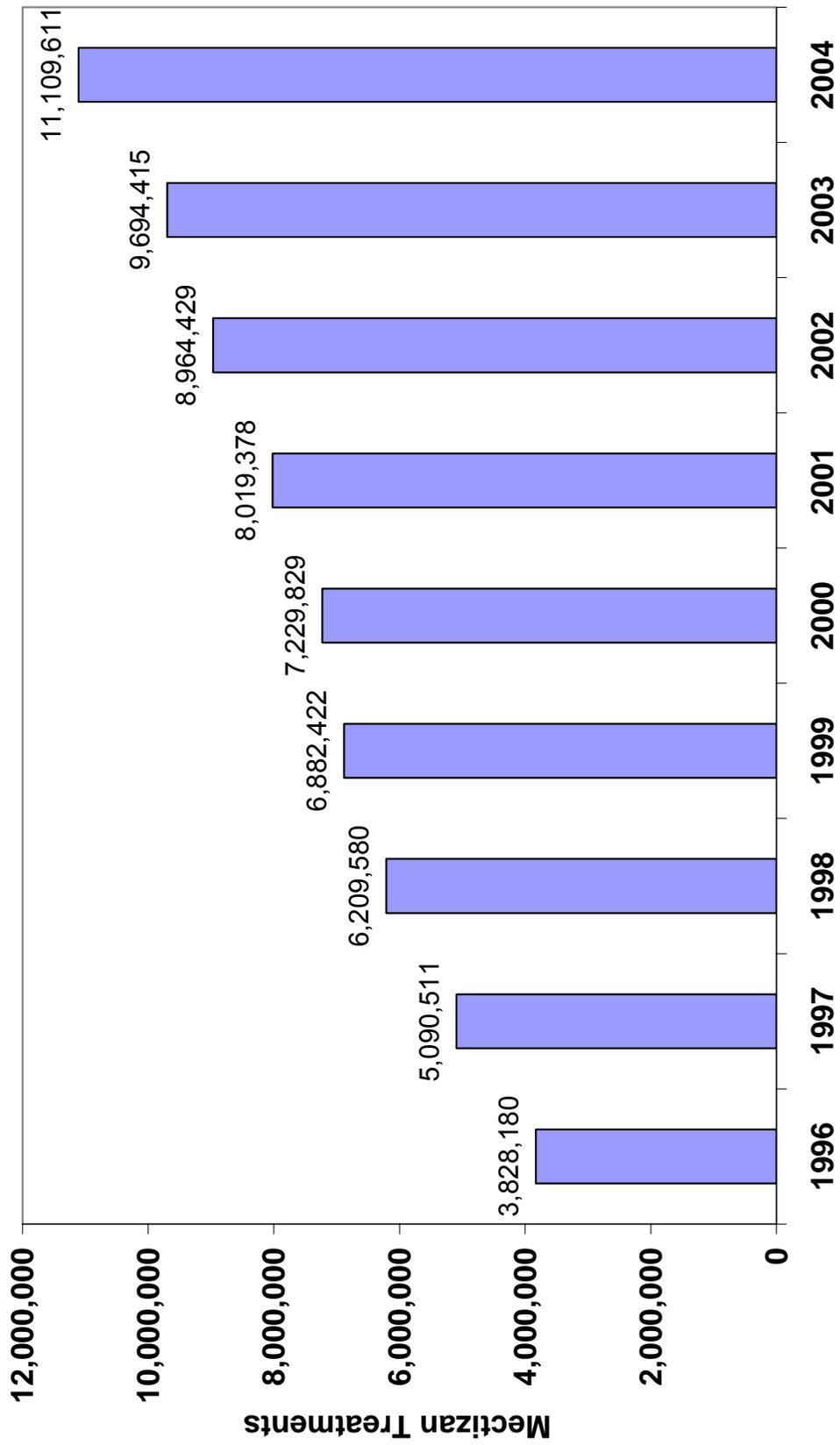
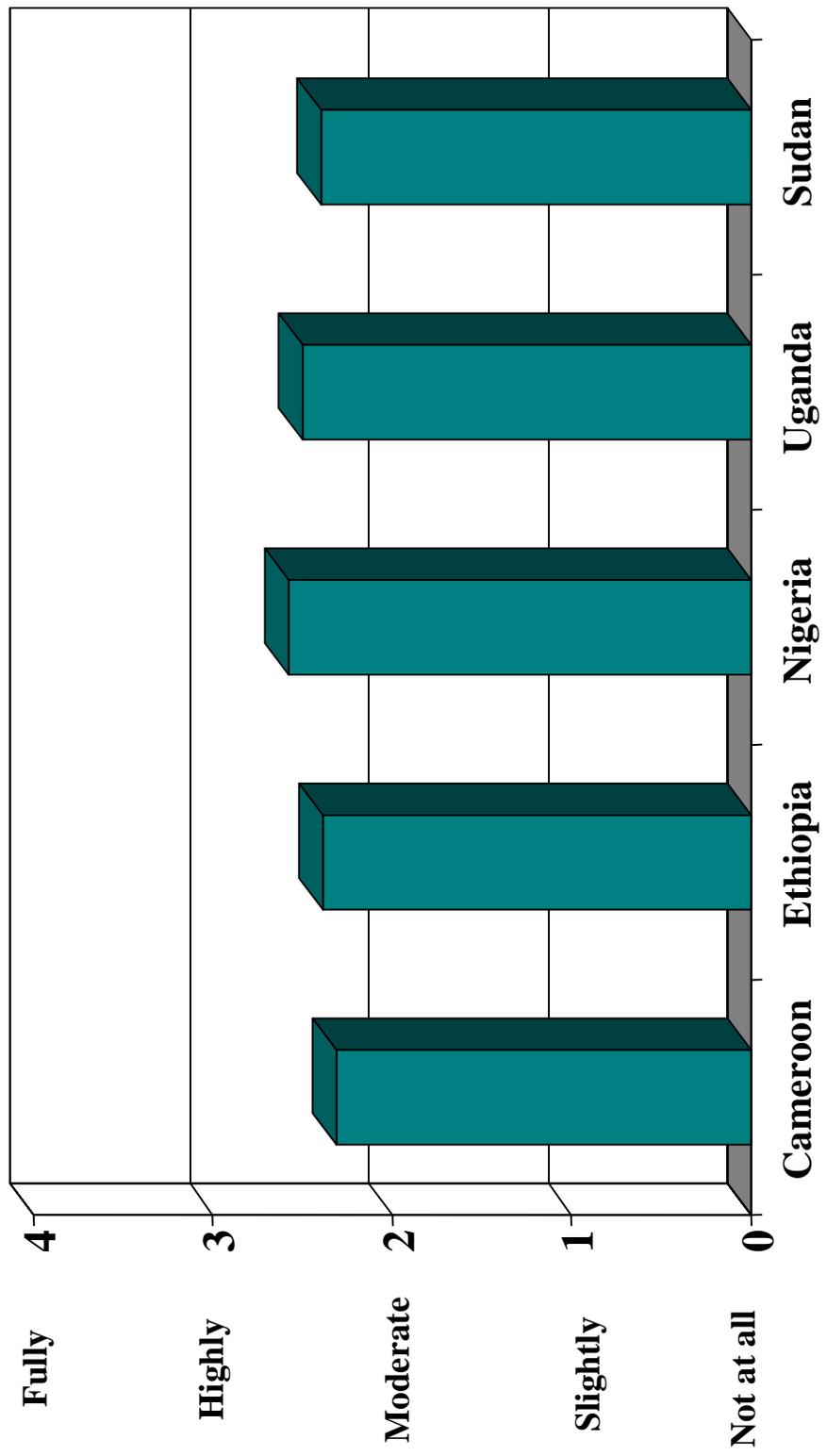
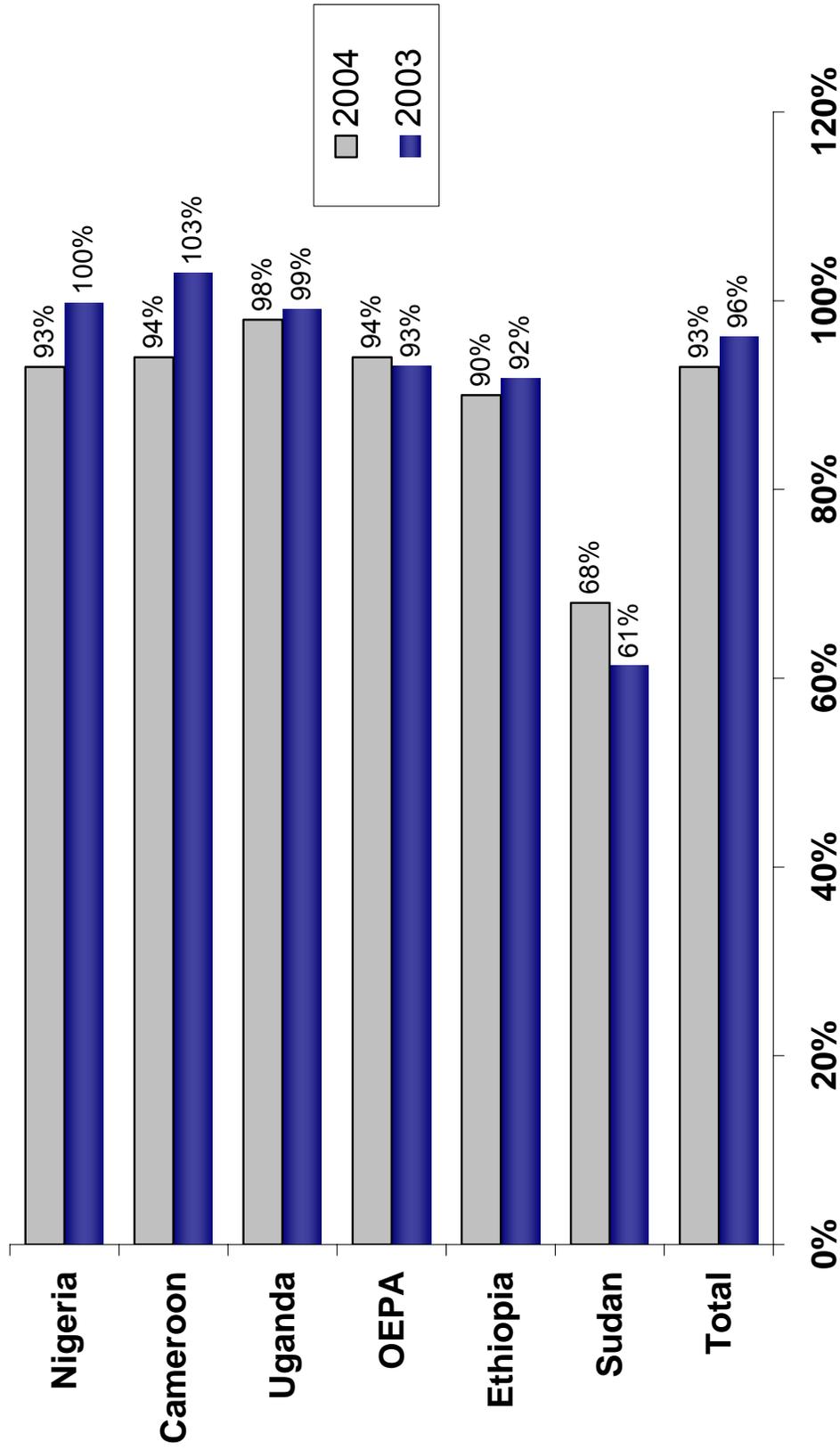


Figure 2: APOC sustainability evaluations of Carter Center projects, 2003 and 2004: Mean scores by country*



* All countries except Sudan evaluated in 2003: Sudan figures come from Northern Sector

Figure 3: Carter Center-Assisted Programs: Percent of Ultimate Treatment Goals reached in 2003 and 2004



**Figure 4: Carter Center-Assisted Programs:
1996 - 2004 Mectizan Treatments, by program**

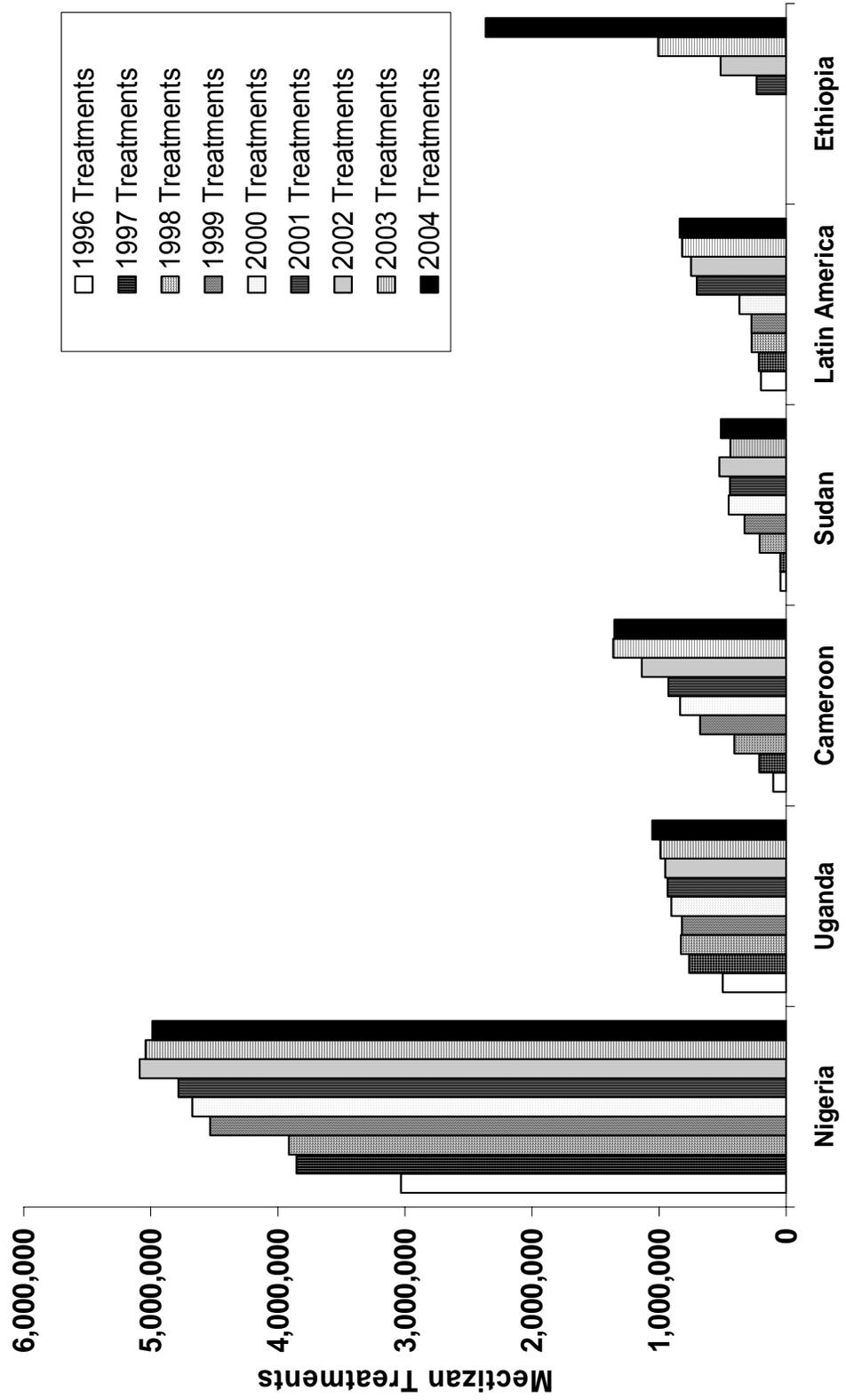
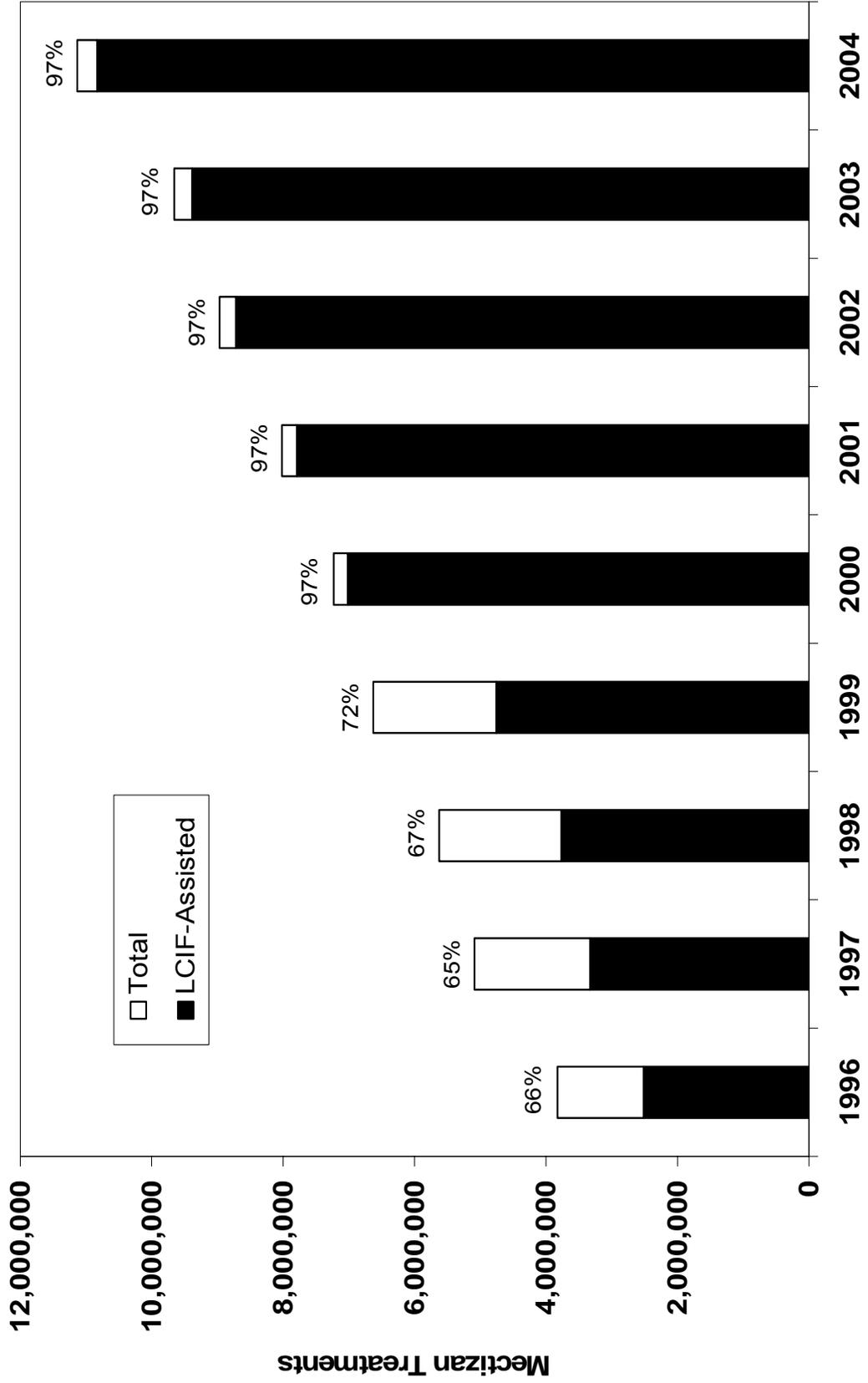


Figure 5: Annual Mectizan Treatments, Carter Center-Assisted and Carter Center / Lions-Assisted Programs



**Table 1: Onchocerciasis: 2004 Mectizan treatment figures for
The Carter Center River Blindness Program-assisted areas in
Nigeria, Uganda, Cameroon, Ethiopia, and collaborative programs in Latin
America (OEPA) and Sudan**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	% ATO
NIGERIA	*UTG= 5,155,917 ATO (villages)= 10,139													
Treatments	0	262	82,135	234,511	436,241	329,679	775,995	559,812	1,157,644	196,033	622,382	592,231	4,986,925	97%
Villages treated	0	1	62	192	674	704	1,319	920	1,936	585	1,417	1,480	9,290	92%
UGANDA	*UTG= 1,024,258 ATO (villages)= 2,360													
Treatments	0	122,990	131,502	115,403	143,443	31,107	112,394	140,800	117,905	93,113	45,239	324	1,054,220	103%
Villages treated	0	158	574	46	297	22	443	767	351	323	233	0	2,360	100%
CAMEROON	*UTG= 1,439,052 ATO (villages)= 3,429													
Treatments	0	0	0	0	0	109,553	689,115	337,636	45,018	95,722	26,213	48,909	1,352,166	94%
Villages treated	0	0	0	0	0	203	1,141	1,002	430	371	176	106	3,429	100%
OEPA	**UTG(2)= 889,116 ATO (villages)= 1,934													
Treatments	0	0	221,393	0	0	207,106	0	0	0	166,521	0	241,811	836,831	94%
Villages treated	0	0	1,253	0	0	599	0	0	0	997	0	861	1,855	96%
ETHIOPIA	*ATO= 2,621,799 ATO (villages)= 13,843													
Treatments	35,884	79,552	0	54,008	280,241	143,713	779,574	333,365	982	0	568,825	89,002	2,365,146	90%
Villages treated	238	318	0	1,216	1,313	845	3,718	2,680	4	0	3,452	59	13,843	100%
SUDAN	*ATO= 759,542 ATO (villages)= 1,204													
Treatments	20,838	19,972	23,554	84,676	109,830	31,898	63,228	86,293	3,424	8,895	1,353	60,362	514,323	68%
Villages treated	103	64	124	251	147	109	179	217	35	30	28	100	1,204	100%
TOTALS	*ATO= 11,889,684 ATO (villages)= 32,909													
Treatments	56,722	222,776	458,584	488,598	969,755	853,056	2,360,502	1,380,508	1,322,902	611,751	1,323,021	1,032,639	11,109,611	93%
Villages treated	341	541	2,013	1,705	2,431	2,035	3,082	2,906	2,752	2,306	1,854	2,547	31,981	97%

Carter Center-assisted cumulative treatments (1996 - 2004) = 66,203,985

*ATO: Annual Treatment Objective, UTG: Ultimate Treatment Goal

**OEPA figures reported quarterly, UTG(2) is the Ultimate Treatment Goal times 2, since OEPA treatments are semiannual

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 morbidity from 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, Lions Club International Foundation (LCIF), the Bill & Melinda Gates Foundation, PAHO/WHO, the Mectizan® Donation Program (MDP) and the U.S. Centers for Disease Control and Prevention (CDC). A Program Coordinating Committee (PCC) provides representation for these partners and gives broad directives to the OEPA office, which is based in Guatemala City and staffed through The Carter Center. The Center also coordinates financial assistance to the six countries.

OEPA has three main goals:

- To prevent new eye disease attributable to onchocerciasis by 2007 through mass treatment of at-risk populations with Mectizan® (ivermectin donated by Merck & Co, Inc.
- To interrupt transmission of onchocerciasis through high coverage, semiannual mass treatment of at-risk populations with Mectizan®. Treatment programs aim to reach at least 85% of persons eligible for treatment who reside in communities known to be endemic for onchocerciasis (Table 3), and sustain treatment coverage for approximately ten years.
- To determine other strategies that might be implemented to hasten the process of elimination, since sustaining the program for such a long time is a major challenge.

In November 2004, a nine-person delegation of Lions, led by Former International President Austin P. Jennings, which included representatives from all six of the OEPA countries and LCIF headquarters, participated in a press conference with President (and Lion) Jimmy Carter, and representatives of the Bill & Melinda Gates Foundation and Merck. The delegation announced an LCIF grant of US\$ 2,000,000 to help match the challenge grant provided to The Carter Center by the Gates Foundation in support of OEPA. This announcement followed immediately after closure of the Inter-American Conference on Onchocerciasis that was held at The Carter Center for the first time. Ms. Holly Drucker, Program Coordinator at LCIF headquarters, participated in the Program Coordinating Committee (PCC) meeting of OEPA in Guatemala in June 2004, as did two Lions (Drs. Carlos Arevalo and Juan Vicente Molina) from Guatemala. Ms. Drucker also joined a field observation trip to endemic areas of the departments of Santa Rosa and Suchitepequez. In March, Ms. Sonia Pelletreau, of LCIF headquarters, participated

in the 2004 River Blindness Program Review, and in September she participated in a



Holly Drucker of LCIF Headquarters gives Mectizan to a child, on a field visit in Guatemala.

meeting of the NGDO Coordination Group for Onchocerciasis Control. In March, Dr. James Zingeser of The Carter Center attended the Lions International Sight Symposium in Seoul, South Korea, where he gave a presentation describing the activities of the Lions-Carter Center SightFirst partnership, with an emphasis on the elimination of RB in the Americas. Greater participation of local Lions in OEPA advocacy and distribution activities is needed, encouraged, and would be welcomed.

Treatment activities in 2004: Since its inception, treatment coverage has been reported to OEPA as a percentage of the total number of persons estimated to be eligible for treatment: the Ultimate Treatment Goal (UTG). The UTG(2) is defined as the number of persons in the region who require treatment with Mectizan® (the UTG multiplied by two, since each individual should be treated twice during a calendar year).

Ivermectin treatments are reported to OEPA quarterly by the six national programs. Treatment coverage for each semester is calculated as the number of treatments divided by the total number of persons estimated to be eligible for treatment (UTG). Annual treatment coverage is the number of treatments divided twice the UTG [UTG(2)]. Starting in 2000, OEPA has been using the UTG(2) to monitor the success of programs in providing two treatments per year to all at-risk eligible persons (Table 2).

In 2004, the six national programs delivered 836,851 ivermectin treatments were delivered, achieving 94.1% of the Regional UTG(2) of 889,116 (See Table 2 and Figure 6). Treatments increased by 8.6% over the 819,066 treatments provided by the six national programs in 2003. For the third year in a row regional coverage exceeded the minimum goal of 85% with 2003 regional UTG(2) reaching 93% of the UTG(2) target (Figure 7). For the second consecutive year, all countries reported an ivermectin coverage rate greater than the 85% goal.

In 2004, based on recommendations from IACO'03 and the 2003 GRBP Program Review, OEPA began to analyze its treatment and epidemiological data by endemic focus, as well as by country. There are 13 onchocerciasis foci within the region (Map 2);

Figure 8 shows the 2004 coverage rates in these foci. Only Venezuela's Southern focus failed to reach the 85% treatment coverage goal in 2004 (Figure 9).

Eighty-two percent of 1,950 endemic communities reached 85% or greater coverage in 2004 (Figure 8, Table 4). The lowest community coverage rates occurred again in the Southern focus of Venezuela.

Details of treatments provided by country are as follows:

Brazil has 1.5% of the population in need of treatment for onchocerciasis in the Americas, all of whom reside in a vast single focus (the Amazonas-Roraima focus), bordering Venezuela. Brazil provided 13,113 Mectizan® treatments in 2004, reaching 97% of its UTG(2) of 13,574. Brazil exceeded the 85% treatment coverage goal for the fourth consecutive year. The distribution strategy calls for the use of health care centers, staffed by MOH and NGDO personnel, in 17 accessible "polo" base camps. Treatments took place in all 17 endemic "polo bases" in both rounds of treatment. The Brazilian program has continued to demonstrate the feasibility of delivering treatment to the migratory Yanomami communities in the Amazon forest.

Colombia has <1% of the population needing treatment in the Americas, all of whom reside in a single focus (Lopez de Micay Focus, Cauca). Its program provided 2286 treatments in 2004, 97% of its UTG(2) of 2364. Colombia exceeded the 85% treatment coverage goal for the sixth consecutive year, despite civil unrest in the area.

Ecuador has a single endemic focus in Esmeraldas Province (the Esmeraldas/Pichincha Focus) and 4.5% of the regional population needing treatment. The program exceeded its treatment coverage goal of 85% for the fourth consecutive year, providing 38,854 treatments (97%) of the UTG(2) of 40,088.

Guatemala has 4 endemic foci in which 37% of the regional population needing treatment reside: Central, Escuintla-Guatemala, Santa Rosa, and Culico (the latter bordering the Southern Chiapas focus in Mexico). The Guatemalan program provided 308,324 Mectizan® treatments in 2004, achieving 94% of its UTG(2) of 327,848. The country surpassed the 85% treatment coverage goal for the third consecutive year. The CDC is working with the Guatemalan Ministry of Health and OEPA in the Santa Rosa focus to develop and test appropriate regional protocols to apply there and elsewhere prior to making the decision to halt Mectizan® treatment.

Mexico has 3 endemic foci in which 35% of the regional population needing treatment reside: Oaxaca, Northern Chiapas, and Southern Chiapas. Mexico surpassed the 85% coverage goal for the fourth consecutive year. The Mexican program provided 288,435 treatments, achieving 93% of the UTG(2) of 309,634. Mectizan® is being provided four times a year (e.g. quarterly) in 50 of its most endemic communities in the Southern Chiapas focus, in a trial aimed at hastening onchocerciasis elimination. A 3-year impact evaluation of the communities involved is scheduled for 2006.

Venezuela, the last endemic American country to launch its national onchocerciasis program, reached the 85% goal for the first time in 2003, a dramatic increase compared to coverage of 65% in 2002 and 53% in 2001. Despite political unrest, the program in Venezuela has made incredible efforts to maintain coverage in 2004 in 2 of its 3 endemic foci: Northeastern and Northcentral (the eligible population of which make up most of Venezuela's 22% contribution to the regional treatment population). In 2004 Venezuela provided 185,839 treatments, achieving 95% of the UTG(2) of 195,608. The poorly accessible Southern focus, which borders the Brazilian focus, provided 5,683 treatments, achieving 51% of their UTG(2) of 11,120.

IACO 2004: The fourteenth annual InterAmerican Conference on Onchocerciasis (IACO 2004) was held at The Carter Center in Atlanta, Georgia, from 13 to 15 November 2004. The meeting was organized by OEPA and PAHO, with financial support from the Bill & Melinda Gates Foundation, Lions Clubs SightFirst Program and Merck & Co. In addition to representatives from the 6 national programs and the sponsoring agencies, the meeting was attended by representatives from the Mectizan® Donation Program, nongovernmental development organizations involved in Mectizan® distribution in endemic areas, CDC and academic institutions. Former United States President Jimmy Carter attended the meeting on 15 November.

IACO 2004 noted that Venezuela has not yet been capable of reaching remote communities in its Southern focus and that the Venezuelan Government's "Yanomami Health Plan", when implemented, would be the best way to provide the infrastructure needed to deliver Mectizan® treatments, along with other health care, to this remote population. The Brazilian and Venezuelan delegations noted that the Southern Venezuelan Focus and Brazilian Amazonas-Roraima Focus (Map 2) were epidemiologically one and the same, and suggested that they be merged under a common name, the Yanomami Area. IACO 2004 concluded that cross-border activities in the Yanomami Area must be coordinated and intensified on the Venezuelan side if transmission is to be interrupted in both countries.

Although reported treatment coverage in Guatemala has been >85%, data from sentinel village populations continue to show presence of nodules, microfilariae in skin and onchocercal lesions in the anterior chamber of the eye, calling into question the veracity of the reported treatment figures. IACO 2004 recommended that the overall management of the Guatemalan program be improved by more direct assistance from OEPA. In addition, it recommended that independent coverage surveys be conducted to verify reported treatment levels.

Other recommendations from IACO 2004 included the need for:

- greater political and financial support from the countries for their programs;
- development of methodology and tools needed for evaluation of foci where Mectizan® treatment could conceivably be stopped (Lopez de Micay, Santa Rosa, Escuintla-Guatemala, Huehuetenango, Oaxaca and Northern Chiapas). This includes development of an antigen detection test for *O. volvulus* adult parasites that could be used in these evaluations;

- increased health education and community-level interventions to maximize treatment coverage and improve sustainability.

Transmission interruption in the 13 foci: OEPA was congratulated on the progress made in restructuring its databases to look at foci, rather than countries. It was recognized that new data were needed for many foci. Based on the OEPA presentations at the Review, and further discussions during the meeting, a basic table was designed to organize available and needed data. The table recommended was:

Focus	Epi (Endemicity, Pnod, Pmf) Bslne Recent	Eye (MFAC, PK) Bslne Recent	Baseline ent: Vector(s), TIP, TIPP Bslne Recent	Serology/ nodules in young children	No years >85% UTG(2)	Transmission status (ongoing/ interrupted)	Model prediction year
1							
2							
3 ...							

Since the review, OEPA has made progress on this recommendation and a draft table is included in this report with data currently available (See Table 5). In 2004, it was believed that transmission had been interrupted in 6 (46%) of the 13 foci: Mexico-Oaxaca, Mexico-North Chiapas, Guatemala-Cuilco (Huehuetenango), Guatemala-Escuintla, Guatemala-Santa Rosa, and Colombia-Lopez de Micay (Cauca). Exercises in preparation for certification are now being conducted in Guatemala-Santa Rosa, with CDC assistance.

RECOMMENDATIONS 2005 for OEPA

Focus on improving treatment coverage in southern Venezuela. Hold a coordination meeting in the southern focus before the next IACO (scheduled also for November 2005 in Caracas, Venezuela).

As much as possible of the 13 foci table should be completed in 2005.

Seek to evaluate the impact of increased training, supervision, and involvement of kinship groups, and improve the gender balance of community treatment coverage.

Complete PCR in all collected flies banked in the region by the end of 2005.

Establish mathematical transmission models for all foci, with particular urgency to do so in *S. ochraceum* areas.

Improve data management in sentinel villages and consider monitoring individuals or cohorts, and the establishment of serological (OV-16) monitoring.

Continue pre-certification exercises in Santa Rosa, Guatemala in collaboration with CDC/MERTU.

Assist the Mexican program in the important 4X per year treatment protocol being conducted in Chiapas.

Suggest CDC/MERTU consider ivermectin/albendazole combination studies.

Work with CDC/MERTU to determine next steps with *Wolbachia* antibiotic or other macrofil trials.

Seek support for basic scientists to develop antigen detection tests.

Consider adding other interventions (nodulectomy, focal vector control), when appropriate, that could be applied in specific foci.

Maintain CDC lab involvement, particularly in serology, nodule histology, entomology, and drug studies.

Seek more Lions involvement politically, to help maintain program visibility and support.

Develop, along with Atlanta technical staff, a more streamlined method of monthly reporting to headquarters.

Continue analysis of data obtained in coverage surveys in the South Coast and Central foci of Guatemala. Work on improving the coverage surveys being performed.

Consider other kinds of coverage surveys where reported treatments are high, yet transmission persists, particularly in Guatemala, Venezuela and Mexico.

Promote community surveys for validating the level of community involvement, health education, training and coverage. Implement the scoring system to monitor community participation.

The importance of demonstrating the impact of The Carter Center's activities on ocular disease was stressed by the Lions as being very important for the second phase of SightFirst fundraising. Carter Center programs need to review all available data from past sentinel areas that may have baseline data pertaining to visual impairment or ocular disease.

Carter Center program staff are encouraged to complete the Emory IRB ethics test, and are required to do so where research on human subjects is or will be taking place.

Map 2: Stratification of onchocerciasis foci in the Americas

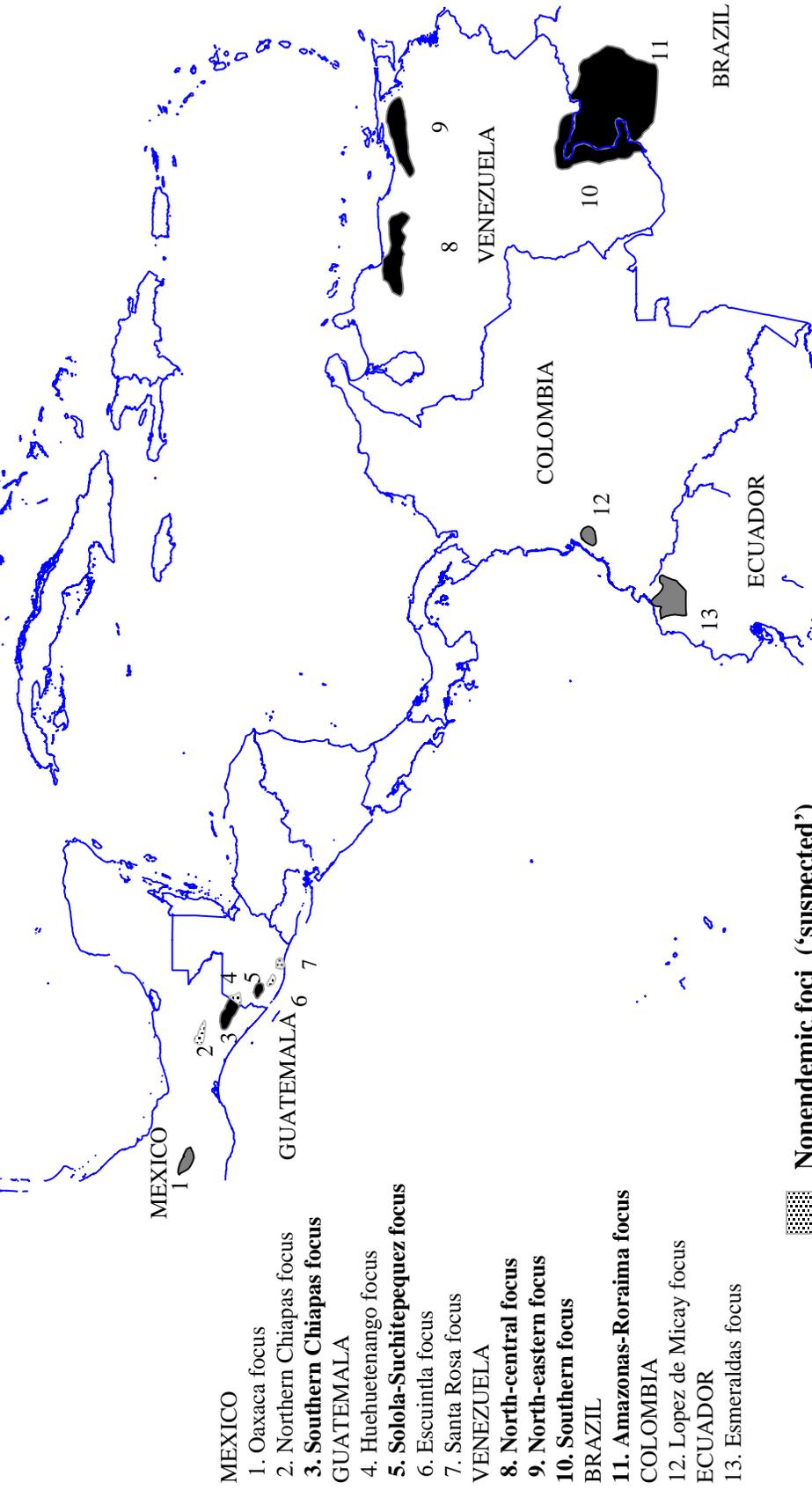


Figure 6: Number of Treatments With Mectizan® in the Americas, 1989-2004, and Ultimate Treatment Goal

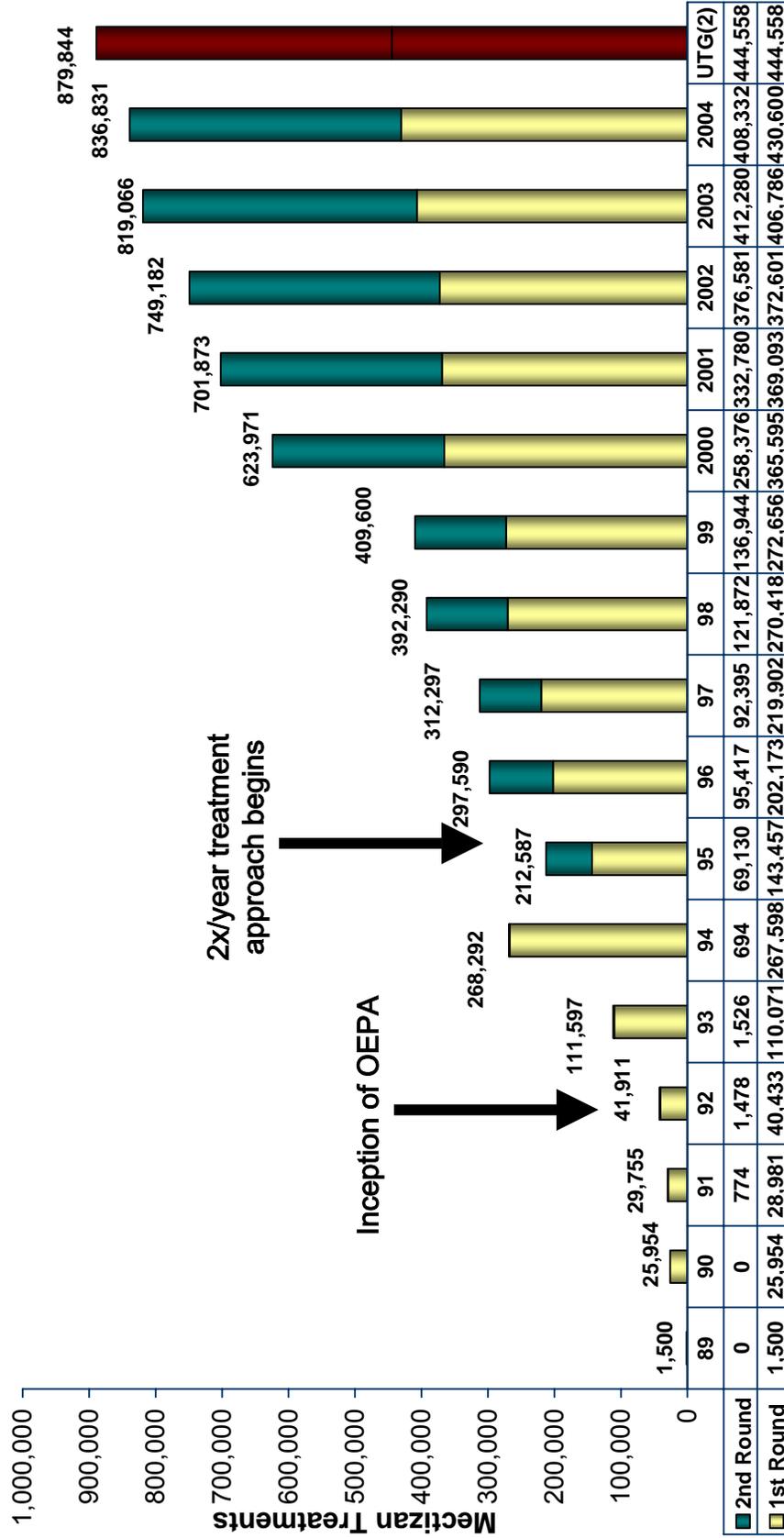
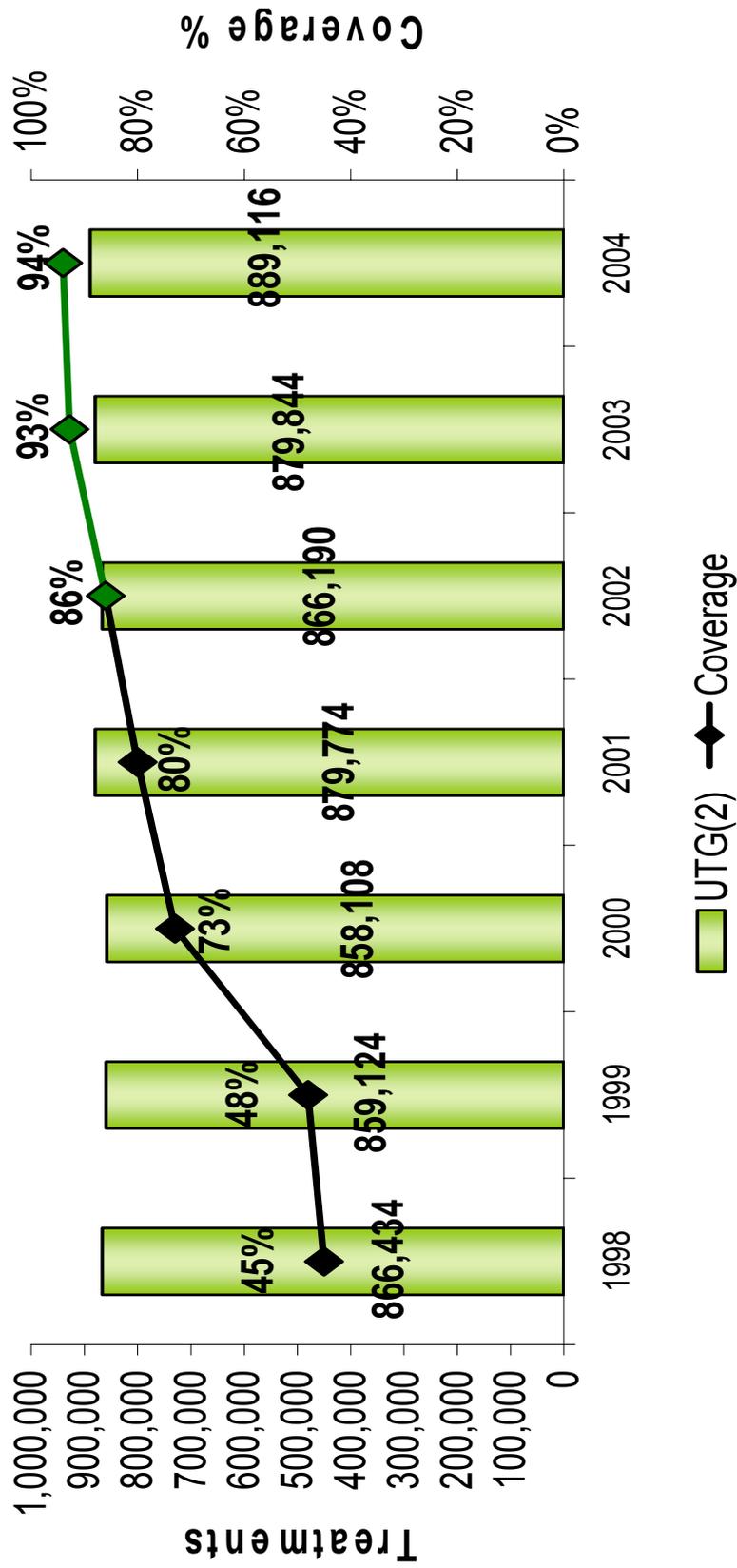


Figure 7: Treatment coverage and UTG(2), by Year*
1998-2004



* Ultimate Treatment Goal multiplied by two, each year.

Figure 8: Regional coverage UTG(2) of communities in Likert scale by foci, 2004

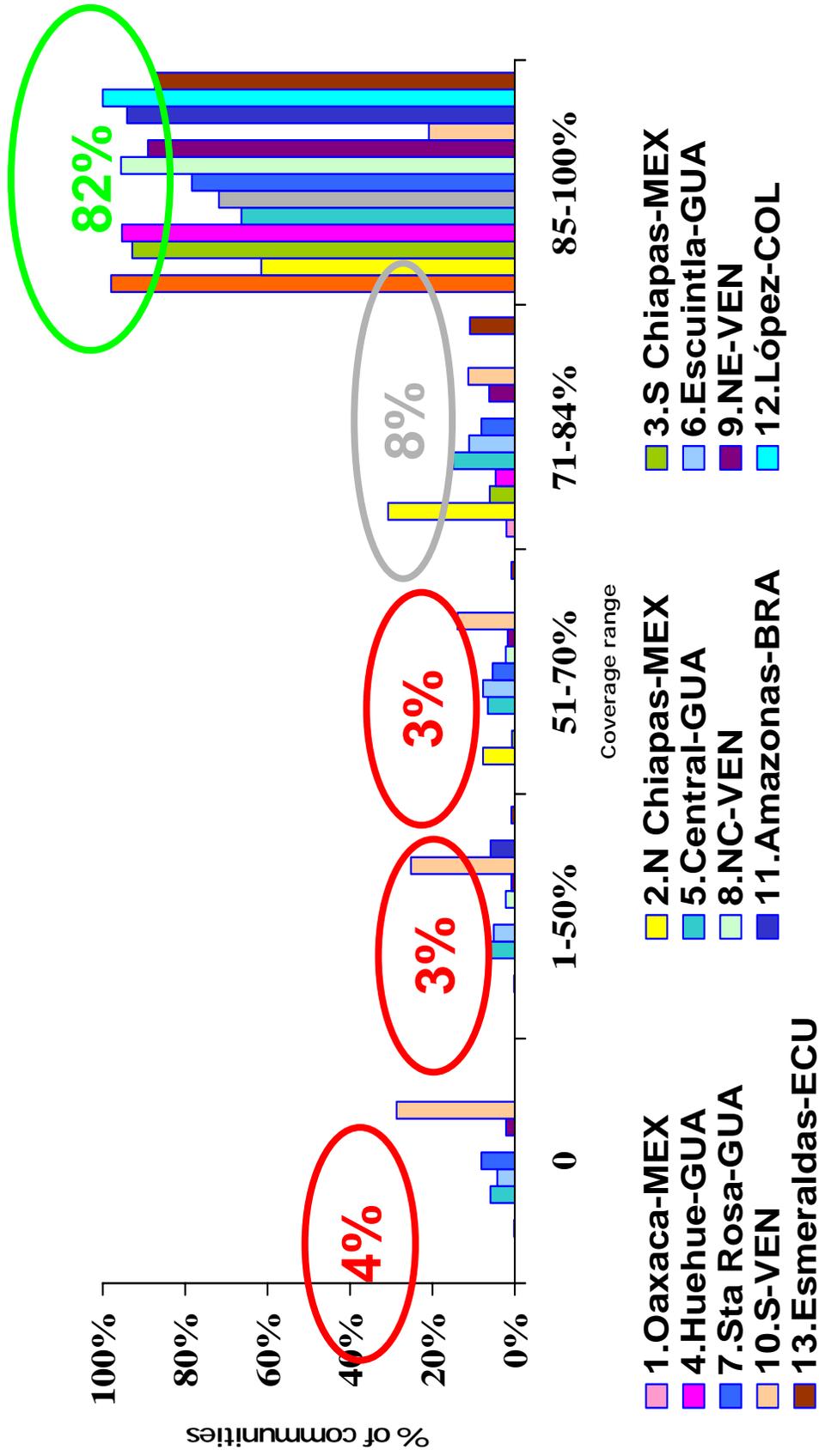
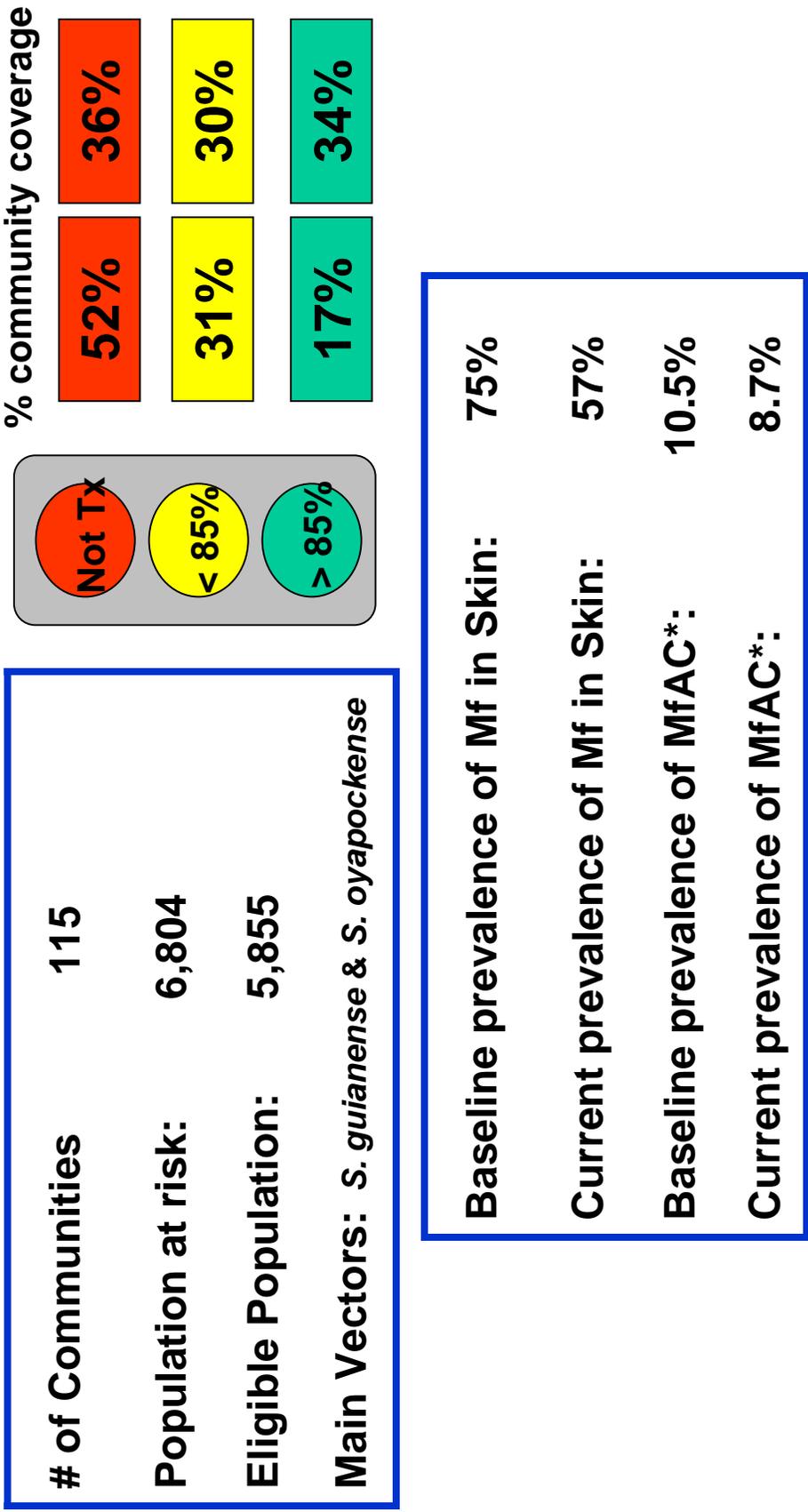


Figure 9: The Southern Focus of Venezuela in 2004



*MfAC = Microfilaria in the Anterior Chamber of the eye

Table 2: Treatments in the Americas by country, 2002 - 2004

OEPA 2004

Countries	first round			second round			Total Treatments		
	UTG	UTG(2)	TX(earp)	TX(earp)	TX(earp)	TX(earp)	TX(earp)	TX(earp)	(earp)
	% UTG	% UTG	% UTG	% UTG	% UTG	% UTG	Cum	Cum	% UTG(2)
Brazil	6,787	13,574	6,180	91%	6,933	102%	13,113	97%	97%
Colombia	1,182	2,364	1,155	98%	1,131	96%	2,286	97%	97%
Ecuador	20,044	40,088	19,393	97%	19,461	97%	38,854	97%	97%
Guatemala	163,924	327,848	154,126	94%	154,198	94%	308,324	94%	94%
Mexico	154,817	309,634	143,374	93%	145,061	94%	288,435	93%	93%
Venezuela	97,804	195,608	92,405	94%	93,434	96%	185,839	95%	95%
Total	444,558	889,116	416,633	94%	420,218	95%	836,851	94%	94%

OEPA 2003

Countries	first round			second round			Total Treatments		
	UTG	UTG(2)	TX(earp)	TX(earp)	TX(earp)	TX(earp)	TX(earp)	TX(earp)	(earp)
	% UTG	% UTG	% UTG	% UTG	% UTG	% UTG	Cum	Cum	% UTG(2)
Brazil	6,436	12,872	6,304	98%	6,184	96%	12,488	97%	97%
Colombia	1,163	2,326	1,156	99%	1,168	100%	2,324	100%	100%
Ecuador	20,029	40,058	19,044	95%	19,418	97%	38,462	96%	96%
Guatemala	160,418	320,836	154,185	96%	154,069	96%	308,254	96%	96%
Mexico	155,570	311,140	140,185	90%	143,208	92%	283,393	91%	91%
Venezuela	96,306	192,612	85,912	89%	88,233	92%	174,145	90%	90%
Total	439,922	879,844	406,786	92%	412,280	94%	819,066	93%	93%

OEPA 2002

Countries	first round			second round			Total Treatments		
	UTG	UTG(2)	TX(earp)	TX(earp)	TX(earp)	TX(earp)	TX(earp)	TX(earp)	(earp)
	% UTG	% UTG	% UTG	% UTG	% UTG	% UTG	Cum	Cum	% UTG(2)
Brazil	6,420	12,840	6,073	95%	6,150	96%	12,223	95%	95%
Colombia	1,163	2,326	1,124	97%	1,140	98%	2,264	97%	97%
Ecuador	20,121	40,242	18,655	93%	19,048	95%	37,703	94%	94%
Guatemala	159,303	318,606	145,299	91%	150,640	95%	295,939	93%	93%
Mexico	158,617	317,234	140,529	89%	146,597	92%	287,126	91%	91%
Venezuela	87,471	174,942	60,921	70%	53,006	61%	113,927	65%	65%
Total	433,095	866,190	372,601	86%	376,581	87%	749,182	86%	86%

Table 3: OEPA: Endemic communities by level of endemicity, 2004

Country	% of endemicity			Total	% by country
	Hyper (>60)	Meso (>20<60)	Hypo (<20)		
Brazil	5	7	5	17	1%
Colombia	0	1	0	1	0%
Ecuador	42	23	54	119	6%
Guatemala	42	15	461	518	27%
Mexico	39	220	411	670	34%
Venezuela	104	216	305	625	32%
TOTAL	232	482	1236	1950	100%
% of endemicity	12%	25%	63%	100%	

Table 4: OEPA: Communities Treated in the First and Second Rounds, 2004

Country	Endemic communities	Communities			Communities not treated	%
		>85%	<85%	%		
Brazil	17	17	100	0	0	0
Colombia	1	1	100	0	0	0
Ecuador	119	110	92	9	8	0
Guatemala	518	410	79	85	16	4
Mexico	670	583	87	86	13	0
Venezuela	625	365	58	155	25	17
Region	1950	1486	76	335	17	7

*31 communities reported as not inhabited: Guatemala has 23, Mexico 1, and Venezuela 7.

Country	Endemic communities	Communities			Communities not treated	%
		>85%	<85%	%		
Brazil	17	17	100	0	0	0
Colombia	1	1	100	0	0	0
Ecuador	119	109	92	10	8	0
Guatemala	518	365	70	122	24	6
Mexico	670	604	90	65	10	0
Venezuela	625	422	68	110	18	15
Region	1950	1518	78	307	16	6

*24 of these communities were reported as not inhabited.

** Community of two inhabitants.

***7 of these communities were reported as not inhabited.

Table 5: OEPA: Baseline and Recent Indicators of Onchocerciasis Transmission, by Focus

#	Focus	Epi (Endemicity, Prod, Pmf) Baseline/Recent		Eye (MFAC, PK) Baseline/Recent		Vector		TI, TTP Baseline/Recent		Serology/nodules in yng children		No. Years >85% UTG(2) From 2001 - 2004 ²	Transmission status (ongoing/interrupted)	Model prediction year					
		Pmf Baseline	Pmf Recent	Nod Baseline	Nod Recent	MFAC Baseline	MFAC Recent	PK Baseline	PK Recent	TI Baseline	TI Recent				TIP Baseline	TIP Recent	Serology	Nodules	
1	Mexico- Oaxaca	7.3%(1993)	0 (2004)	5.10%	0%	0%(1995)	0 (2004)	1.7	0	S. ochraceum	0.42	0.21 (1999)	N/A	3.8 (1.9-6.6) 2001	0%(2001)	N/A (1993) 0%(2004)	4	Suspected interrupted	
2	México- North Chiapas	0.1%(1995)	N/A	0.1%(1994)	0%(2004)	0.6%(1995)	N/A	7.7	N/A	S. ochraceum	N/A	N/A	1.2 (0.03 - 6.1) 2001	0%(2001)	0%	3	Suspected interrupted		
3	Mexico- South Chiapas	14.5%(1995)	2.0%(2004)	8.7%(1996)	2.7%(2004)	1.5%(1995)	0.2%(2004)	13.7	1	S. ochraceum	1.24	0.16 (1999-2000)	N/A	3.1 (1.1 - 6.4) 2001	27% (2001)	20.7% (1998) 0.4% (2004)	4	Ongoing	
4	Guatemala- Huehuetenango (Cuitico)	2.90%	N/A	5.8%	N/A	7.2% (La Providencia) ³	N/A	10.0% (La Providencia) ³	N/A	S. ochraceum	N/A	N/A	N/A	N/A	0%(2001)	N/A	4	Suspected interrupted	
5	Guatemala- Central Focus (Suchitepéquez, Soilola and Chimaltenango)	52.2%(1994)	16%(2003)	29.8% ³	33.0 % (2003)	20.7% ³	2.9%(2003)	50.1% ³	3.1	S. ochraceum	1.95%	0.19 (1996)	N/A	In process(2002)	N/A	N/A (1996) y 8.6% (2003)	4	Ongoing	
6	Guatemala- Escuintla	37.4% 29.5% (1979) ¹	N/A	17.3% 10.3% (1979) ⁴	N/A	6.2% (1996-1997) ⁵	N/A	N/A	N/A	S. ochraceum	N/A	N/A	N/A	N/A	N/A	N/A	3	Suspected interrupted	
7	Guatemala- Santa Rosa	3.00%	N/A	4.60%	N/A	N/A	N/A	N/A	N/A	S. ochraceum	N/A	N/A	N/A	N/A	0%(2005)	N/A	4	Suspected interrupted	
8	Venezuela- North-central	44.9%(1999)	1.9%(2001)	2.150%	3.8%	31.0%(1999)	0.0%(2001)	37.90%	0%	S. metallicum	0 (2001)	0 (2001)	N/A	N/A	N/A	N/A	2	Ongoing	
9	Venezuela Northeastern	28.0%(1999)	5.23%(2001)	8.50%	10.8%	21.7%(1999)	4.23%(2001)	23.90%	5%	S. metallicum	1.38%	0.55 (2001)	N/A	N/A	N/A	N/A	2	Ongoing	
10	Venezuela- South	75.0%(1998) 5 com	57.0%(2001) 4 com	33.00%	7.6%	10.5%(1998)	8.7%(2001) 2 com	27%	23.9% dos com	S. guianense and S. oyapockense	4.17% (4 comunidades 1997)	0.44 (4 comunidades 1997)	N/A	N/A	N/A	N/A	0	Ongoing	
11	Brazil- Amazonas/Roraima	63.3%(1995)	20.2%(2003)	N/A	3.20%	31.2%(1995)	2.7%(2003)	71.6	6.60%	S. guianense. S. oyapockense and S. incrustatum	7.02	N/A	N/A	N/A	N/A	0%	4	Ongoing	
12	Colombia- Lopez de Micay (Cauca)	39.6%(1995)	0.9%(2004)	17.0% (1995)	0%(2004)	2.2%(1996)	0%(2001)	32.6	25.7	S. exiguum	4.27%	1.07 (1996)	0	1.7 (0.04 - 9.7) 2001	0%(2001)	0%	4	Suspected interrupted	2004 (25/25 chance) ¹
13	Ecuador- Main focus	76.7%(promedio de %) ¹	0.039%(2004)	15.5% 2 com (1997) 6.9% (2000)	4.60%	24.7%(promedio de %) ²	0.0%(2004)	35.3 ³	0	S. exiguum, S. quadrivittatum	2.33%	0.94 (1996)	5.9 (4.4 - 7.7) 2000	1.9 (1.1 - 3.0) 2000	0%(2001)	2%	4	Ongoing, except subocus Rio Cayapas Grande ⁴	2010 (99.99%) Corriente Grande ⁵

¹ Country program reported 80.8%

² Country program reported 22.8%

³ Country program reported 16.8%

⁴ Recent for 10,000 files

⁵ Recent for 10,000 files

⁶ The results presented above were obtained from a first run of the SIMON-a Model using preliminary data from Nacional. Some of the data, particularly the vector parameters, need to be checked and verified. Further replicates and tests also need to be carried out to improve the integrity

⁷ Thus the output presented here should be considered only as rough indicator of the eventual outcome.

⁸ Information of all foci available at OEPA from 2001. However, some foci could have reached coverages >85% before that year.

⁹ Branding-Bennett 1981

¹⁰ J.O. Ochoa 1979, San Vicente Paeyaya

¹¹ I. Tadi, et al 1996-1997

Key to transmission status:

Table 6: OEPA: 4 times/ year treatment exercises in Chiapas, Mexico: 2004

Edemicity	Communities	Population at risk	Eligible population
Hyperendemic	37	2919	2558
Mesoendemic	13	2954	2675
TOTAL	50	5873	5233

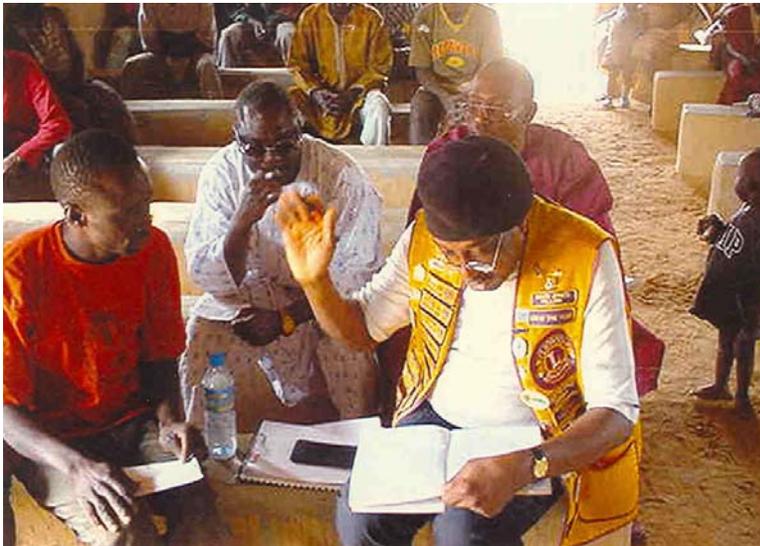
1st round			2nd round		
Edemicity	Population Treated	Coverage (%)	Edemicity	Population Treated	Coverage (%)
Hyper	2217	91	Hyper	2331	91
Meso	2131	89	Meso	2324	87
Total	4357	90	Total	4655	89

3rd round			4th round		
Edemicity	Population Treated	Coverage (%)	Edemicity	Population Treated	Coverage (%)
Hyper	2372	93	Hyper	2431	95
Meso	2377	89	Meso	2583	97
Total	4749	91	Total	5014	96

NIGERIA

Nigeria is probably the most highly endemic country in the world for river blindness, having as much as 40% of the global disease burden. It is estimated that 27 million Nigerians need curative or preventative treatment with Mectizan® for onchocerciasis (i.e. the Ultimate Treatment Goal [UTG] is 27 million). The National Onchocerciasis Control Program (NOCP) began in 1989 by treating approximately 49,566 persons with Mectizan®, and has progressed to providing over 20 million treatments in 2004 (from Nigerian Federal Ministry of Health, “15 Years of Onchocerciasis Control in Nigeria” Report by the National Onchocerciasis Control Program, Feb 2005).

Background: The Carter Center program in Nigeria has offices in Benin City, Enugu, Jos, Lagos, and Owerri. Primary activities consist of: 1) directly assisting treatment activities in nine of the 32 onchocerciasis endemic states in Nigeria (Abia, Anambra, Delta, Ebonyi, Edo, Enugu, Imo, Nasarawa, and Plateau States) (Map 3); 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 Christoffel Blindenmission, Helen Keller International Eye Foundation, MITOSATH, SightSavers, and UNICEF; and 3) working to implement and evaluate the African Program for Onchocerciasis Control (APOC) strategy of sustainable Community-Directed Treatment with Ivermectin (CDTI) programs. The Lions Clubs International Foundation (LCIF) SightFirst Initiative is a major Carter Center partner in Nigeria.



Lions and Carter Center staff checking CDD register to validate treatment.

In addition to the funding provided by LCIF, members of Lions Clubs District 404 have been active participants in the Carter Center-assisted RB control activities in Nigeria, the most endemic country for river blindness in the world, from the outset in 1996. They participate in mobilization of communities in advance of mass drug administration, in health education advocacy, and monitoring of coverage. Two articles (See Annex 8) documenting the impact of Mectizan® distribution in reducing visual impairment by

over 90%, and describing important gender issues in Mectizan® distribution campaigns were published in 2004. Both articles acknowledge the special roles of Lions Edem Basse and Dr. Oluwasesan Onofowokan in that work.

Treatments: In 2004, the Carter Center assisted program in Nigeria provided health education and Mectizan® treatments to 4,986,925 persons in nine states (Table 7), 410,512 (8.2%) of which were passive treatments. The program reached 97% of the UTG, but had a 1% decrease from treatments provided in 2003. Treatments were conducted in 9,290 villages, including 1,918 hypo-endemic villages of the same states, which received passive treatment. The treatments assisted by The Carter Center represented approximately 25% of the 20 million total treatments estimated to have occurred in Nigeria (Figure 10).

No Serious Adverse Events (SAEs) were reported as a result of Mectizan® treatments in Nigeria in 2004, despite close monitoring for adverse reactions in the southeastern states because of the presence of *Loa loa* in that part of the country. Because all of those states are now entering their sixth and seventh years of mass treatment, the risk of SAEs is low.

Mectizan®: The Carter Center Nigeria Program received 15.4 million Mectizan® tablets for 2004. It had about 1.3 million remaining at the end of 2004. The average number of tablets per person treated was 2.9.

Training and Health Education: The nine states conducted training or retraining for a total of 28,122 health workers involved in Mectizan® distribution in 2004. This included 12,280 community-directed distributors (CDDs), 13,626 Community Supervisors, and 2,216 frontline-health level workers. The average number of CDDs per village was 2.3. The ratio of persons treated per CDD was very high at 406:1. Thirty-four percent of CDDs were female, which is roughly similar to 2003. CDD attrition remains high at 23%, which was unchanged from 2003, but lower than previous years: 35% in 2001 and 38% in 2002.

Financial Contribution: APOC funding concluded in seven of the nine states in 2003, and the remaining two (Edo and Delta) in 2004. Imo and Abia, which concluded their fifth APOC year in 2003, did receive a remainder of 2003 funding in 2004. In 2003, the government (all levels) contributed approximately 11% (approximately US \$82,551) of the total funds received by the Carter Center-assisted projects, while APOC contributed 9% (approximately US \$69,740), and The Carter Center contributed the remaining 80% (Figure 11).

Approximately 22% of the 7,036 endemic villages receiving treatment in the southeastern states supported their CDDs, in amounts averaging the equivalent of US \$8.73 each in 2004 (assuming 135 naira to US \$ 1). In Plateau and Nasarawa States, 85% of the 885 endemic communities provided an average of US \$6.87 to each of their CDDs in 2004. Total village-level contribution equaled 2.5 million naira (US \$18,396). In all project areas, 32% of the 138 LGAs budgeted 5.8 million naira (US \$42,993), for an average of \$1,265 per budgeted LGA. Six of the nine states contributed funding, totaling 2.9 million naira (US \$21,773). The Federal Ministry of Health (FMOH) provided no direct financial support for the River Blindness Program in any of the nine states in 2004.

Sustainability and Integration: The Program has successfully integrated with the existing health service delivery system. Most people who distribute Mectizan® are also involved with other health programs, such as HIV and malaria control. CDTI has been integrated into the overall health plan in Nigeria. All the assisted communities are involved in planning and implementing the Program in their villages, and governmental primary health care workers supervise all of the CDDs.

Post-APOC scenario: In Imo and Abia States, The Carter Center is no longer providing funding towards implementation activities in order to test what happens when activities are turned over to the full responsibility of the federal, state and local governments. Compared to treatments delivered in years prior to 2004, there was a readily observable decrease in Imo and Abia in 2004 (Figure 12); other states reported coverage at 85% and above, while Imo and Abia reached only 71% and 73%, respectively. In addition, Imo and Abia treatment data were reported from the field much later than usual in 2004, with final data reports not received until June 2005. All other states submitted final reports in February or March. The Carter Center will continue to monitor the outcome of the post-APOC scenario in Imo and Abia in 2005, and will not provide the funding there for treatment activities that it will provide to other Carter Center assisted Nigerian states.

Lymphatic filariasis initiative in Plateau and Nasarawa States: With financial support provided from GlaxoSmithKline and The Bill and Melinda Gates Foundation, The Carter Center program in Nigeria has worked with the FMOH of Nigeria and with the state governments of Plateau and Nasarawa States to provide annual combination Mectizan®/albendazole mass treatment for LF and praziquantel treatment for *Schistosomiasis haematobium* (SH) in those two states (Map 4). Health education is an integral part of both components of this initiative, which are implemented in conjunction with established onchocerciasis control activities. (See Background in Annex 7.)

Plateau and Nasarawa States were mapped for LF in 2000 (Map 5), and it was determined that mass treatment and health education for LF were required in all cities and villages in the 30 LGAs of the two states (estimated current population: 4.2 million). The results of these assessments are summarized in Map 6.

A total of 3,236,206 persons in the two states received health education and mass treatment for LF in 2004, which was 93% of the UTG of nearly 3.5 million treatments (Figure 13 and Table 8). Of treatments given, 1,060,827 were in hyper- and meso-endemic onchocerciasis target areas, and the remaining 2,175,379 in LF-only areas (some of which are hypo-endemic for onchocerciasis). Due to the pace of program expansion, and civil unrest in one LGA in 2003, 2004 was the first year in which all 30 LGAs in the two states were reached.

Hydrocelectomy surgeries (as reported by Dr. Gail Thomas) using the standard 'eversion' technique have been highly successful and enormously popular. In a Ministry of Health/Carter Center survey conducted in Plateau and Nasarawa states in 1999, 13%

of 4,320 men examined suffered from hydroceles. The hydrocelectomy campaign began when it was decided at the 2000 Program Review that surgery should be offered to those affected men identified in the survey. All the patients from surveyed villages in Plateau and Nasarawa States are eligible if they are good operative candidates. Hydrocele surgery is performed in larger village hospitals during “mass surgery days.” All personnel, equipment, and supplies are assembled for 3 to 5 days of hydrocele surgeries. Patients are admitted, examined, and then undergo the 20-30 minute procedure to remove the fluid and prevent its reaccumulation. Efforts have been made to find patients months after their operations to evaluate postoperative outcome. To date, more than 200 patients have undergone surgical correction of their hydroceles. Overall, the patients have done extremely well, and the rate of hydrocele recurrence has been very low. The surgeries are extremely popular, and the LF program hopes to continue to be able to offer “Mass Hydrocele Surgery Days” in Plateau and Nasarawa States in 2005.

Schistosomiasis initiative in Delta, Plateau and Nasarawa States: By the end of 2001, nine of the 30 LGAs in Plateau and Nasarawa had been mapped for SH, in tedious village-by-village assessments using urine dipsticks to detect hematuria in samples of children ages 6-14. Another four LGAs were mapped in 2002. The results of these assessments are summarized in Maps 4 and 5.

Thanks to funding from ChevronTexaco Corporation, Delta State performed a rapid epidemiological assessment of schistosomiasis (Map 7) in 2003, and launched a praziquantel distribution program in 2004, representing about 20% of the overall ATO of 208,465. A total of 215,343 persons in Plateau, Nasarawa and Delta states received health education and mass praziquantel treatment for schistosomiasis in 2004 (Figure 14 and Table 8), which was 103% of the ATO. The ATO for 2005 is 204,971.

The progress of the highly popular SH component of the integrated program is limited mainly by the slow methods available for assessing SH prevalence and by the cost of praziquantel tablets. Ministries of Health of Plateau and Nasarawa States, and The Carter Center, are rotating the praziquantel tablets from LGAs (‘the PZQ withdrawal of treatment protocol’) where treatment has reduced the rates of hematuria, to other LGAs that have yet to be treated.

LF and Schistosomiasis integration in Plateau and Nasawara States: The demonstration project in Plateau and Nasarawa States continues to show that LF and urinary schistosomiasis (SH) MDA efforts can be complementary to Mectizan® distribution. In addition, the results of research supported by TDR/ WHO suggest that simultaneous administration of the three medicines (Mectizan®, albendazole, and praziquantel) does not adversely affect blood levels and is safe in uninfected volunteers. The Carter Center is encouraging partners (the Federal Ministry of Health and WHO) to officially sanction the use of these medicines simultaneously, since this would further enhance the cost benefits of program integration.

However, the challenges of integration are notable particularly for their complexity and variability based on disease prevalence. There are different needs for different communities and LGAs, and different technical requirements for each disease. Integration of programs has become an important topic on the international agenda, and the conclusions of a recent meeting, Integration of Trachoma and Lymphatic Filariasis, held in Bagamoyo, Tanzania August 24-25, 2004, contributed to the table below (Kilima P, King J. "Integration of Trachoma and Lymphatic Filariasis Elimination." Sixth Annual Program Review of Carter Center Assisted Trachoma Control Programs. Atlanta. March 2, 2005).

	Very Beneficial	Beneficial
Most Feasible	<ul style="list-style-type: none"> • Joint National Communication Strategy • Joint advocacy and social mobilization • Joint registration (census prior to MDA) • Integrated hygiene improvements • Coordinated MDA (training, same CDDs, etc.) • Joint task force • Increased participation of planning • Coordination of the sequence of program activities • Integrated supervision • Strengthening policies and guidelines 	<ul style="list-style-type: none"> • Integrated mapping • Combined program review • Combined case detection methods for CDD • Joint community committees
Less Feasible	<ul style="list-style-type: none"> • Co-administration (drugs without PK studies) • Community validation studies (coverage surveys) • Standardized data collection and storage • Improved IT and communications • Improved access to water and latrines 	<ul style="list-style-type: none"> • Integrated drug logistics • Joint education materials and curriculum

Collaboration between LF and malaria, Plateau and Nasarawa States:

In Africa, the same anopheline mosquitoes transmitting LF also transmit malaria. Insecticide treated bednets (ITNs) are one of the most important prevention tool for malaria, and several studies (including studies conducted by CDC in Kenya) have shown that broad distribution of ITNs results in large reductions in death and disease due to malaria, especially among children younger than five years of age and pregnant women. However, the distribution of the ITNs can be logistically complicated, and the global target of achieving 60 % ITN coverage of children younger than 5 years of age and pregnant women by 2005 will not be reached. Linking ITN distribution with mass drug administration programs for LF has potential benefits for both programs: sharing the resources results in cost reductions, and protection from the mosquito vectors reduces transmission of both diseases simultaneously.

In 2004, CDC consultants helped The Carter Center to determine if the CDTI system could be used to simultaneously distribute ITNs. The program was assisted by CDC entomologists and epidemiologists Drs. William Hawley, Els Mathieu and Brian Blackburn.

The Carter Center received a donation of 56,000 ITNs from the MOHs of Plateau and Nasarawa. Two local government areas (LGAs), Kanke (in Plateau State) and Akwanga (in Nasarawa State) were chosen as the sites for the ITN distribution (population approximately 218,000). Logistical systems were developed, and distributors were trained, to enable distribution of ITNs during the MDA for LF. The ITN were provided free of charge to children under five and pregnant women. Within four months, 38,600 ITNs were distributed in 159 villages. In 2005, Dr. Blackburn will return to Nigeria to conduct a cluster survey for MDA and ITN coverage. If successful, the combined ITN and drug distribution effort may be a model for future collaboration of the existing malaria control and LF elimination programs in Africa. A summary of bednet distribution in 2004 can be seen in Table 8. In 2005, the program is working on a method to perform mass-retreatment of the nets, and is expanding to two more LGAs with an additional donation (Figure 13).

Monitoring, Evaluation and Research: Using baseline data and data collected after several years of treatment, the Nigerian projects have noted substantial impact on the manifestations of all three diseases. The preliminary impact data are displayed together in Figure A.

Onchocerciasis nodule data was first collected in 1992 by RBF, prior to the launching of Mectizan® treatment, and repeated in 1999 in 23 of the originally surveyed villages. Thirty to fifty males were sampled. The nodule rate prior to treatment was 51%, and 7 years later had dropped to 3%.

Blood in urine (hematuria) is a manifestation of schistosomiasis. Hematuria prevalence was determined using a rapid test to detect blood in urine ('dipstick test'). Baseline testing of urine of in 1999 was repeated in 2004, in ten villages of Pankshin and Akwanga LGAs of Plateau and Nasarawa States, respectively. Independent samples of 30 school-aged children per village were tested in each round, for a sample size of 300. Prior to treatment, 47% of children tested had blood in their urine. After six rounds of treatment, this rate was reduced to 8%.

There have been 2 LF studies that have shown evidence of diminishing disease burden and reduced transmission in Plateau and Nasarawa States. One study of nearly 2,000 persons in seven villages used a rapid test ('ICT') to detect LF antigen in blood (Map 5). Antigen presence in 2000, just prior to starting combination Mectizan®/albendazole treatment, was 45%; this dropped to 10% in 2004 as the result of the program. Testing of mosquitoes for LF infection was conducted in 9 villages. The infection rate in 2000 was 5.2%, and in 2004 only 1%.

RECOMMENDATIONS 2005 for THE CARTER CENTER NIGERIA

Continue the Imo and Abia post-APOC scenario trial. A better description of the 'study' is needed, along with the key data variables being monitored and the approach to data collection. Compare Imo and Abia variables with those of Ebonyi state, which seems to be "succeeding."

Better financial data is needed on government and NGO contributions to the Post-APOC sustainability test. Close monitoring now for outside investment (eg, APOC) is also indicated.

Seek to increase training, supervision, involvement of kinship groups, and better gender balance. Pay special attention to the number of CDDs per village, which continues to be inadequate in most areas. Monitor CDD attrition in all states.

All projects should send CDD training proposals to APOC, with a focus on kindred approach.

Follow national figures closely to determine if there is a downturn in treatments now that APOC funding has been withdrawn from most projects in the country. Obtain final 2004 treatment figures from FMOH to determine if treatments levels in 2003 were maintained in 2004.

Show the impact of the program on onchocerciasis (eye disease, nodule rates, mf rates, transmission indices). The importance of demonstrating the impact of ivermectin on ocular disease was stressed by Lions as being very important for the second phase of SightFirst fundraising. The Carter Center programs need to review all available data from past sentinel areas that may have baseline data pertaining to visual impairment or ocular disease.

Monitor impact of the program on onchocerciasis. Seek to design a study to evaluate impact of combined albendazole, and Mectizan on onchocerciasis transmission.

Consider a more politically-oriented Nigerian Program Review in 2005 for the sake of advocacy. Push to determine the costs to Nigeria to expand its schistosomiasis and LF programs to the full national coverage now being achieved by the onchocerciasis program.

Encourage the Lion Club's District 404 to be more involved in advocacy at the state levels. Pursue high-powered advocacy to states and LGAs for release of counterpart funding.

The Carter Center program staff are encouraged to complete the Emory IRB ethics test, and are required to do so where research on human subjects is or will be taking place.

RECOMMENDATIONS 2005 for NIGERIA INTEGRATED PROGRAMS

Plateau and Nasarawa States:

Lymphatic filariasis

Maintain the best possible coverage for LF (including in urban areas) in order to interrupt transmission.

not stop LF treatments in Pankshin and Akwanga, even though those two LGAs completed five rounds (years) of combined ivermectin/albendazole therapy in 2004.

The LF program should always present prevalence of microfilaremia (mf) data, in addition to entomology and ICT results. Work to strengthen this laboratory component of the sentinel monitoring activities, since it is a key index in the Global Program, but remains a weakness in the Jos laboratory.

Evaluate the impact of MDA on LF in urban areas.

Simplify the program by seeking to combine albendazole, Mectizan and PZQ treatments in pilot areas, based on the recent JAF statement and TDR studies indicating safety of this combination. If the FMOH should respond to the JAF statement by endorsing the implementation of combined treatments in Nigeria, The Carter Center should begin to develop plans and a protocol to do so in Plateau and Nasarawa.

Conduct a coverage survey of ITN in pilot combined LF/Malaria LGAs of Kanke and Akwanga LGAs of Plateau and Nasarawa States.

Develop a methodology for testing how ITNs can be reimpregnated within the MDA/CDTI program, then implement prior to the 2005 rainy season. This will require obtaining or purchasing reimpregnation materials as soon as possible, and considerable funding is required to purchase this material.

Continue to support “Mass Hydrocele Surgery Days” on a limited scale in areas where patients have been identified in The Carter Center-supported hydrocele prevalence surveys. Focus on pre-op screening, sterility during surgery, timely removal of stitches, and postoperative follow-up. Training in new surgical techniques is not indicated based on good long-term outcome of operative interventions commonly used by Nigerian physicians in Plateau and Nasarawa States. Encourage states and LGAs to fund this intervention. Encourage Dr. Thomas to publish her results.

Schistosomiasis

Plan and execute the PZQ withdrawal of treatment scheme, carefully following the agreed-upon protocol. Monitor schistosomiasis prevalence in areas where treatment

has been withdrawn. Analyze baseline data of hematuria from the 20 sentinel villages with headquarters.

More attention must be paid to revising, delivering, strengthening and monitoring health education activities in anticipation of PZQ withdrawal, as well as KAP studies pertaining to the community understanding surrounding the withdrawal. Set and reach definite goals for number of persons trained, number of training sessions, etc., that can be monitored in monthly reports.

Develop the approach to evaluating the impact of trachoma latrines on the prevalence of schistosomiasis (urinary and intestinal).

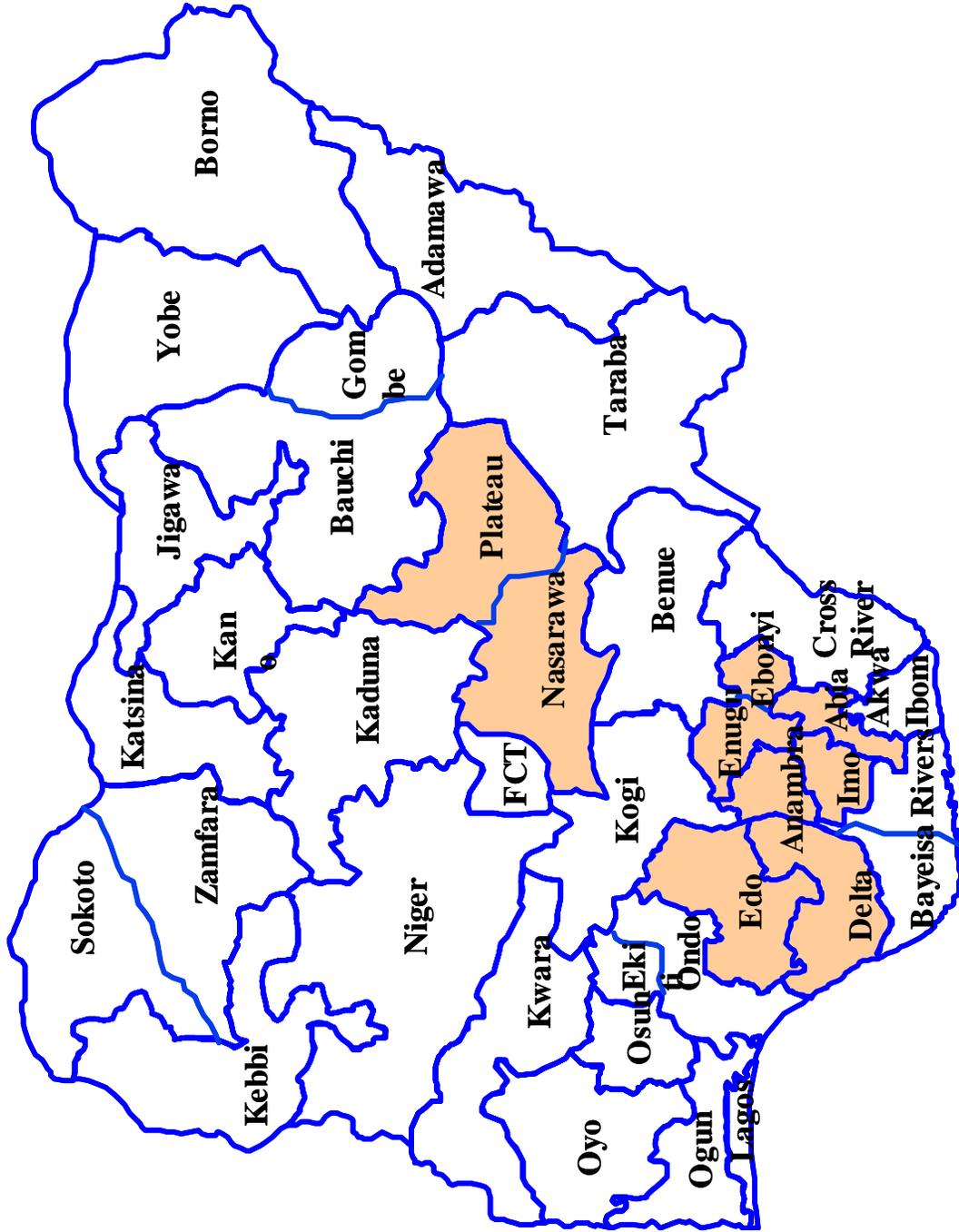
Southeastern States:

Reanalyze sensitivity, specificity, and predictive value data for the urinary schistosomiasis study in Delta State, with assistance from headquarters.

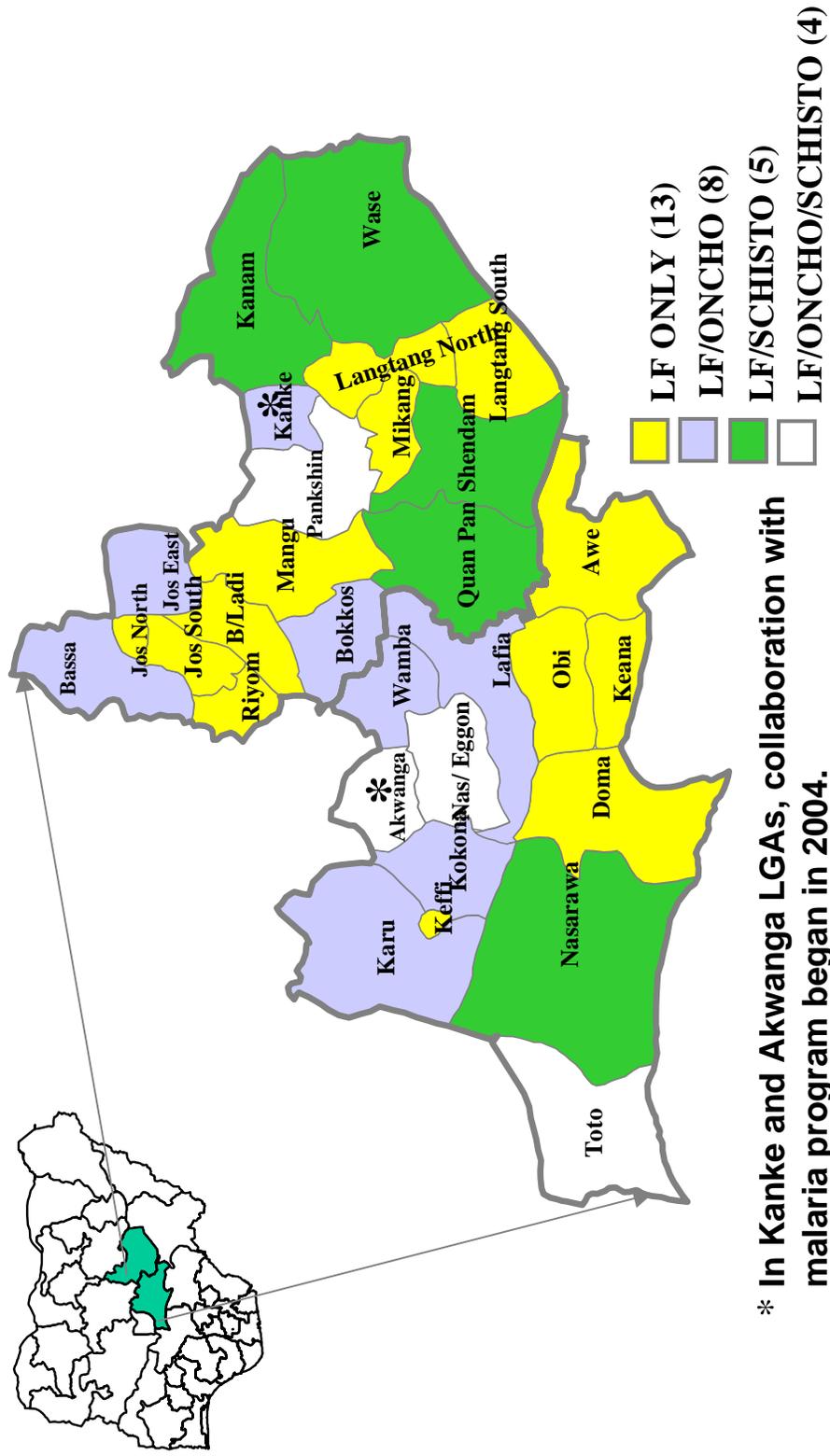
Conduct RAPLOA and LF assessment exercises in selected areas of the southeast, in LGAs with ongoing onchocerciasis activities, in consultation with headquarters.

Proceed with a demonstration of Vitamin A supplementation activities, addressing in particular issues and costs related to twice-per-year dosing.

Map 3: Nigeria: Carter Center-Assisted States



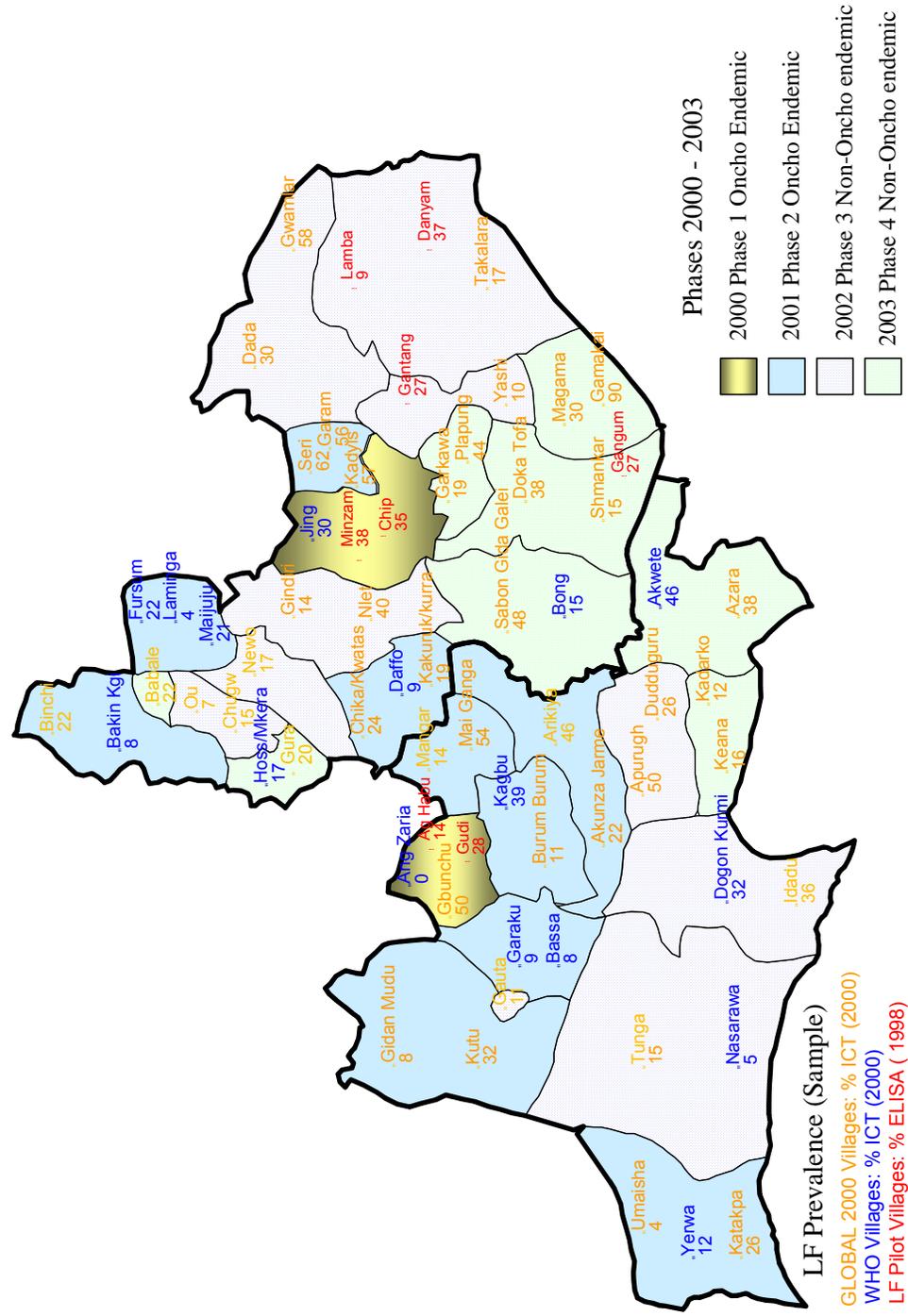
Map 4: Projects areas in Plateau and Nasarawa, Nigeria



* In Kanke and Akwanga LGAs, collaboration with malaria program began in 2004.

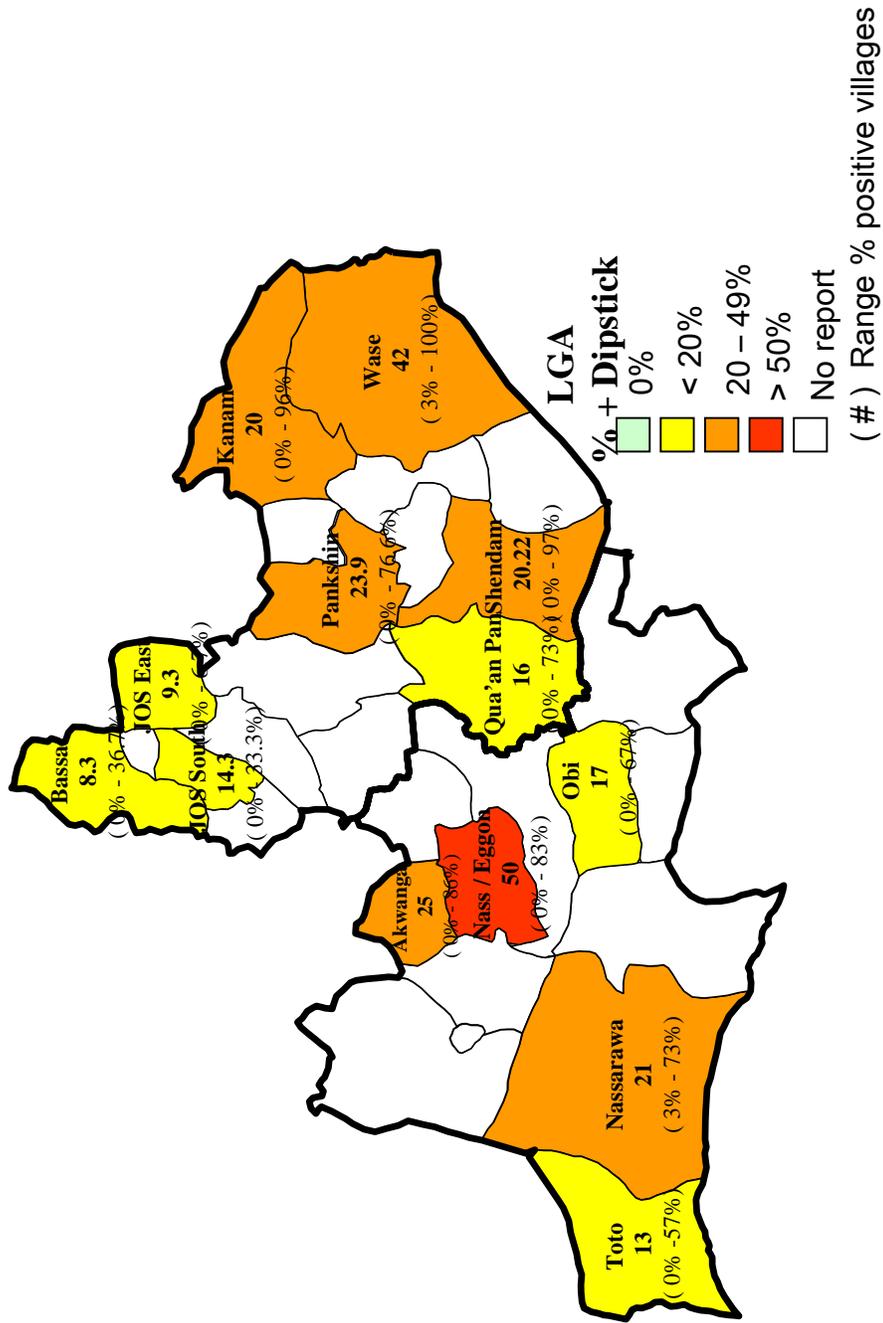
Map 5: Distribution of Lymphatic Filariasis (LF) in Plateau / Nasarawa States

Results in Villages Sampled for LF Antigen Testing (Numbers are % positive Antigenemia)



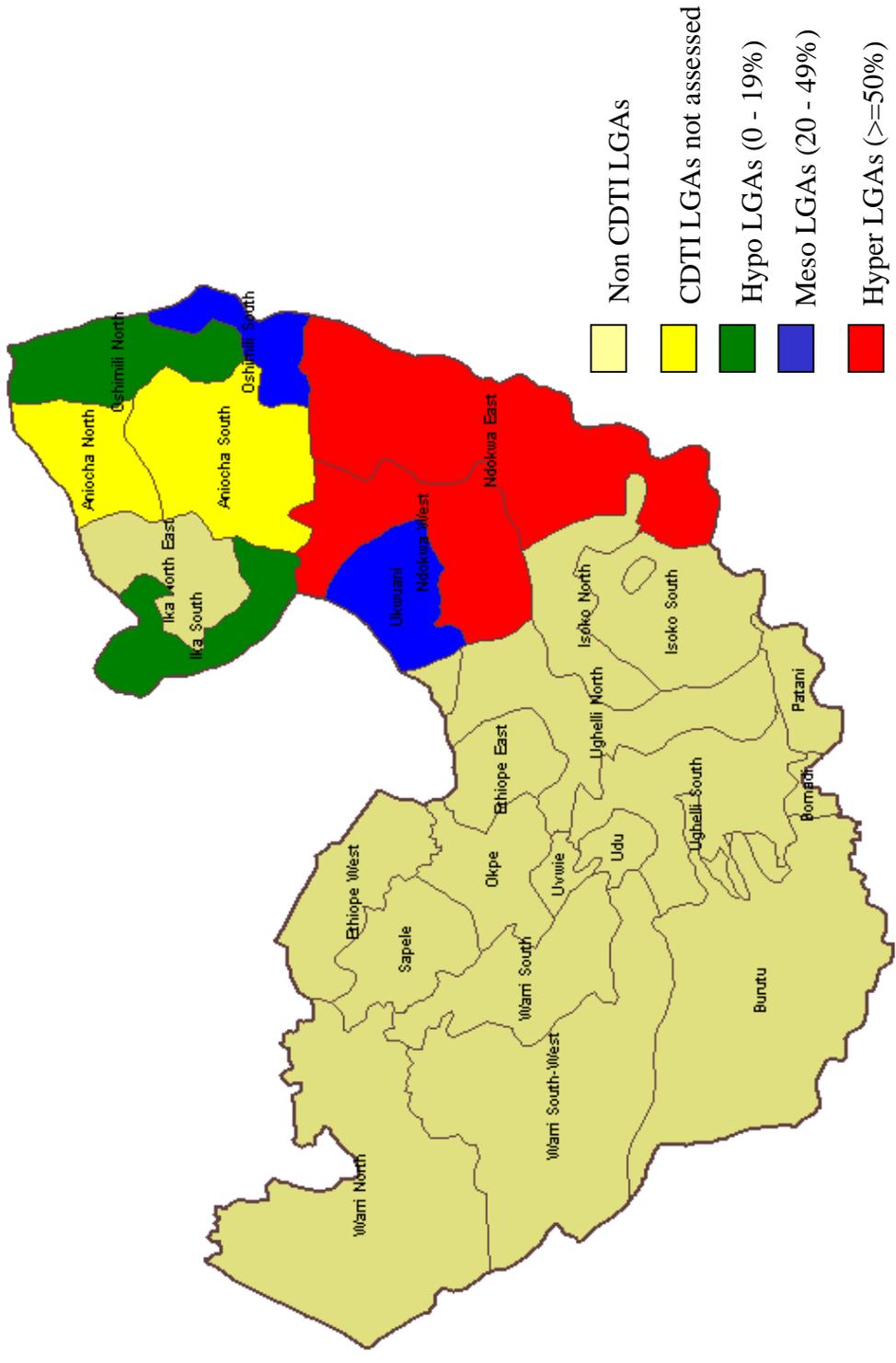
Map 6: Rapid Assessment for Urinary Schistosomiasis in Plateau / Nasarawa States

Average % dipstick positive



Map 7: Rapid Assessment for Urinary Schistosomiasis in Delta State

via questionnaire survey



Map 8: Rapid Assessment for Urinary Schistosomiasis in 2 LGAs (52 villages) in Delta State

Average % dipstick positive

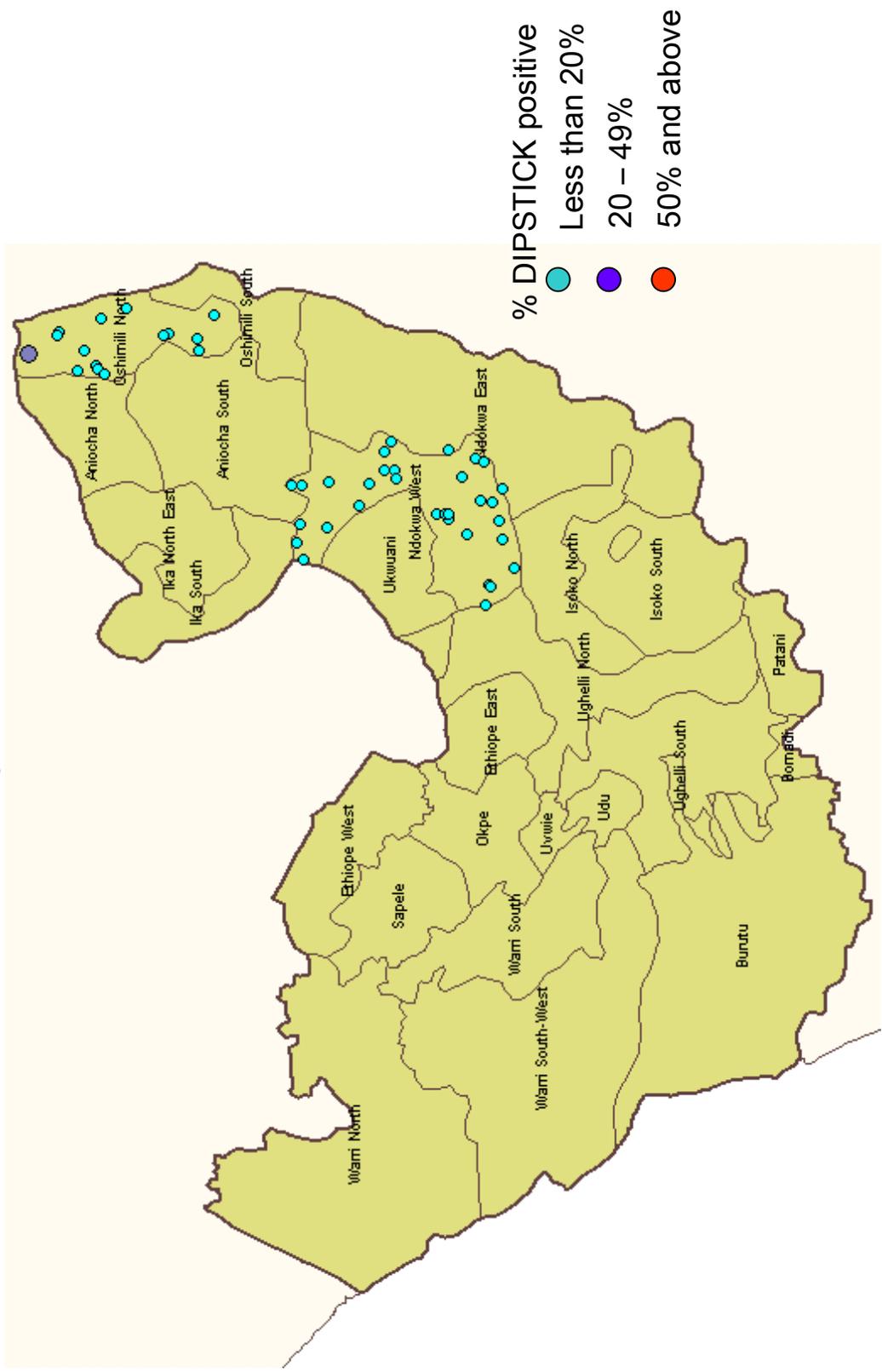
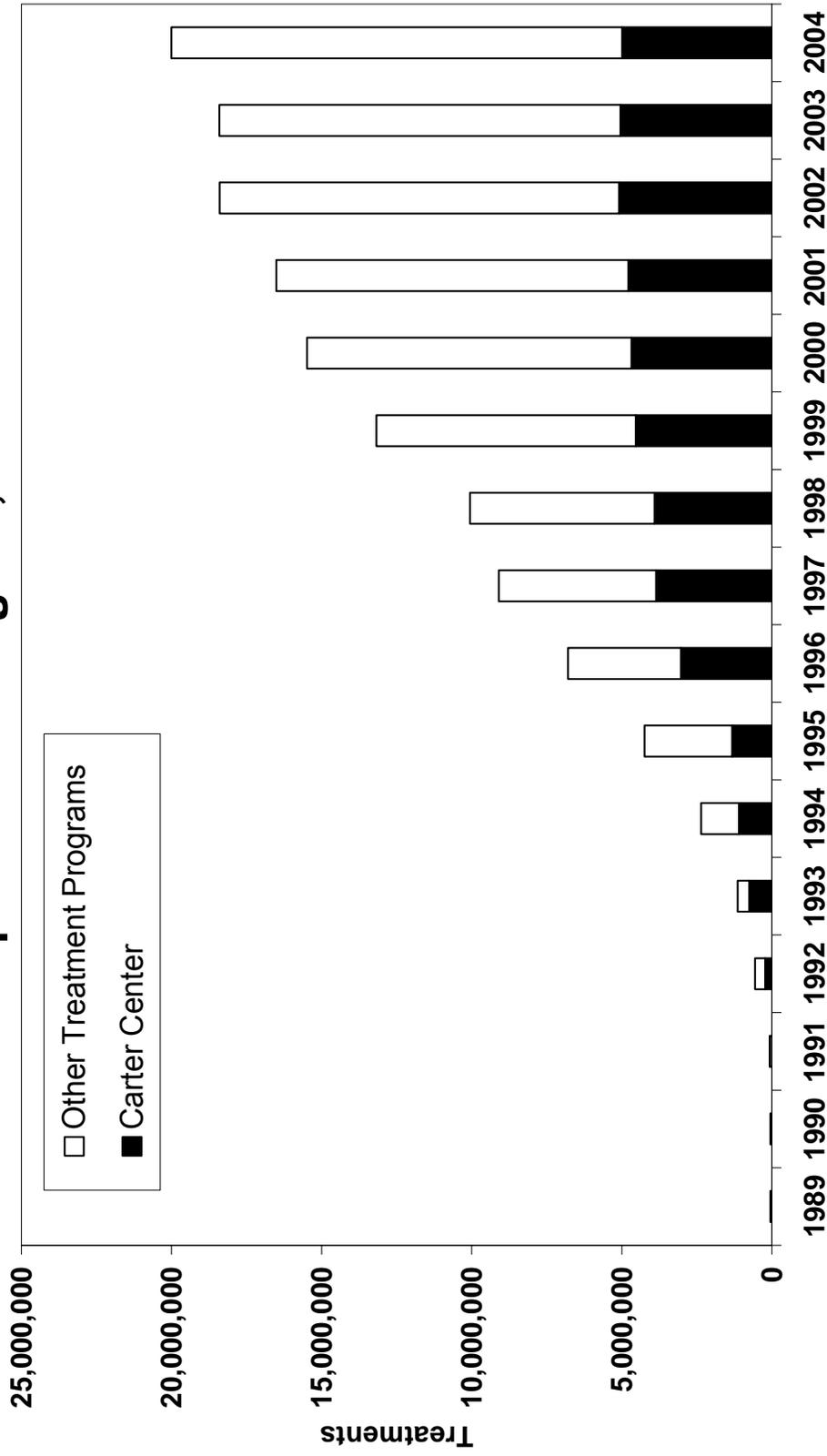


Figure 10: Carter Center-Assisted treatments and total Mectizan treatments provided in Nigeria, 1989-2004*



* Treatments from 1992-1995 by RBF. Source of provisional 2004 non-Carter Center figure: Nigerian Federal Ministry of Health, "15 Years of Onchocerciasis Control in Nigeria" Report by the National Onchocerciasis Control Program, Feb 2005 .

Figure 11: Nigeria: Financial contributions, 2000-2004

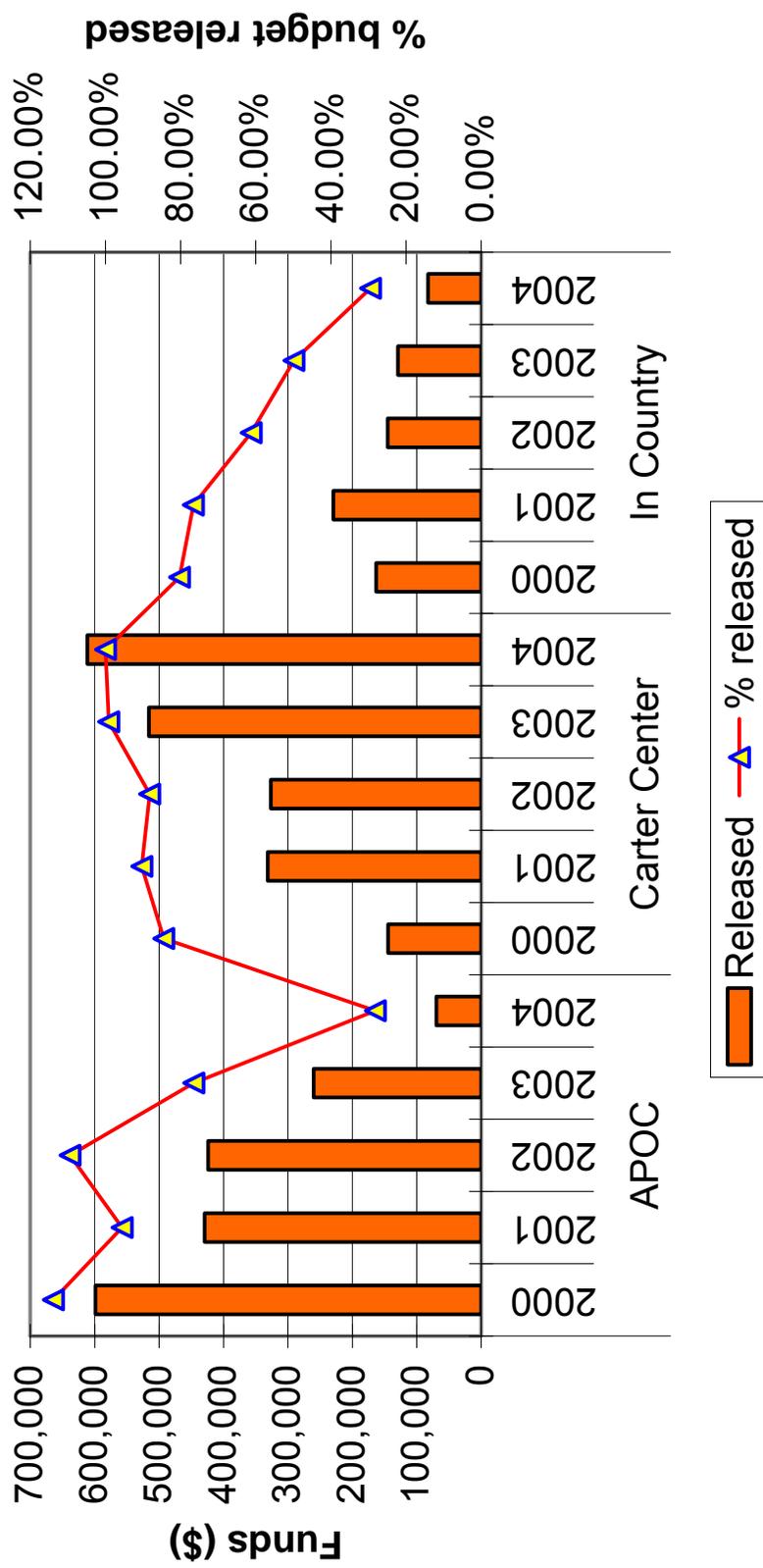
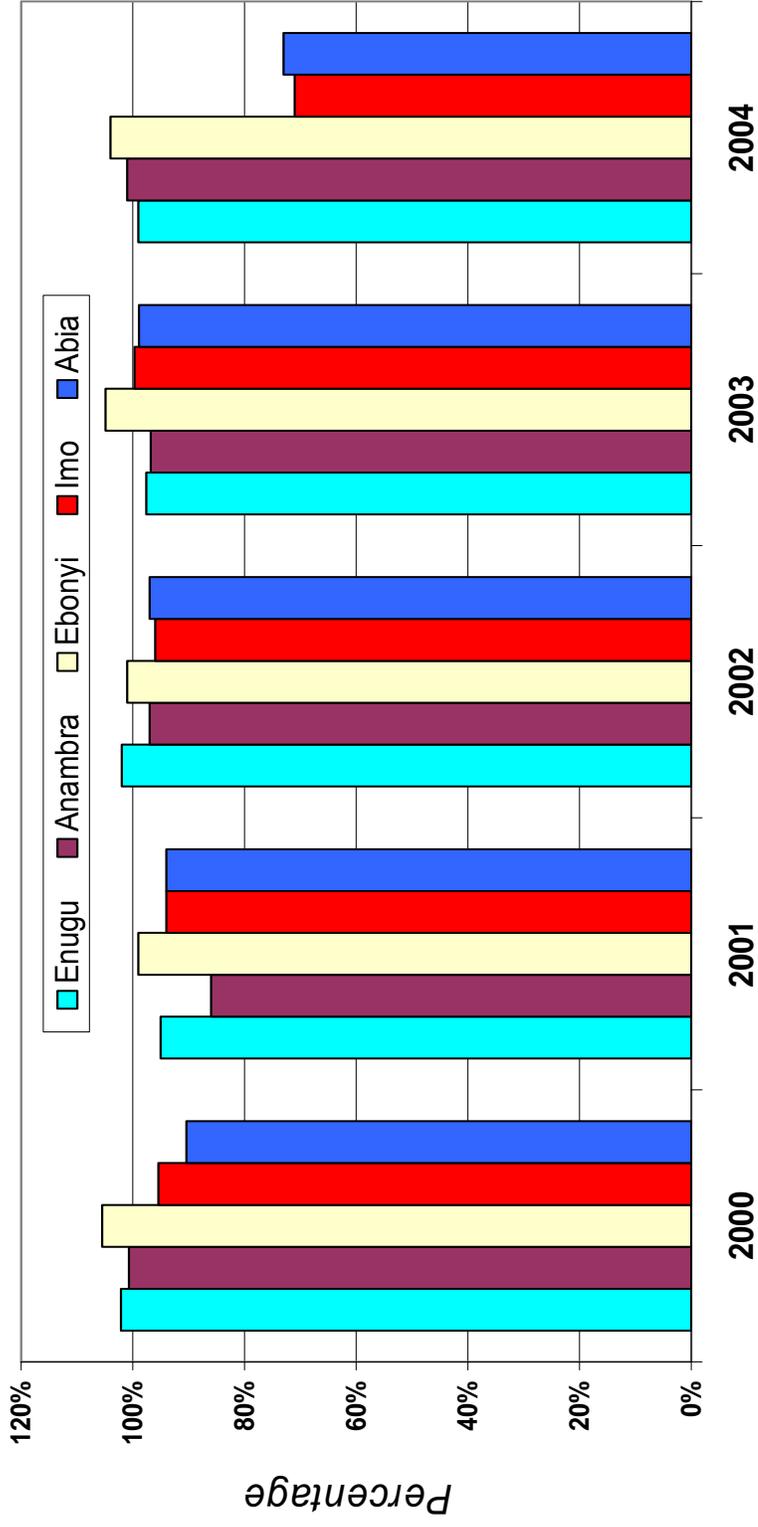
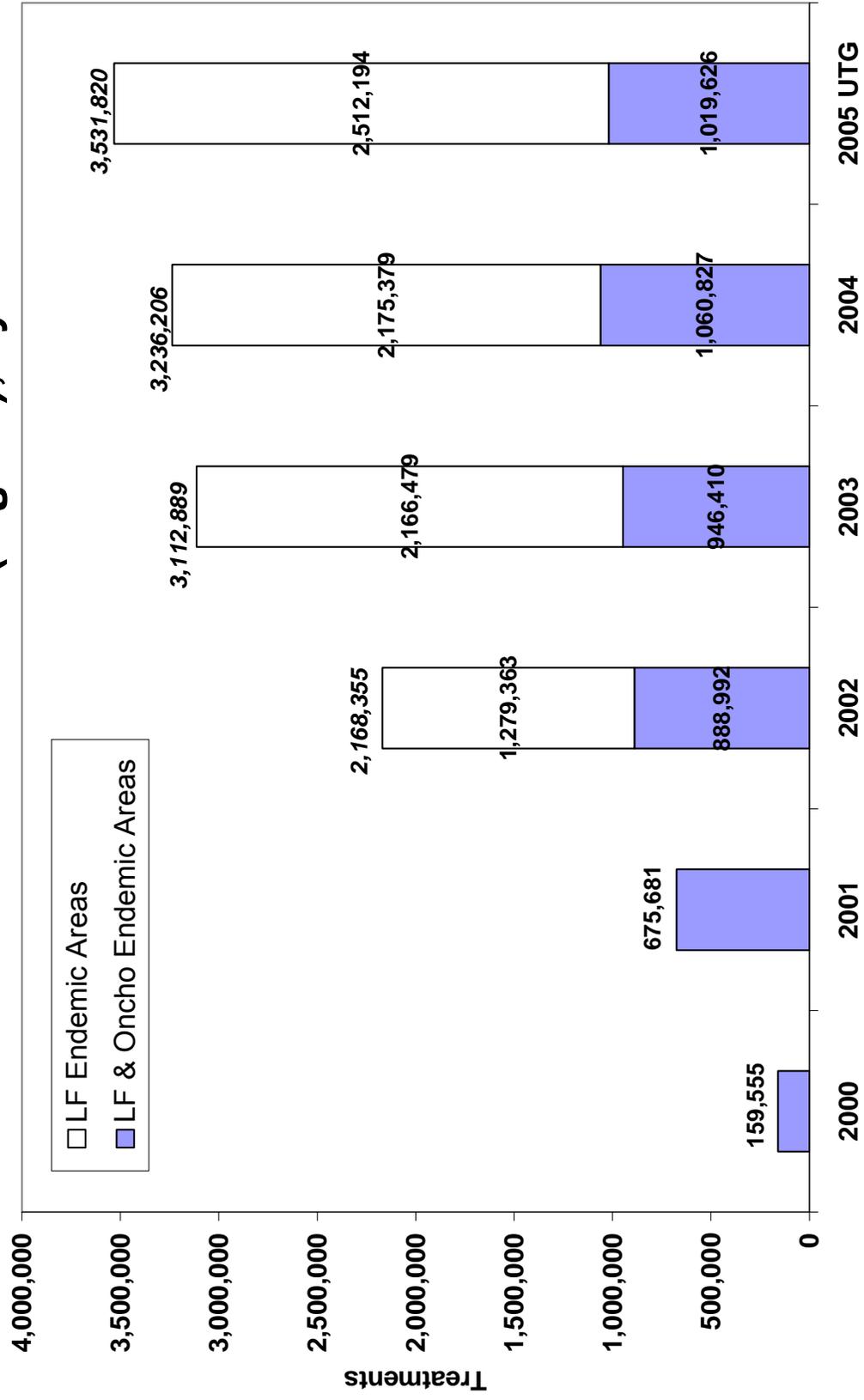


Figure 12: Nigeria: Treatment coverage contrast between 2 post-APOC scenario states and 3 other states in the Southeast*



* Imo and Abia States ceased to receive funding from APOC in 2003, and Carter Center does not fund activities there.

Figure 13: Lymphatic Filariasis Treatments: Plateau and Nasarawa States (Nigeria); by Year



**Figure 14: Schistosomiasis Treatments:
Plateau, Nasarawa and Delta States; by Year**

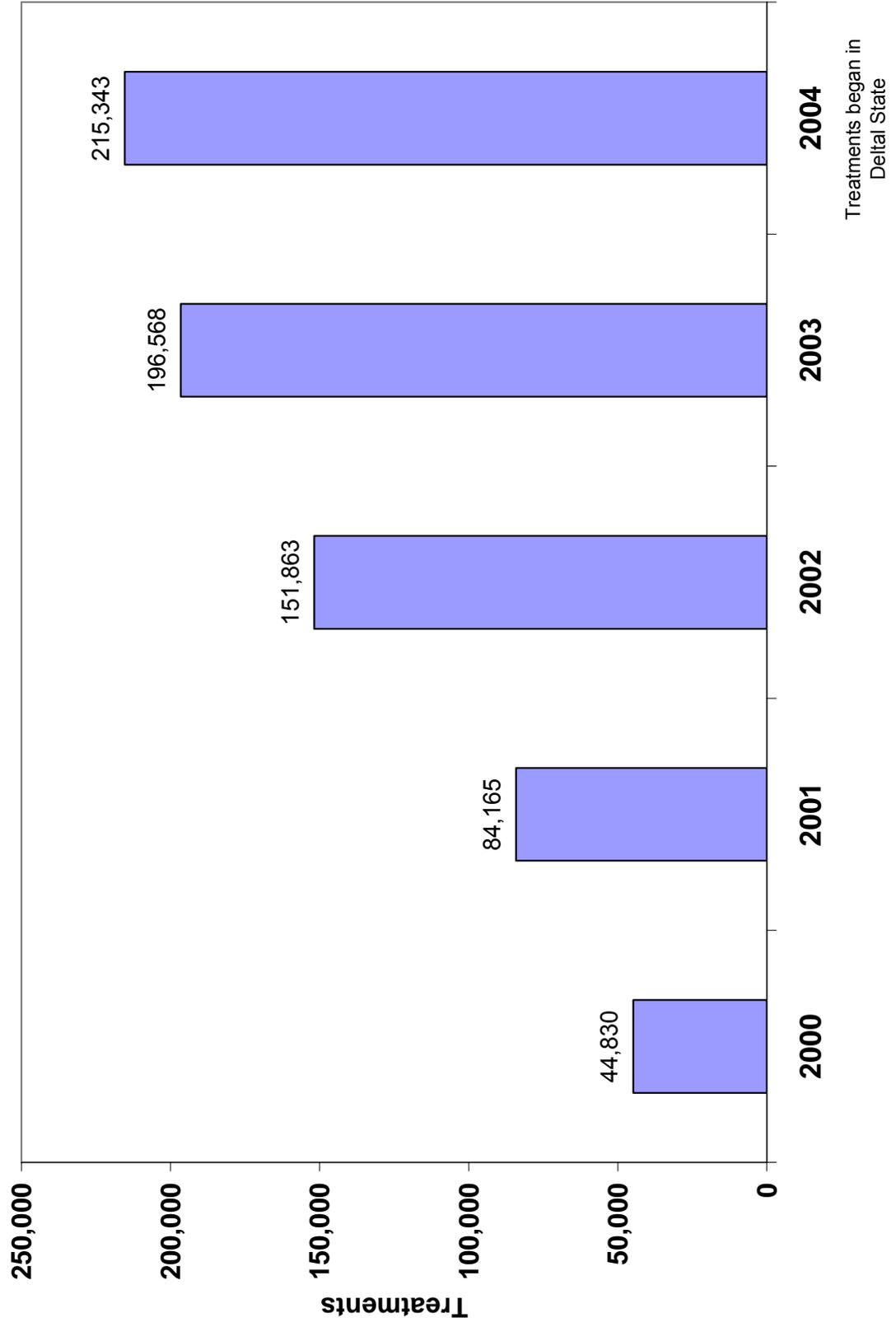


Table 7: Nigeria: Carter Center-Assisted Areas: 2004 Mass and Passive Treatments for Onchocerciasis

Mass Treatments										
State	No. of LGAs	Pop. Treated cumulative for 2004	Ultimate TX Goal (UTG)/ATO for 2004	Percent UTG treated in 2004	Total Pop. For 2004	Percent total pop. Tx in 2004	Active Villages cumulative for 2004	Active Villages UTG/ATO for 2004	Active villages % for UTG/ATO for 2004	Percent of active villages covered
ENUGU	16	746,323	753,552	88	905,026	82	1,373	1,377	100	100
ANAMBRA	16	606,679	597,508	1052	739,190	82	1,062	1,062	100	100
EBONYI	10	494,183	471,849	105	574,444	86	1,013	973	104	104
EDO	12	524,530	488,313	107	869,634	60	522	530	98	98
DELTA	9	445,579	449,530	99	656,151	68	481	470	102	102
IMO	20	445,959	630,055	71	922,577	48	1,168	1,940	60	60
ABIA	12	252,333	345,721	73	511,228	49	516	684	75	75
PLATEAU	5	284,736	292,739	97	351,286	81	295	296	100	100
NASARAWA	7	776,091	716,792	108	860,150	90	585	589	99	99
TOTAL	107	4,576,413	4,746,059	96	6,389,686	72	7,015	7,921	89	89

Passive Treatments							
State	No. of LGAs	Pop. treated cumulative for 2004	ATO for 2004	% ATO for 2004	Passive villages cumulative for 2004	Passive villages ATO for 2004	Passive villages % ATO for 2004
ENUGU	17	8,422	7,938	106	51	37	138
ANAMBRA	21	23,282	24,269	96	132	132	100
EBONYI	13	16,403	17,681	93	193	193	100
EDO	18	123,161	110,000	112	131	220	60
DELTA	25	40,374	40,000	101	275	280	98
IMO	38	121,653	120,558	101	647	738	88
ABIA	22	77,217	89,412	86	489	618	79
TOTAL	154	410,512	409,858	100	1,918	2,218	86

Table 8: Nigeria: 2004 Lymphatic Filariasis and Schistosomiasis treatments in Plateau, Nasarawa and Delta States and Collaboration Between LF and Malaria Programs in Kanke and Akwanga LGAs of Plateau and Nasarawa States

Lymphatic Filariasis Treatments									
State	No. of LGAs	Pop. Treated cumulative 2004	Ultimate TX Goal (UTG) 2004	%UTG treated 2004	Total pop. 2004	% Total pop. treated in 2004	Active villages cumulative for 2004	Active villages UTG for 2004	Active villages % for UTG for 2004
Plateau	17	1,744,988	2,076,028	84	2,491,234	77	2,466	2,616	94
Nasarawa	13	1,491,218	1,420,824	105	1,704,989	88	1,039	1,061	98
Total	30	3,236,206	3,496,852	93	4,196,223	77	3,505	3,677	95

Schistosomiasis Treatments						
State	No. of LGAs	Pop. Treated cumulative 2004	ATO for 2004	Total pop. 2004	% ATO for 2004	% Total pop. 2004
Plateau	4	99,333	82,650	542,439	120	18
Nasarawa	4	86,311	86,410	546,501	100	16
Delta	9	29,699	39,405	80,008	75	37
Total	17	215,343	208,465	1,168,948	103	18

Collaboration Between LF and Malaria Programs								
State	No. of LGAs	Pop. Received ITN cumulative in 2004	TTN Distribution objective (ADO) for 2004	Total LGA Pop. for 2004	ATO (Villages)	Cumulative No. villages covered	% ADO coverage	% village coverage
Plateau (Kanke LGA)	1	13,748	14,815	86,441	87	83	93	95
Nasarawa (Akwanga LGA)	1	24,872	28,983	154,873	103	99	86	96
Total	2	38,620	43,798	241,314	190	182	88	96

UGANDA

Background: Onchocerciasis affects approximately 1.8 million persons residing in 18 (out of 39) districts in Uganda (Map 9). Currently, Carter Center-assisted programs are active in 11 of these endemic districts: Kabale, Kanungu, Kasese, and Kisoro in the Southwest focus bordering the Democratic Republic of Congo (DRC); Adjumani, Moyo, and Nebbi in the West Nile focus bordering Sudan and DRC); Apac and Gulu in the Middle North focus; and Mbale and Sironko in the Mount Elgon focus in the east, bordering Kenya (Map 10).

Local Lions Clubs have worked with the Carter Center-assisted and LCIF-funded river blindness control activities in Uganda since 2000. Lions have mobilized relevant government officials and members of parliament and educated them about onchocerciasis disease, as well as advocating for regular and sustained government



Community members who have taken their Mectizan® raise their hands. They are joined by Jim Ervin, past international president of Lions Clubs International, the governor for district 411A from Ethiopia, Ugandan Lions, and Carter Center staff.

support of community-directed treatment with ivermectin (CDTI) activities. Through this program, the Lions also have established new Lions Clubs in some onchocerciasis endemic districts. Additionally, in 2004, local Lions submitted an invited request for funding to the Lions Club Moore Park in the United Kingdom to help support advocacy, health education, and monitoring at the district and sub-county levels in endemic areas. The Carter Center-Uganda assisted local Lions in preparing their budget, which is under

consideration by Moore Park Lions. The Carter Center's Country Representative in Uganda, Ms. Peace Habomugisha, became a Lion in 2004.

Treatments: The Carter Center/Uganda assisted in the treatment of 1,054,220 persons in 2004. Excluding passive and visitor treatments totaling 51,283, Uganda reached 98% of its Ultimate Treatment Goal (UTG) of 1,024,258 persons (Figure 15 and Table 9). This was the eighth straight year of more than 85% coverage of the UTG in Carter Center-assisted areas, and the ninth successive year of coverage exceeding 90% of the UTG. All 11 districts achieved 90% or more of their respective UTG, and all high-risk villages were treated during the year. Also in 2004, Carter Center-assisted areas

provided 56% of the 1,896,351 treatments in all of Uganda¹ (see Figure 15). The UTG for 2005 in Carter Center-assisted areas is 1,049,867.

Training and Health Education: Uganda trained 34,140 community-directed distributors (CDDs) and 4,361 Community-Directed Health Supervisors (CDHSs) in 2004. Of these, 45% of the CDDs and 37% of the CDHSs were female. The ratio of CDDs to population served is 1:29, which is the best ratio of all Carter Center river blindness programs.

Financial Contribution: In 2004, APOC and the Lions-Carter Center SightFirst Initiative provided support to the Program. The districts, health sub-districts, and sub-counties have pledged and contributed some funds for CDTI activities, but the amounts pledged and released may not be sufficient to sustain CDTI training, provision of IEC materials, and maintenance of transport.

All districts but Moyo, Gulu, and Apac have now completed their fifth year of APOC funding. Total funds released to all programs by The Carter Center, APOC, and the local governments were approximately \$72,572 in 2004 (Figure 16). The governments contributed about US \$9,000 (13% of all contributions), which is an increase from about 4% (approximately US \$3,000) in 2003. The Carter Center contributed about 53% in 2004, and still supports Mectizan® distribution activities (except in Kisoro and Mbale, see below), but will not fill the funding gap left by APOC.²

Sustainability and Integration: The “community-directed intervention approach” has been adopted as national health policy in Uganda. It already has been introduced with measurable positive results for malaria control, with significant reduction of infant mortality, and other programs. Hence, government support for onchocerciasis control activities within the primary healthcare system is strong, although financial support has not been regular or in the expected amounts. Involvement and active participation of members of the affected communities has increased over the years. Program strategies include the following: 1) training as many inhabitants of endemic villages as possible; 2) encouraging involvement of women and men; 3) grouping community health workers and those that they serve in their own kinship clans; and 4) letting community members choose their own health volunteers and the location of treatment centers. Some districts, sub-districts, and sub-counties are providing financial support for the Program. The CDDs and CDHSs continue to demonstrate high levels of involvement in other types of interventions, most commonly water and sanitation and immunization.

Post-APOC Scenario: In Kisoro and Mbale Districts, The Carter Center is no longer providing funding towards treatment implementation activities, in order to test what happens when activities are turned over to the full responsibility of the federal, district, and local governments. In 2004, there was evidence from these two districts that

¹ Total figure supplied by the Mectizan® Donation Program.

² These data are provisional based on preliminary information provided by program offices.

increased time was required for treating and reporting compared to 2003; data collection took six or more months in Kisoro and Mbale. In Kisoro, 47% of CDDs did not distribute Mectizan®. In both districts, involvement of health workers and community leaders was minimal, at less than 5%. In Mbale, some supervisors actually withheld data until they were paid for their information. Figure 17 suggests that involvement of community members in program activities was diminished in post-APOC scenario districts. Treatment coverage, however, was maintained in Kisoro and Mbale compared to other districts, although Kisoro may have shown a slight decrease (Figure 18). The Carter Center will continue to monitor the outcome of the post-APOC scenario in Kisoro and Mbale in 2005 by not providing direct financial assistance to drug distribution activities in those districts.

Monitoring, Evaluation and Research: A ten-year impact assessment of Mectizan® treatment on onchocerciasis was conducted in Moyo in sentinel villages (Masola, Paleore-Pacunaki, Madulu, and Andra), where mean annual treatment coverage has been consistently above 80%. Skin snips were performed, incubated in saline, and read for *O. volvulus* microfilaria. Results were compared with baseline data collected in 1994 with support from the River Blindness Foundation.

Considerable impact was noted on onchocerciasis infection rates (Table 10). Of the 420 people examined in 2004, only 7% had microfilaria in the skin, compared to 80% in 1994. None of the children less than 10 years of age who were sampled in 2004 were infected, which suggests that transmission has been markedly reduced or even interrupted. Unfortunately, no data were available on impact on ocular disease (either from this study or the original baseline study in 1994). When questioned, more than 70% claimed to have dramatically improved skin since the program began.

RECOMMENDATIONS 2005 FOR CARTER CENTER UGANDA

Consider publication of the impact assessment results. Given the influence of Mectizan® on microfilaria production, impact assessment should take place at least one month before the next Mectizan® treatment.

Gather better financial data on government and NGO contributions to the post-APOC sustainability test areas. Close monitoring for outside investment (i.e., APOC) in 2005 also is indicated.

Consider, with headquarters consultation, impact assessments in two districts where *Simulium damnosum* is the dominant vector and compare with report of the impact assessment in districts where *Simulium neavei* is dominant.

Identify foci where elimination of onchocerciasis transmission is feasible using twice per year Mectizan® treatments, especially in *S. neavei* areas.

The importance of demonstrating the impact of Mectizan® on ocular disease was stressed by Lions as being very important for the second phase of SightFirst fundraising. Carter Center programs need to review all available data from past sentinel areas that may have baseline data pertaining to visual impairment or ocular disease. These, if they exist, could be used as baseline for follow-up impact studies.

Carter Center program staff are encouraged to complete the Emory IRB ethics test, and are required to do so where research on human subjects is or will be taking place.

Map 9: Uganda REMO Map 1996

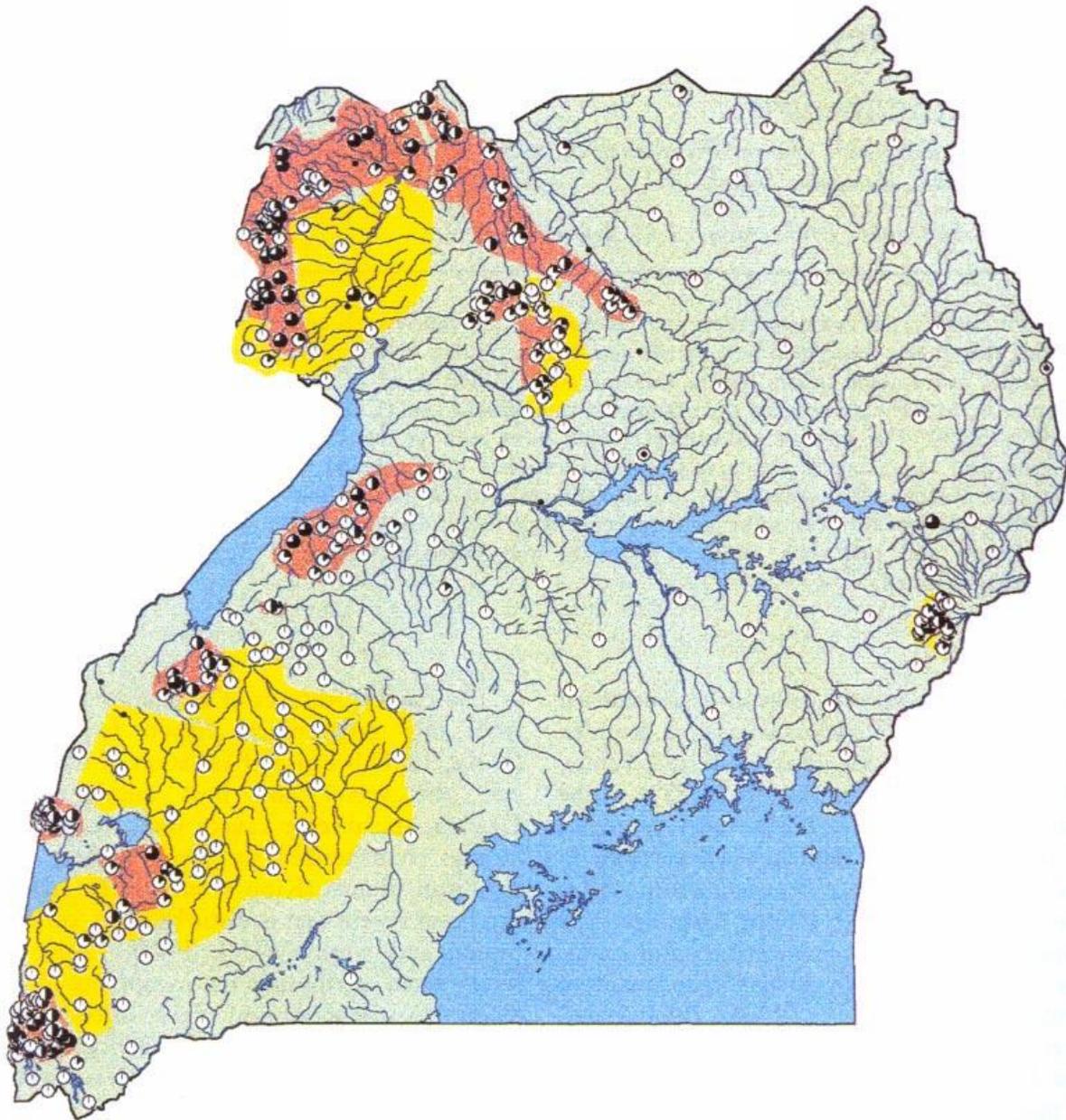


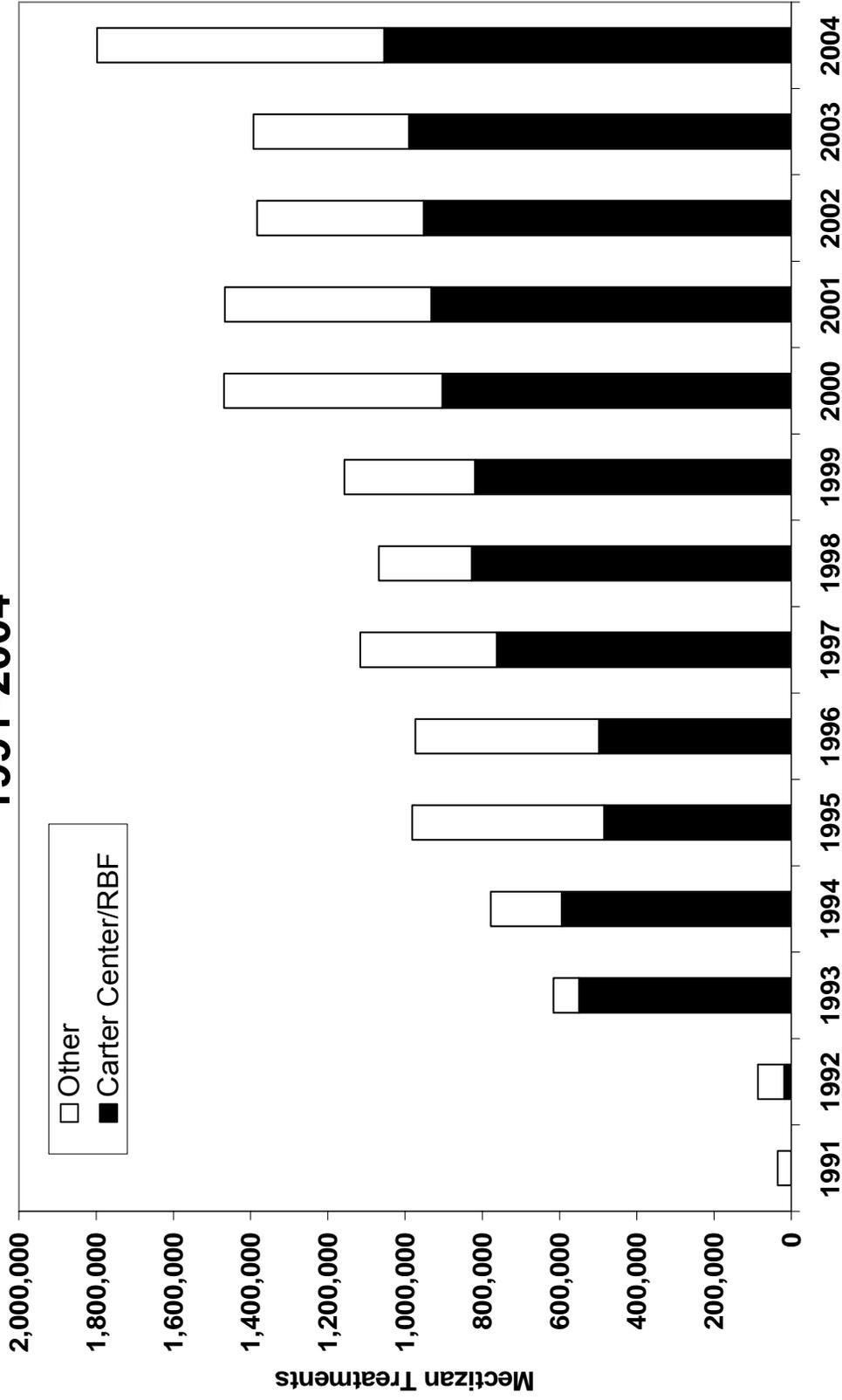
Fig. Endemicity of onchocerciasis in Uganda, as revealed by rapid epidemiological mapping. Nodule prevalences are shown as pie-charts: ○, <1%; ◐, 1%-9%; ◑, 10%-19%; ◒, 20%-39%; and ◓, >40%. Areas clearly requiring treatment (red) and areas requiring further assessment (yellow) are also indicated.

Map 10: Uganda

Carter Center - Assisted Districts



Figure 15: Uganda: Carter Center-Assisted Mectizan Treatments as Part of the Total Treatments Provided, 1991-2004*



* Treatments in 1992-1995 assisted by River Blindness Foundation.
 Source of non-Carter Center figure: Mectizan Donation Program.

Figure 16: Uganda: Financial contributions, 2000-2004

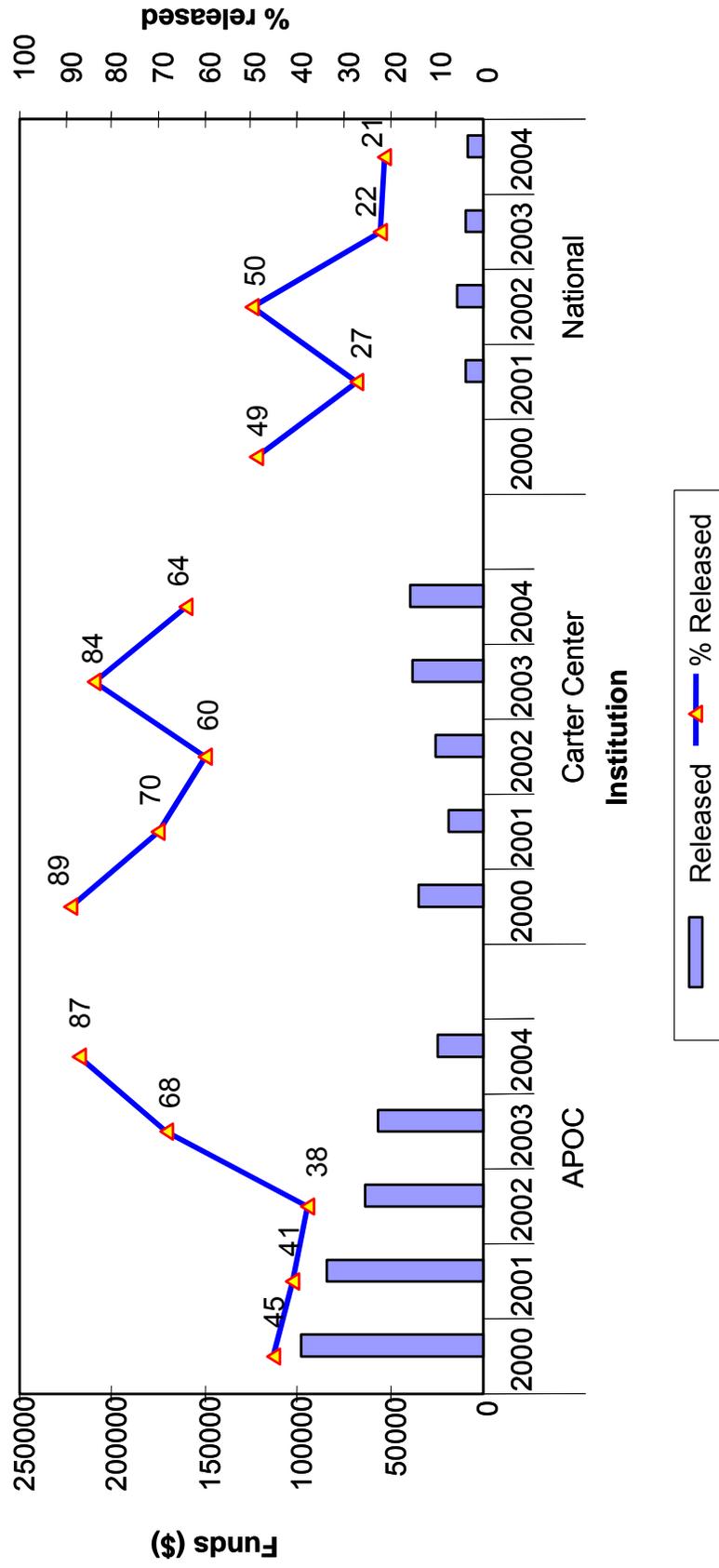
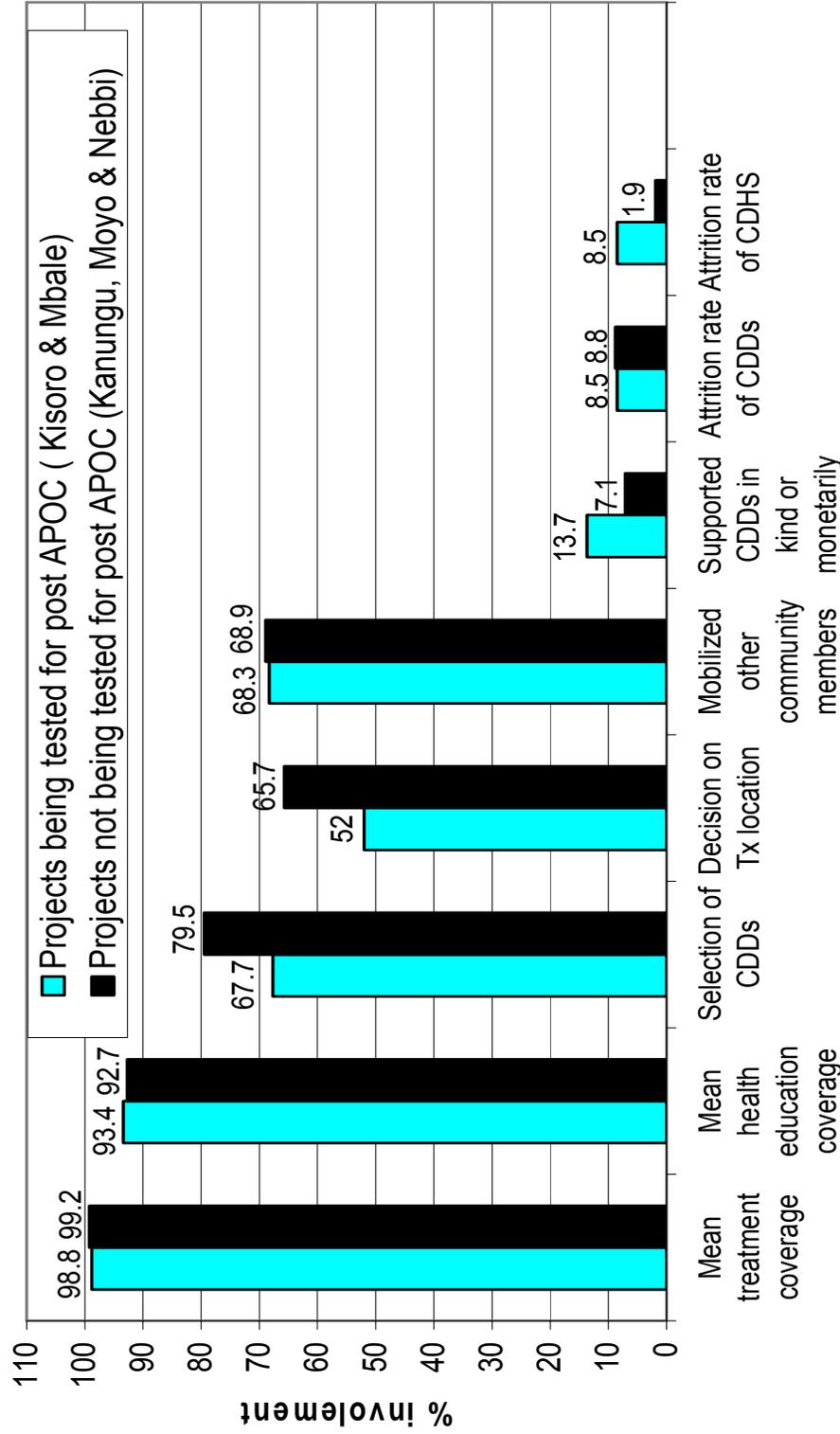
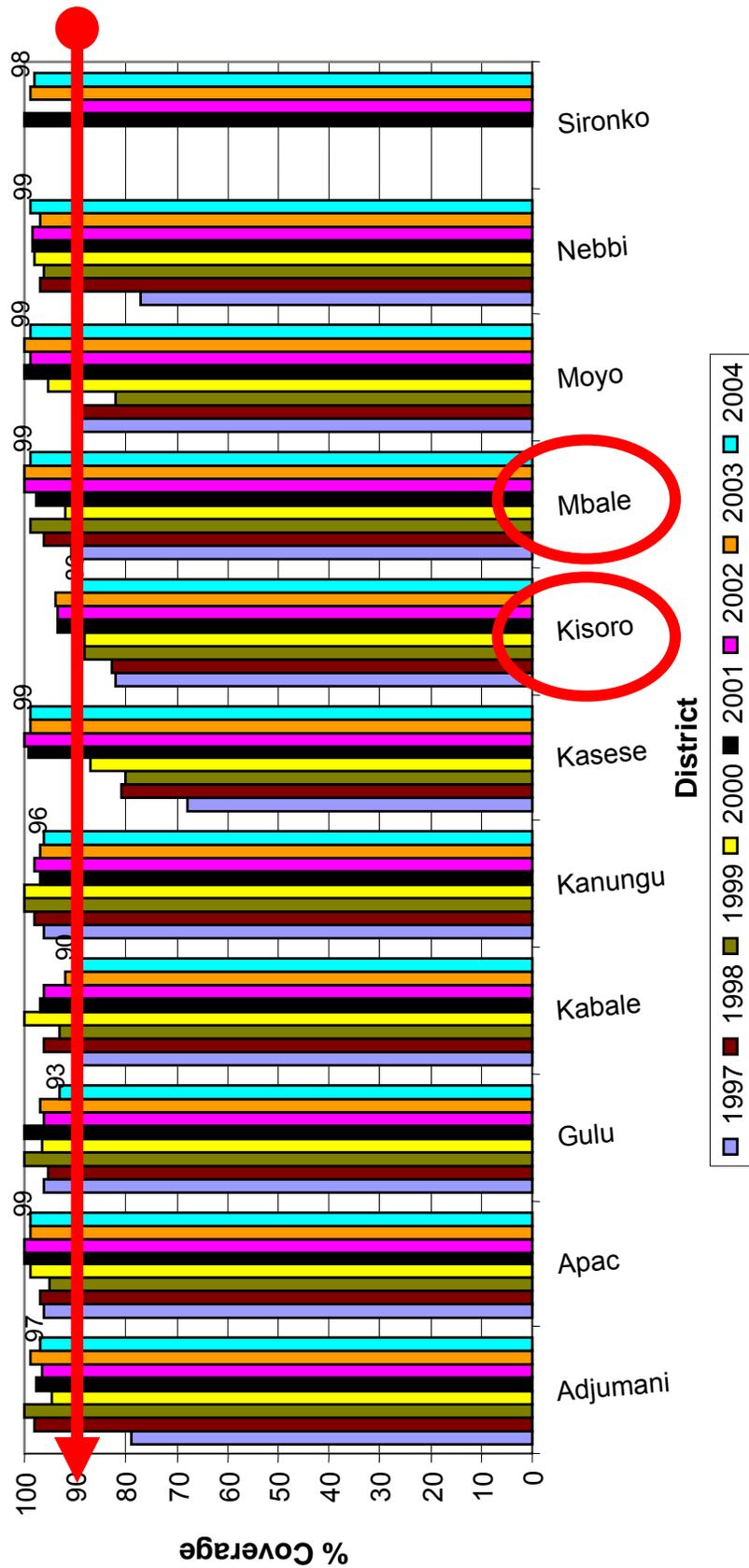


Figure 17: Uganda: Comparison between districts testing for post-APOC scenario and other districts*



* Kisoro and Mbale ceased to receive funding from APOC in 2003, and Carter Center does not fund activities there.

**Figure 18: Uganda: Mean coverage by district, 1997-2004
(post-APOC scenario districts circled)**



**Table 9: Uganda: Carter Center-Assisted Areas: 2004 Mass
Treatments for Onchocerciasis**

District	Total Pop. for 2004	Ultimate TX Goal (UTB) for 2004	Pop. Treated cumulative for 2004	Total Pop. TX % for 2004	Pop. TX% of UTG 2004	Active Villages treated 2004	Active Villages cumulative for 2004	Active villages of UTG for 2004	% of Active villages covered
Adjumani***	171,128	146,563	143,012	84	98	218	218	218	100
Apac****	15,672	12,818	12,808	82	100	9	9	9	100
Gulu****	204,879	150,660	140,114	68	93	187	187	187	100
Kabale**	17,475	15,235	13,796	79	91	48	48	48	100
Kanungu***	46,448	38,873	37,635	81	97	105	105	105	100
Kasese*	95,717	79,637	79,505	83	100	131	131	131	100
Kisoro*	21,315	17,861	16,027	75	90	32	32	32	100
Mbale**	179,749	140,091	139,982	78	100	580	580	580	100
Moyo****	177,788	140,069	139,019	78	99	189	189	189	100
Nebbi****	283,519	232,546	231,950	82	100	670	670	670	100
Sironko**	59,789	49,905	49,089	82	98	191	191	191	100
TOTAL	1,273,479	1,024,258	1,002,937	79	98	2,360	2,360	2,360	100

* phase 1

** phase 2

*** phase 3

**** phase 4

Passive treatments 2004: 13,154

Visitors treated in 2004: 38,129

Table 10: Pre-and post-treatment prevalence of nodule, microfilariae carriers, worm load and onchocercal dermatitis in four sentinel villages in Moyo District, Uganda, 1994 and 2004

Sentinel Villages	NUMBER EXAMINED (AND % POSITIVE) IN 1994 AND 2004									
	Onchodermatitis %		Nodules %		Microfilariae Carriers		Worm Load mf/mg mfs/mg		Geometric Mean (CMFL)	
	1994	2004	1994	2004	1994	2004	1994	2004	1994	2004
Masoloa	-	0 (0)	-	4 (3.1)	76	3.8	18.1	3.6	6.3	0.2
Paleore-Pacunaki	-	18 (20.5)	-	27 (30.7)	100	13.6	92.3	5.6	61.2	0.7
Madulu	-	24 (24)	-	12 (12.0)	72	4.0	6.2	3.3	3.0	0.1
Andra	-	8 (2.9)	-	5 (5.0)	70	7.0	15.9	3.9	3.9	0.2
TOTAL	-	50 (11.9)	-	48 (11.4)	80	6.6	33.1	4.1	18.6	0.3

CAMEROON

Onchocerciasis is widespread in Cameroon, with an estimated 5.1 million people infected, and approximately 62% of its population of 15 million at risk of infection. Approximately 60,000 people are believed to suffer some degree of visual impairment from onchocerciasis, and an estimated one million persons have onchocercal skin disease.

Background: The Carter Center's predecessor, the River Blindness Foundation (RBF), began assisting the Ministry of Health (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 Carter Center project not currently assisted by Lions Clubs International Foundation (LCIF). The Carter Center also became responsible for assisting West Province in 1996. In 1999, the Lions-Carter Center SightFirst Initiative (LCCSFI) launched a project, supervised by Lions District 403B and in partnership with the MOH and four NGOs (RBF, Helen Keller Worldwide, International Eye Foundation, and SightSavers International), to distribute Mectizan in three additional provinces (Adamaoua, Centre, and West) over a five year period. The original SightFirst Cameroon project ended in early 2001, when an extension was granted to supplement new APOC projects in LCIF-assisted zones, including West Province.

In Cameroon, the Lions-Carter Center SightFirst Initiative operates and is funded as part of a consortium of four international NGOs (The Carter Center, HKI, IEF, and



Carter Center and Lions personnel conversing with the chief and community members in Makouosop community.

SSI), which is coordinated by Lions District 403B, in partnership with the Cameroonian MOH. The Lions in West Province have been advocating for support of onchocerciasis control. They also worked with The Carter Center office to develop fundraising material for the SightFirst Initiative using community-directed treatment with ivermectin (CDTI) activities in West Province.

Treatments: Carter Center-assisted areas (Map 11) in Cameroon provided 1,352,166 treatments in 2004 (Figure 19), or 94% of the ultimate treatment goal (UTG) of 1,439,052. This included 1,047,431 treatments in West Province and 298,837 treatments in North Province (Table 11). Each province provides limited passive treatments; 5,898 treatments in 2004 were passive (0.4% of all treatments delivered).

All six health districts in the North Province achieved UTG coverage of at least 90%, while in the West Province, 16 of 17 health districts achieved at least 85% UTG coverage.

Mectizan®: The Carter Center/Cameroon received a total of 4,354,620 Mectizan® tablets in 2004, and assisted in distributing 3,849,524 tablets. In the West Province, 719 tablets were wasted, while 5,793 tablets were unaccounted for in the two provinces. No tablets were returned. Only 2,609 mild adverse reactions (0.2% of persons treated) were reported. The average number of tablets per treatment was 2.9.

Training and Health Education: In 2004, the Program trained a total of 4,937 community-directed distributors (CDDs), with West Province accounting for 4,111 and North Province accounting for 826. There was an average of one CDD per 476 persons and one CDD per community in North Province, while in West Province, the ratio averaged one CDD per 325 persons and two CDDs per community. Health education was provided to all 3,429 communities in both provinces. Involvement of women as CDDs in the North, which has a significant Muslim population, was lower than in the predominantly Christian West (3% and 27% respectively).

Loa loa: No cases of serious adverse reactions potentially related to *Loa loa* were reported in Carter Center-assisted areas of Cameroon in 2004, making this the third year free of serious reactions (Figure 22). Surveillance structures for monitoring adverse reactions in all Carter Center-assisted areas were maintained and strengthened in 2003 and continued in 2004. Provincial health delegates and 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 is integrated into the primary health care system. Patients are managed in district hospitals, so that their families remain near to help with their nursing care.

Financial Contribution: APOC and the Lions-Carter Center SightFirst Initiative, especially in West Province, supported the program (Figure 20). APOC funding for North Province stopped in 2003, after five years of support. The Carter Center is not providing support in the North as part of the post- APOC sustainability trial. In that trial, Carter Center/Lions funds for implementation activities are no longer provided in order to test what happens when activities are turned over to the full responsibility of the federal, provincial, and local governments (Figure 21).

There was evidence of considerable government investment in both West and North programs. Cameroon provides important evidence as to the critical importance of government funding in sustaining Mectizan® distribution after APOC funding ceases.

Sustainability and Integration: Mectizan® treatment and health education using CDTI has been accepted as the principal strategy for control of onchocerciasis in Cameroon since 1999. Prior to 2002, however, the Cameroonian MOH used a “cost recovery” system, under which 100 and 10 Central African Francs (CFAs) (US \$0.20 and US \$0.02) were charged to adults and children, respectively, for each Mectizan® treatment,

in order to cover distribution costs. The transition to the CDTI strategy in the two provinces was about two-thirds complete in 2002 and concluded in 2003.

To address the concern that CDDs would be less motivated to do their jobs without funds generated for them through cost recovery, the Cameroon office began to implement the kinship strategy to engage new CDDs with the expectation that they would not demand payment. CDD numbers in 2004 were lower than 2003, but it is hoped that the spread of the kinship approach will increase involvement. The program would like to increase the number of CDDs from its average of one or two per community to 10 per community.

A sample of 239 CDDs showed that 84% were involved in other community health activities, such as national immunization days, an expanded program of immunization, HIV/AIDS, malaria fever control, and sexually transmitted diseases. They also are utilized for non-invasive procedures in immunizations, social mobilization, impregnation of mosquito nets, registration, record keeping, and reporting.

It is believed that the potential integration of Vitamin A distribution into the CDTI framework, and lymphatic filariasis interventions in North Province, would help strengthen the programs, particularly in the absence of APOC support.

Post-APOC Scenario: In North Province, The Carter Center is no longer providing funding towards treatment activities, in order to test what happens when those activities are turned over to the full responsibility of the federal, provincial, and local governments. In the post-APOC sustainability trial in North Province, little change in treatment coverage or programmatic activity was observed after Carter Center support was withdrawn in 2004 (Figure 21). The sustained treatment numbers compared favorably with West Province in 2004, where APOC support was still being received. The strength of the program in the North was likely due to government funding that was made available, and makes a case that sustainability is more feasible when there are adequate government contributions to the program. The Carter Center will continue to monitor the outcome of this scenario in 2005.

Monitoring, Evaluation and Research: Cameroon engaged in routine monitoring of coverage, involvement of community members in decision-making, health education, involvement of women, monetary incentives, and attrition rate of CDDs. The general sample size was 3,835. Of these, 93% reported that they received treatment in 2004, while only 40% reported receiving health education. However, 98% of those who did not receive health education intended to receive treatment in 2005, similar to those who received health education (96%).

Health education did seem to have an effect on the respondents' participation in CDTI activities. Of those who were health educated, 33% helped decide on the method of drug distribution; 47% helped mobilize other community members; and 51% helped select CDDs. Among those who did not receive health education, these numbers were

9%, 11%, and 13%, respectively. The CDD sample size was 239, of which the majority (87%) was male. A full 97% voiced intent to continue distributing in 2005.

RECOMMENDATIONS 2005 FOR CARTER CENTER CAMEROON

Gather better financial data on government and NGO contributions to the Post-APOC sustainability test in North Province. Close monitoring for outside investment (i.e., APOC) also is indicated.

Seek to increase training, supervision, involvement of kinship groups, and improve gender balance.

Vitamin A supplementation may begin in 2005. The program should keep headquarters closely advised on this development.

Report to headquarters in monthly reports on the interaction of Carter Center assisted programs with the Roll Back Malaria Program/Global Fund.

Careful analysis of data seems to suggest that increased integration has led to a decrease in treatment coverage. Factors affecting integration should be monitored closely.

An office member should be selected to receive local training for Microsoft Excel, which can then be shared with the rest of the office.

Improve Atlanta's fax and email accessibility to Cameroon office.

Send a summary of APOC funding, which was set to be disbursed in January 2004 and was not received until October 2004, to the international NGDO Group, with details.

Share the percentage of people who have experienced adverse events, by year, with the Mectizan® Donation Program.

Find out why some communities have coverage above 100% of their UTG on the community coverage lists for both projects and have them adjusted.

Lions stressed the importance of demonstrating the impact of the program on ocular disease for the second phase of SightFirst fundraising. Carter Center programs need to review all available data from past sentinel areas that may have baseline data pertaining to visual impairment or ocular disease.

Carter Center program staff are encouraged to complete the Emory IRB ethics test, and are required to do so where research on human subjects is or will be taking place.

Map 11: Cameroon Carter Center-Assisted Provinces

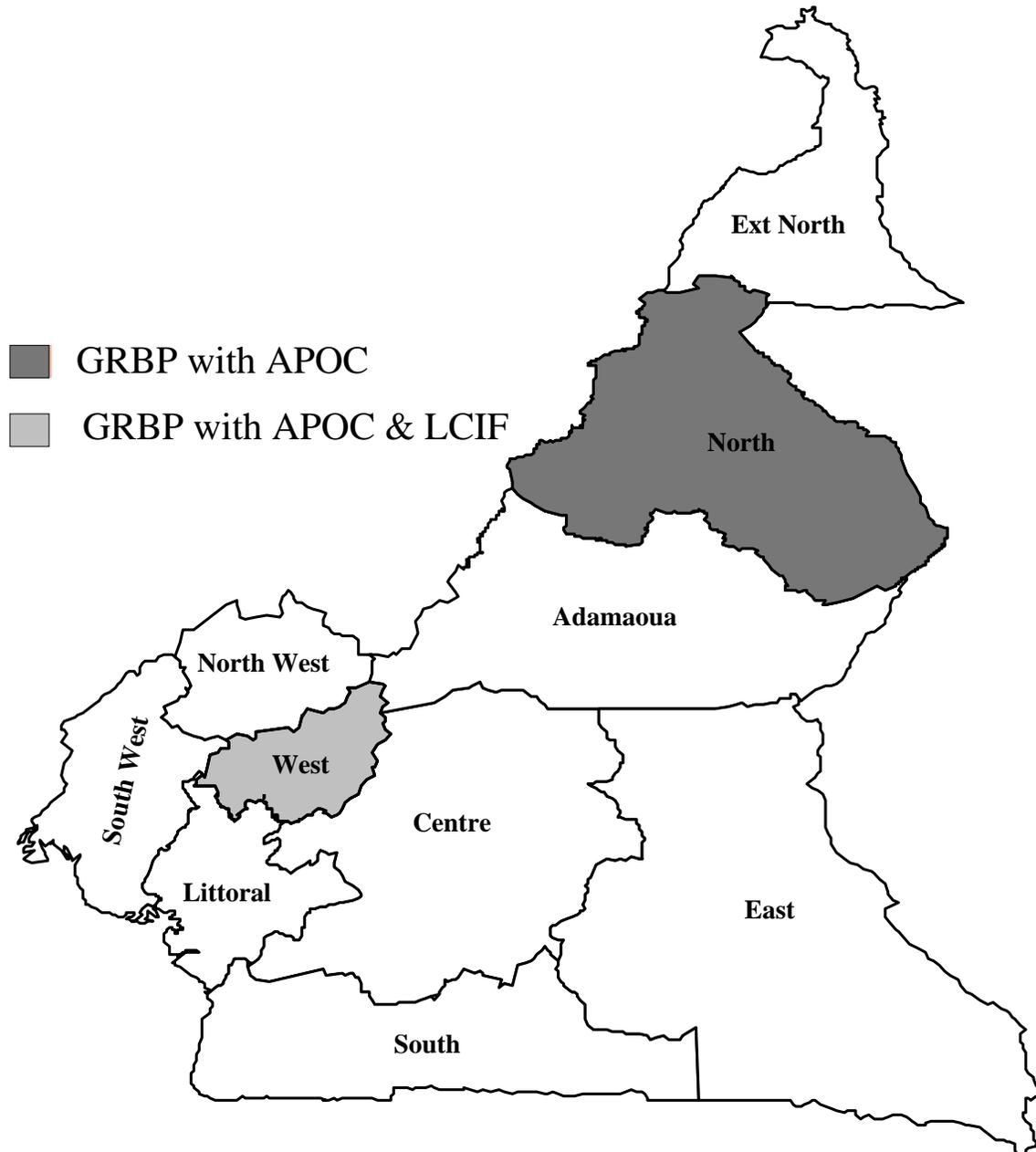
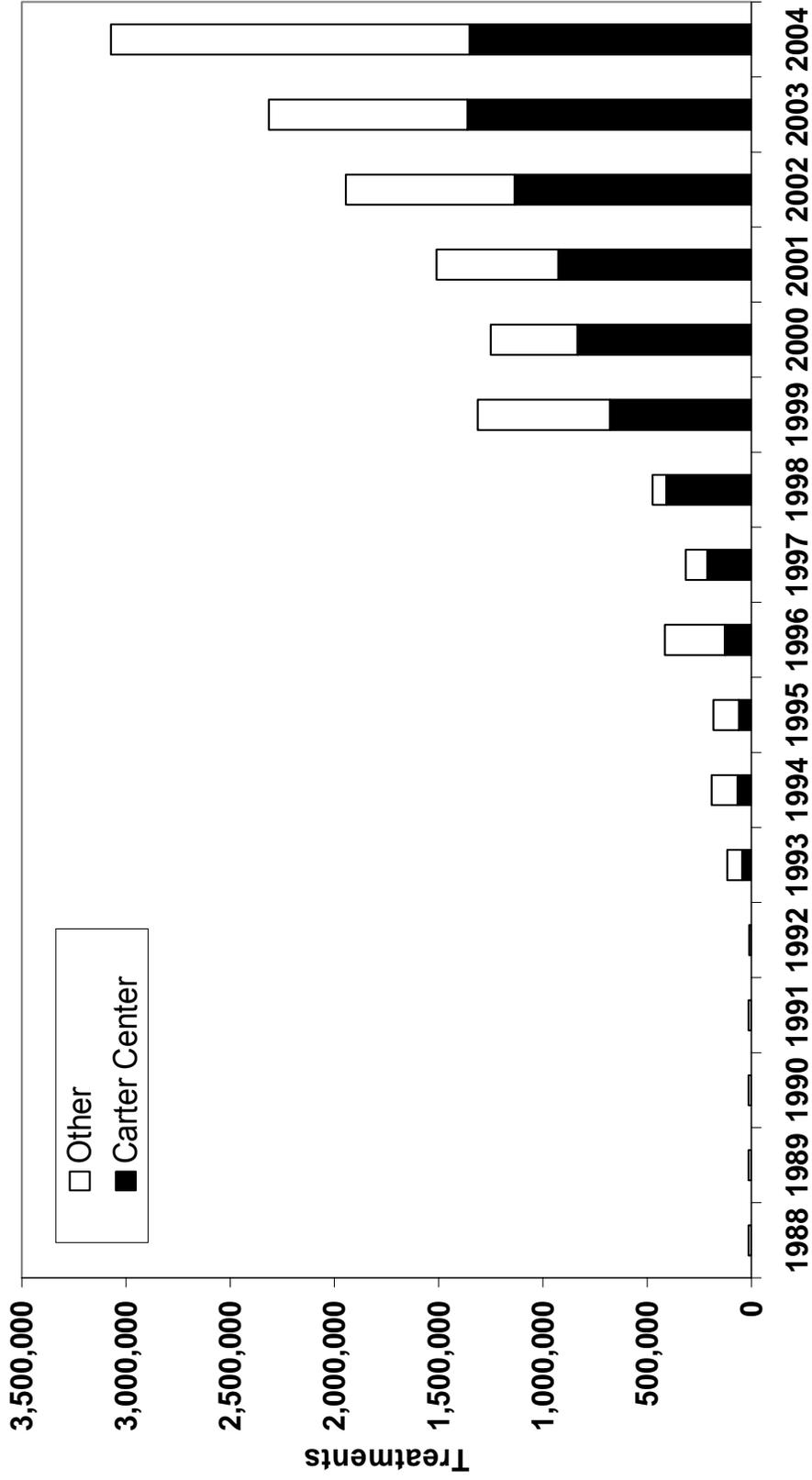


Figure 19: Cameroon: Carter Center-Assisted Mectizan Treatments as Part of Total Treatments Provided, 1988-2004*



*Treatments in 1993-1995 by RBF. Source of non-Carter Center figure: NGDO coordinating office.

Figure 20: Cameroon: Financial contributions, 2000-2004

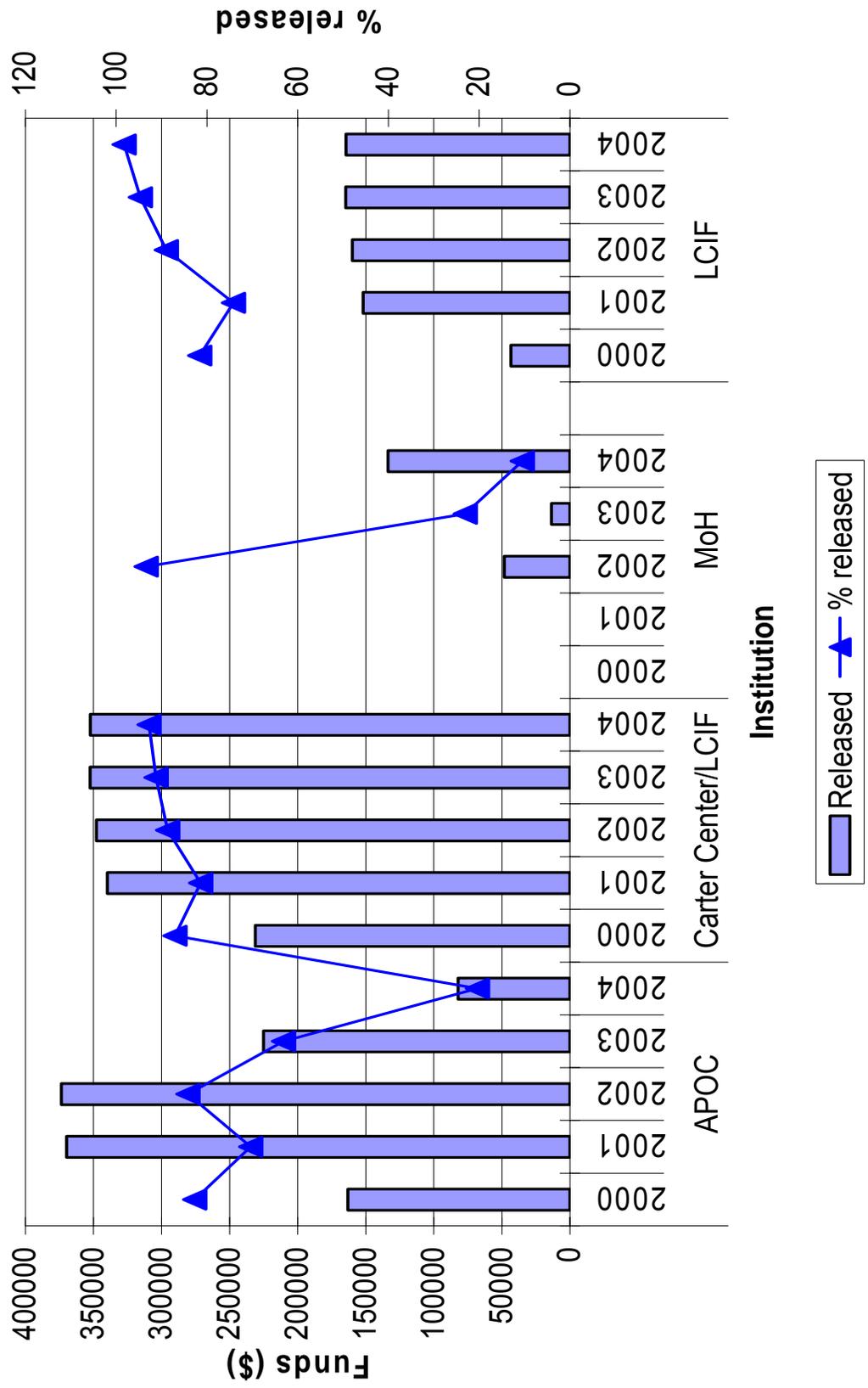
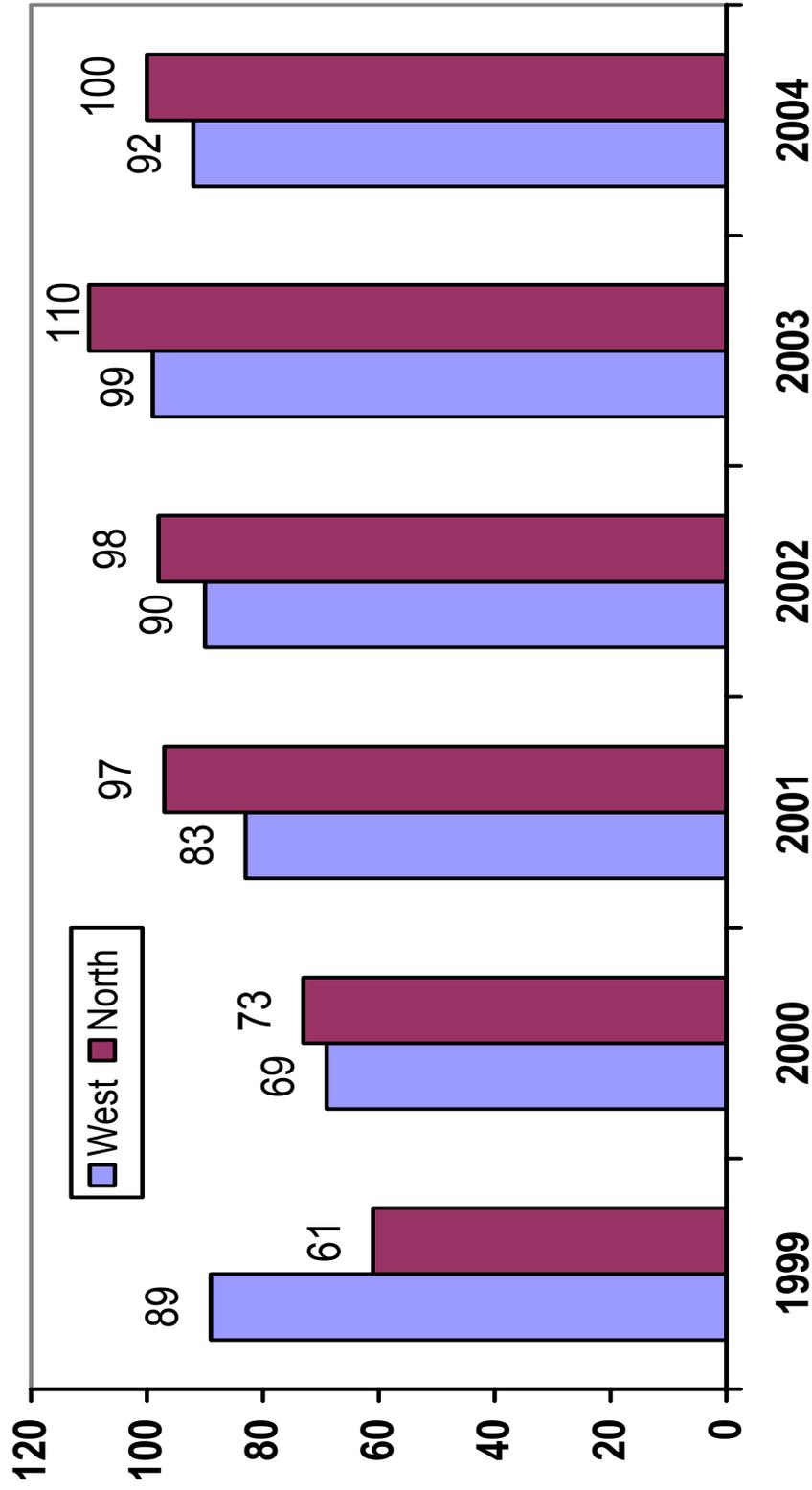


Figure 21: Cameroon: Performance of West Province vs. post-APOC scenario in North Province*



* North Province ceased to receive funding from APOC in 2003, and Carter Center does not fund activities there.

**Figure 22: Adverse Reaction Rate Potentially Related to Loa loa,
Per Million Treatments in West Province
1996-2004**

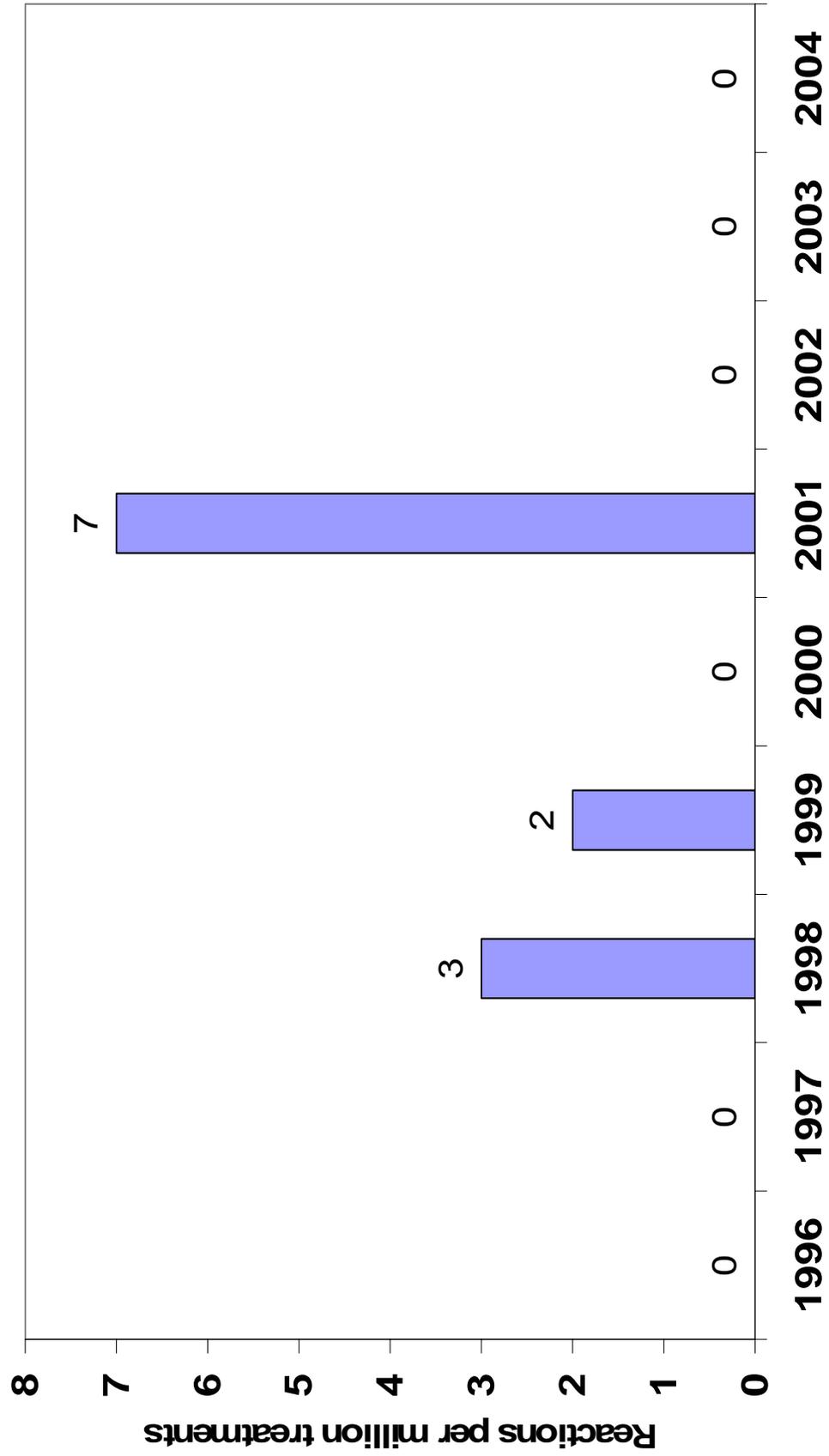


Table 11: Cameroon: Summary of Treatment Activities 2004

Name of Province	Number of Districts	Pop. treated cumulative for 2004	UTG/ATO for 2004	% UTG/ATO treated	Total Pop. for 2004	% Total Pop. treated	Active Com cumulative for 2004	Active Com UTG/ATO For 2004	Active com % for UTG/ATO for 2004
West	17	1,047,431	1,140,828	91.81	1,335,035	78	2,380	2,380	100
North	6	298,837	298,224	100.21	392,822	76	1,049	1,049	100
Total	23	1,346,268	1,439,052	94	1,727,857	78	3,429	3,429	100

Passive treatments: 5,898

SUDAN

Background: There are an estimated five million persons at-risk of onchocerciasis in Sudan, with an ultimate treatment goal (UTG) of at least 3.4 million people. Some of the highest rates of blindness due to onchocerciasis in the world occur in southwest Sudan; an estimated 10,000 cases of onchocerciasis-related blindness exist in that region. Of the several endemic areas (Map 12) in the country, the southern (principally southwestern) focus is the most significant and is characterized by high prevalence of onchocerciasis (Map 13).

In January 2005, a comprehensive peace accord was signed with hopes of putting an end to the decades-old civil war in Sudan. The peace agreement has created a Government of South Sudan (GOSS) that will now take over operations in Southern Sudan. As a result, the Government of Sudan (GOS) will soon no longer be serving the areas of Southern Sudan where it worked previously. Restructuring is taking place within the GOS onchocerciasis program as well, with plans for the oversight of the onchocerciasis program to be turned over from the Academy of Medical Sciences and Technology to the Ministry of Health (MOH) in 2005. It is hoped that in the wake of the peace accord, the number of treatments will increase dramatically, since during the war as much as 20% of the population in need of treatment could not be accessed by either side.

This report encompasses the 2004 'pre-peace accord' period, when Operation Lifeline Sudan/South (OLS/S), a consortium of non-governmental organizations (NGOs) led by the United Nations Children's Emergency Fund (UNICEF), worked in the contested southern part of the country. Within the structure of the OLS, Christoffel Blindenmission (CBM) served as the principal coordinating NGO (i.e., ordering and storing Mectizan® for NGOs undertaking onchocerciasis control activities in areas served by OLS). CBM also is an NGO partner with APOC in five community-directed treatment with ivermectin (CDTI) projects. All parties worked closely with the Sudan Relief and Rehabilitation Association (SRRA), which is the humanitarian arm of the resistance group, the Sudan People's Liberation Movement (SPLM).

In 2004, The Carter Center worked with the Lions Clubs International Foundation (LCIF) in supporting ivermectin distribution activities in several areas in the south (in collaboration with other NGOs: Zud Ost Asia, International Medical Corps, and Aktion Afrika Hilfe/County Health Department) and in GOS areas in both north and south. The Carter Center's river blindness (RB) and trachoma control programs in Sudan, which help support activities in northern and southern areas of the country, are funded under the second five-year grant from LCIF.

Treatments: The Carter Center-assisted areas treated 514,323 persons in 2004, 68% of its annual treatment objective of 759,542. This is a 17% increase from the 439,798 treatments provided in 2003 (Figure 23). Of the total number treated in 2004, GOS treated 372,645 persons (Table 12), while The Carter Center-assisted areas of OLS treated 141,678 persons (Table 13). GOS treatments increased by 50% over 2003, but

2004 figures were similar to those attained in 2002. Carter Center-assisted treatments in OLS areas decreased by 26%, in large part due to changes in roles and responsibilities of old and new partners with the transition to peace and an internationally recognized government for the South, as well as the transition to CDTI.

Much work will need to be carried out in 2005 to improve communications and adjust the program in accord with GOSS directives and the new boundaries being established by APOC-sponsored CBM projects. All projects need to be unified under the Southern Sudan Onchocerciasis Task Force, led by the GOSS MOH. The Carter Center holds an institutional seat on the Task Force.

Training and Health Education: The OLS program trained or re-trained 368 community-directed distributors (CDDs) in 2004, and the GOS program trained or re-trained 520. This is a drastic increase (167%) over the 334 CDDs trained in both the north and south in 2003, although high attrition levels remain an issue.

In the GOS areas, 359 (79%) of a targeted 456 villages received health education. In OLS areas, only 389 (66%) of a targeted 586 villages were reached.

Mectizan: In 2004, 1,335,000 Mectizan tablets were received, and 1,106,738 distributed in GOS areas. In OLS areas, 867,411 tablets were received, and 417,290 were distributed. No Severe Adverse Events (SAEs) were reported by either office.

Sustainability and Integration: Sustaining the gains achieved by mass treatments with Mectizan® since 1995 has been a particularly difficult challenge in Sudan, due to the twenty-year-old civil war, but the infrastructure is expected to improve dramatically in the future. Mectizan® treatments are very popular at the community level, and health workers on both sides have sought to actively encourage community participation in the distribution process, in keeping with the CDTI strategy. The onchocerciasis program has been used as an entry point for several other interventions, including vitamin A and iodized salt distribution, trachoma control, and polio eradication. However, in order for this program to be successful, the government will need to begin providing financial support to the projects (Figure 24). The national government has voiced its intention to do so.

In GOS areas, RB activities were conducted in collaboration with other community-based programs, including malaria control, immunizations, leprosy, and tuberculosis. Accordingly, supervisors and CDDs address multiple program activities when they visit villages.

Monitoring, Evaluation and Research: The Khartoum office performed a baseline survey in Raja to evaluate the ocular and dermatological prevalence of disease manifestations. This evaluation utilized a cluster survey and systematic random sampling. The rate of blindness was found to be 11.7%. Ocular microfilariae were found in 23% of those examined, and 43% had skin lesions.

RECOMMENDATIONS 2005 FOR THE CARTER CENTER SUDAN

Southern Sudan Onchocerciasis Control Program Lokichokio

The Nairobi office will be relocating in 2005 to Lokichokio, Kenya, to engage more closely with program operations.

The Carter Center strategy will change from an NGO-driven support system to one in which GOSS/Lokichokio plays the central role, in partnership with the CBM/APOC projects.

The Carter Center RTA needs to develop and define clear roles for The Carter Center/Lions Clubs, in consultation with headquarters, and within the context of Carter Center priorities and the existing donor (Lions' Clubs) agreement.

Seek to increase training, supervision, involvement of kinship groups, and improve gender balance.

Sudanese representatives should visit and learn about The Carter Center-assisted Ethiopia Public Health Training Initiative as a potential model for Sudan.

Use strengths of existing resources and communications through Carter Center offices on both sides to promote a smooth transfer of affected treatment activities from GOS to GOSS administration in Southern Sudan, when and where appropriate.

The importance of demonstrating the impact of the ivermectin distribution on ocular onchocercal disease was stressed by Lions as being very important for the second phase of SightFirst fundraising. The Carter Center programs need to review all available data from past sentinel areas that may have baseline data pertaining to visual impairment or ocular disease.

The Carter Center program staff are encouraged to complete the Emory IRB ethics test, and are required to do so where research on human subjects is or will be taking place.

Sudan Onchocerciasis Control Program Khartoum

Adjust Carter Center activities and headquarters location to support the MOH in its internal decisions. Place greater reliance on SMOH for implementing the program.

Secure government participation in funding the program.

Use strengths of existing resources and communications of Carter Center offices on both sides to promote a smooth transfer of treatment activities from GOS to GOSS, when and where appropriate.

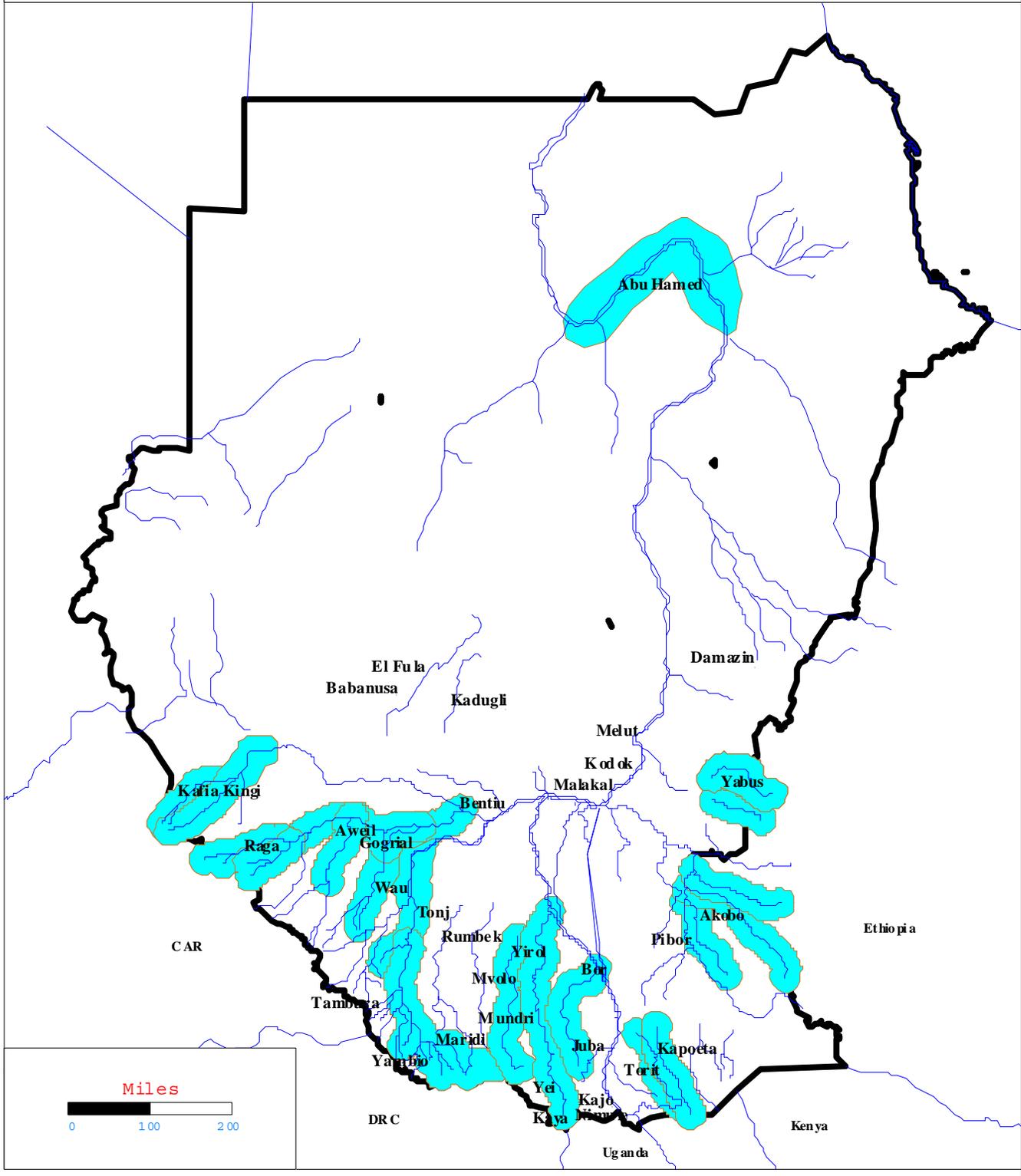
Monitor government funding for the program.

Seek to increase training, supervision, involvement of kinship groups, and improve gender balance.

The importance of demonstrating the impact of ivermectin on ocular disease was stressed by Lions as being very important for the second phase of SightFirst fundraising. Carter Center programs need to review all available data from past sentinel areas that may have baseline data pertaining to visual impairment or ocular disease.

Carter Center program staff are encouraged to complete the Emory IRB ethics test, and are required to do so where research on human subjects is or will be taking place.

Map 12: Onchocerciasis in Sudan



Map 13: Sudan Onchocerciasis Control Program

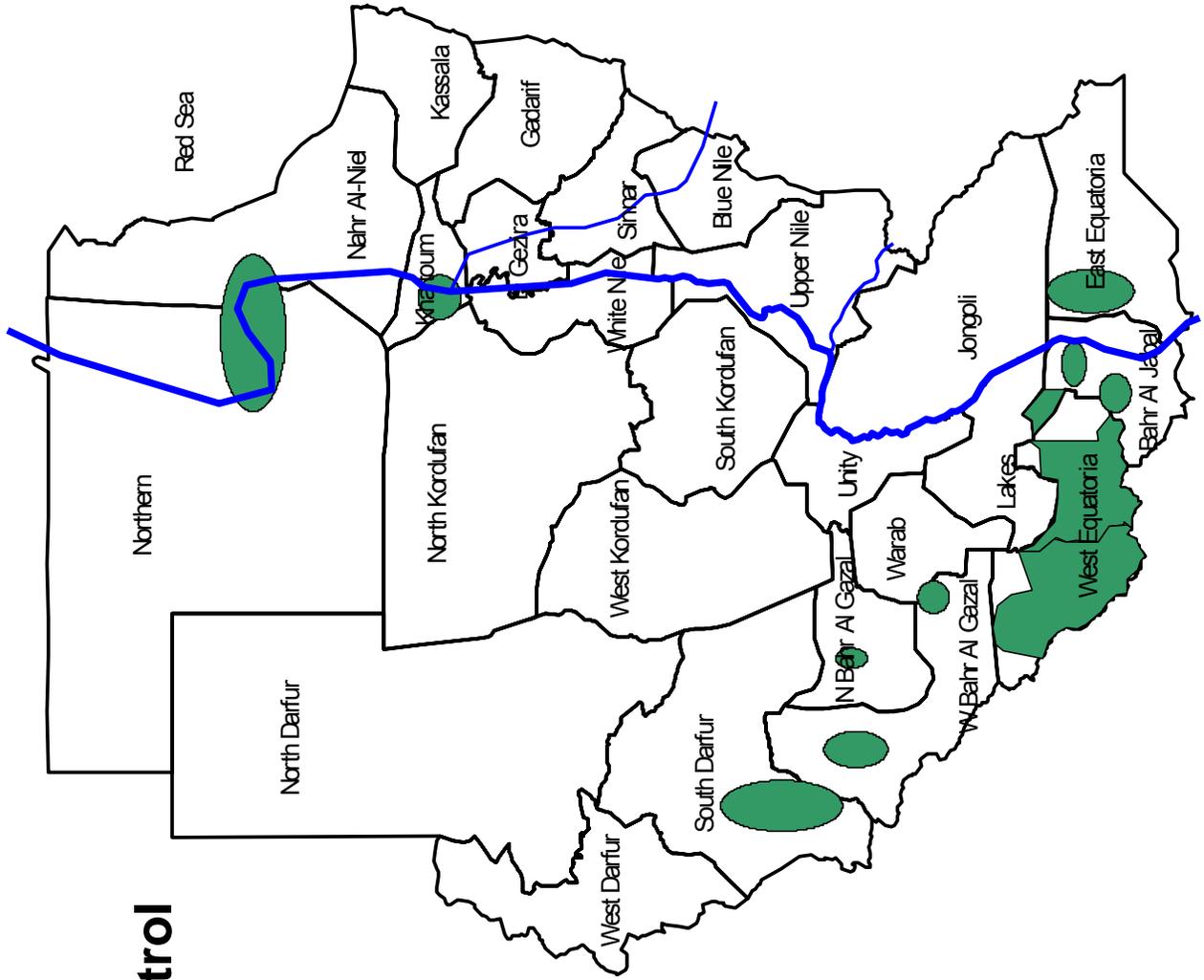
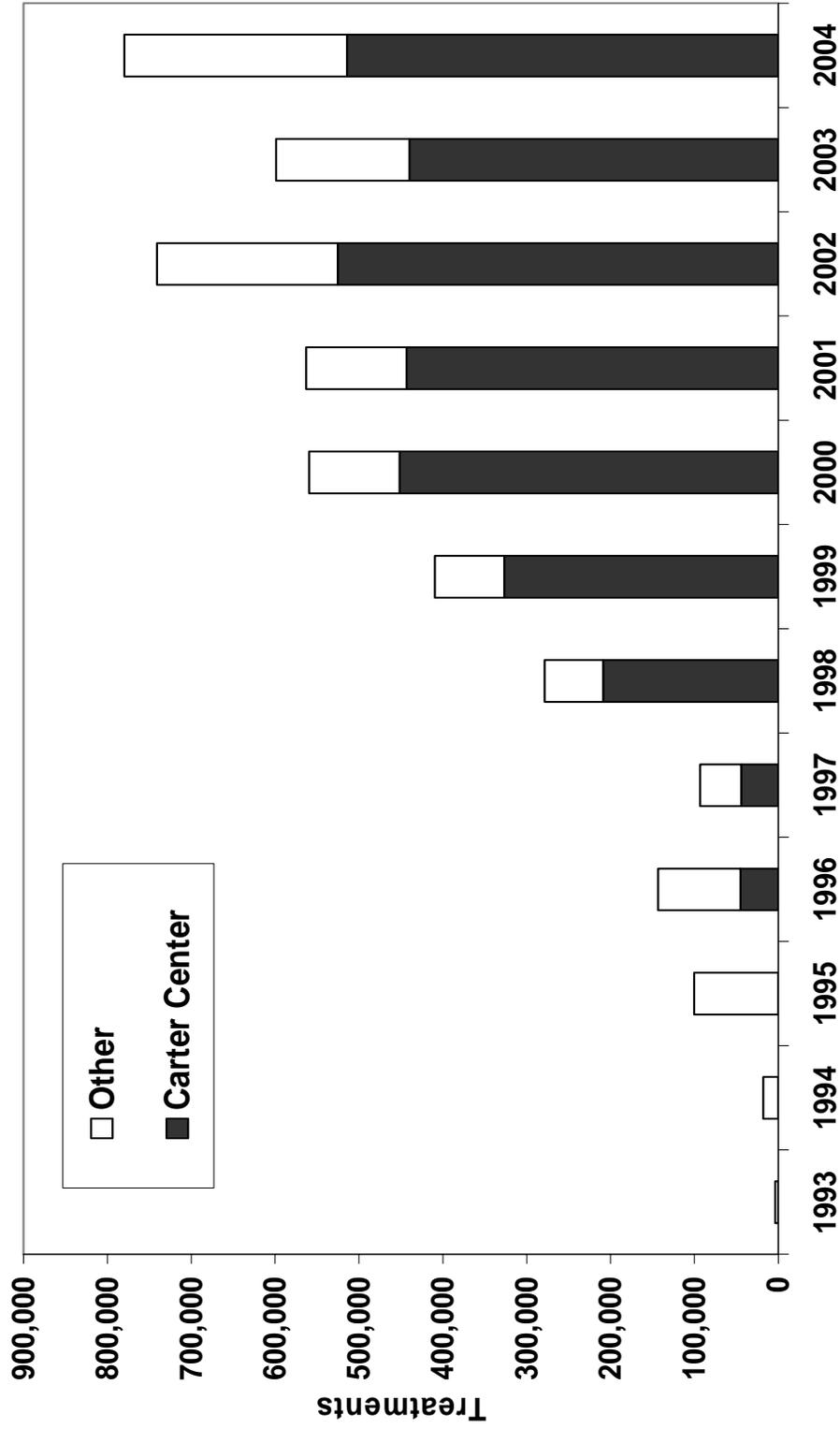


Figure 23: Sudan: Carter Center-Assisted Mectizan Treatments as Part of the Total Treatments Provided, 1993-2004*



* Since 1997, Carter Center activities in Sudan have been supported by Lions Clubs International Foundation. Source of non-Carter Center figure: NGDO coordinating office.

Figure 24: Sudan: Financial contributions, 2000-2004

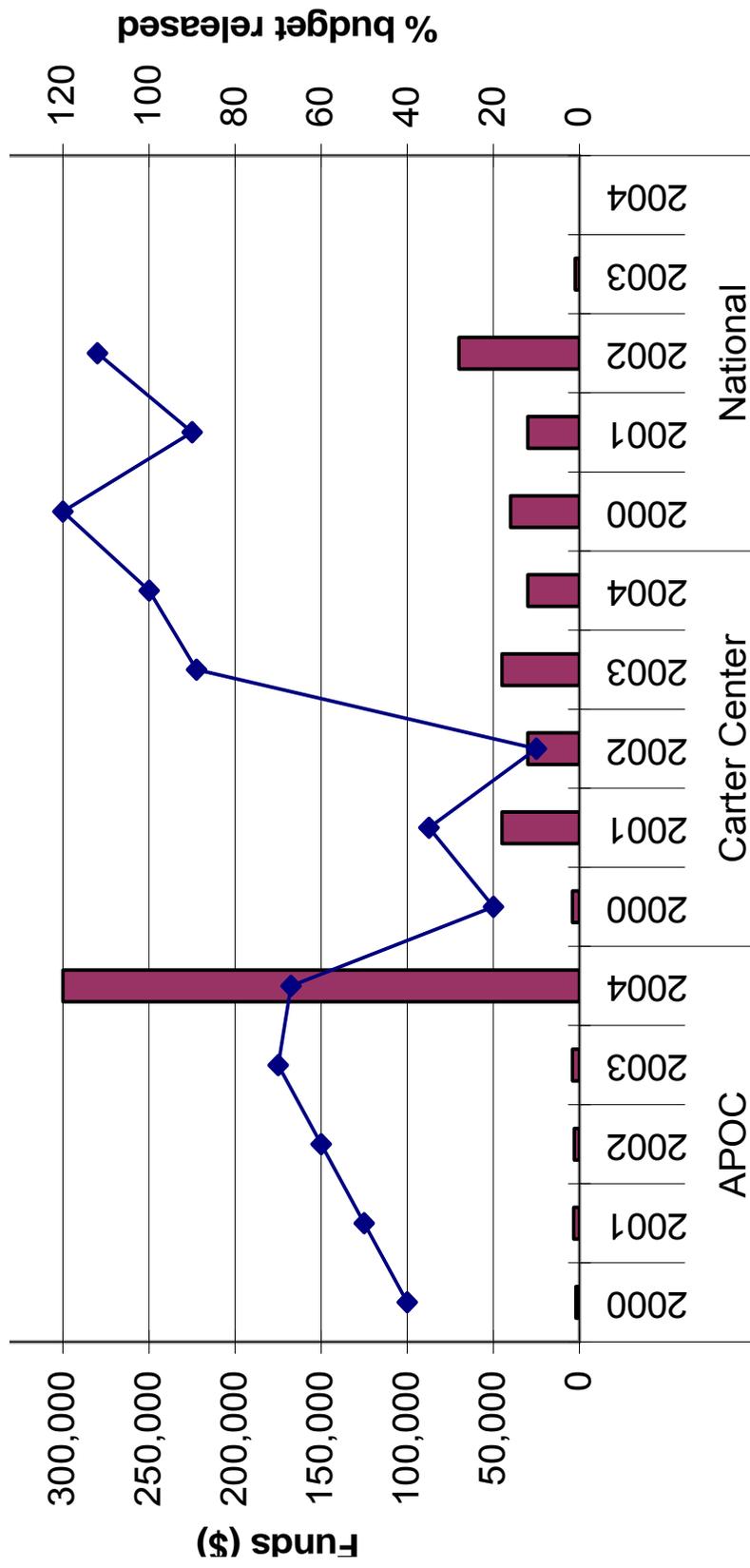


Table 12: Sudan GOS - Carter Center Assisted Mectizan treatments 2004

State	Locality	Total Pop. for 2004	Pop. treated cumulative for 2004	ATO for 2004	% ATO treated in 2004	% of total pop. treated in 2004	Active village ATO for 2004	Active villages cumulative for 2004	Active village % for ATO for 2004	% active villages treated in 2004
Western Bahr EI Ghaza	2	138,037	108,326	114,821	94%	78%	86	86	100%	100%
Northern Bahr EI Ghazal	1	37,870	18,507	15,000	123%	49%	9	9	100%	100%
South Darfour	1	23,203	21,163	19,723	107%	91%	20	20	100%	100%
River Nile	3	85,429	67,485	60,000	112%	79%	89	89	100%	100%
Bahr El Jabal	2	179,732	115,714	112,000	103%	64%	330	330	100%	100%
Lakes	1	8,000	4,827	6,000	80%	60%	19	19	100%	100%
Eastern Equatoria	1	28,800	12,471	22,000	57%	43%	49	49	100%	100%
Khartoum	2	56,742	24,152	36,800	66%	43%	16	16	100%	100%
TOTAL	13	557,813	372,645	386,344	96%	67%	618	618	100%	100%

Table 13: Sudan OLS/S - Carter Center Assisted Mectizan treatments 2004

	NGO	PAYAM	Population treated cumulative from Jan-Dec 2004	ATO for FY 2004	% of ATO treated Jan-Dec 2004	Total Population for FY 2004	% of total Population treated Jan-Dec 2004	Active villages cumulative for FY 2004	Active villages ATO for FY 2004	Active villages % for ATO for 2004
IMC		TAMBURA	43,377	42,829	101%	53,534	81%	33	33	100%
IMC		EZO	26,508	22,530	118%	28,162	94%	17	17	100%
IMC		YAMBIO	53,903	82,756	65%	103,445	52%	59	59	100%
		SUBTOTAL	123,788	148,115	84%	185,141	67%	109	109	100%
ZOA		TALI	1,775	41,250	4%	55,000	3%	18	18	100%
ZOA		KATIGIRI	5,020	30,659	16%	40,879	12%	48	48	100%
		SUBTOTAL	6,795	71,909	9%	95,879	7%	66	66	100%
AAH/CHD		MARIDI	1,840	48,939	4%	161,092	1%	24	173	14%
AAH/CHD		MUNDRI	7,732	20,229	38%	53,235	15%	70	81	86%
AAH/CHD		YEI	1,523	84,006	2%	140,010	1%	120	157	76%
		SUBTOTAL	11,095	153,174	7%	354,337	3%	214	411	52%
Total			141,678	373,198	38%	635,357	22%	389	586	66%

ETHIOPIA

Background: Ethiopia is the largest, most populous country in the Horn of Africa, with a population of more than 67 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 onchocerciasis endemic in studies conducted in the 1970s. Onchocerciasis endemicity was evaluated further in Rapid Epidemiological Mapping of Onchocerciasis (REMO) exercises conducted in 1997, 1998, and 2000. REMO was completed in 2001, and the results indicated that nine zones or regions were endemic for onchocerciasis and eligible for community-directed treatment with ivermectin (CDTI) (Map 14). Currently, it is estimated that 7.4 million persons are at risk of onchocerciasis, and more than three 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). In 2001, CDTI was launched with Carter Center assistance in Kaffa-Sheka zone (later officially split into two zones, Kaffa and Sheka). CDTI was expanded in 2002 and 2003 to include all 13 woredas of those two zones. In 2003, two more CDTI projects were established in North Gondar and Bench Maji zones, and, in 2004, six more CDTI projects were approved to receive support from APOC trust funds.



A backpack used by onchocerciasis health workers in Ethiopia.

These included Jimma and Ilubabor CDTI projects, where The Carter Center is the NGDO partner (Map 15). The estimated population in all the areas where The Carter Center is the NGDO partner is 3,186,885 people, with a UTG of 2,618,000 people.

Members of Lions District 411A continue to play an important role in advocacy, especially for onchocerciasis control in the Lions-Carter Center-assisted areas of Ethiopia. Mr. Teshome Gebre, The Carter Center country representative, and himself a Lion, is co-chair of the NOTF and chair of the NGDO coalition, and so plays a leadership role in the national effort against river blindness. Thus, he represents the Lions both on the NOTF and the National Committee for the Prevention of Blindness (NCPB), and is the incoming SightFirst Committee Vice Chairman for Ethiopia. Ethiopian Lions participated actively in the annual staff retreat.

Treatments: During 2004, 2,365,146 people were treated, reaching 90% of the annual treatment objective in The Carter Center-assisted zones of Kaffa, Sheka, Bench-Maji, North Gondar, Illubabor and Jimma (Table 14, Figure 25). This is over a hundred percent increase from the 1,007,983 treatments reported by The Carter Center's Ethiopia projects in 2003. Each year since its inception in 2001, the Ethiopia program has doubled treatments from the year prior in a rapid scaling up of the program's outreach. In 2005, the program will aim to reach its UTG of 2.6 million. There were no Severe Adverse Events (SAEs) reported in 2004, compared to two in 2003. Although no SAEs occurred, some zones reported as high as 7% adverse reactions after treatment.

Mectizan®: In 2004, a total of 7,420,000 tablets were received from NOTF and made available for distribution to The Carter Center's six CDTI zones. Through the course of the year, 6,344,753 tablets were distributed, while 34,595 (0.5%) were damaged. The balance returned was 767,745. The average number of tablets per person treated was 2.7. Mectizan® treatment is very popular in Ethiopia, in part because of its additional and highly popular benefits against intestinal helminthes.

Training and Health Education: Training was provided to 25,608 community-directed distributors (CDDs), achieving 99% of the training target. A total of 1,119 community supervisors were trained, representing 74% of the training target of 1,150. Bench Maji and Sheka zones did not train any supervisors. The six zones trained a total of 711 front line health workers, exceeding the target of 684. Health education was provided in 31 woredas and 13,843 targeted communities, representing 100% geographical coverage.

Financial Contribution: Although CDTI is being implemented through government health care delivery structures, most of the funding is still coming from APOC trust funds and the Lions Clubs International Foundation. There is need for the government to begin allocating and releasing funds. The Program is encouraged to continue advocating for more budget allocation, specifically for CDTI core activities, as part of malaria and other vector borne disease control budget lines.

Sustainability and Integration: Since its inception, the Program has been integrated into the existing health service delivery system. Mectizan® procurement and distribution takes place at all levels through the pharmacy department of the MOH. CDTI has been integrated into the overall health plan.

Monitoring, Evaluation and Research: An APOC-sponsored study in Illubabor (in its first year of mass treatment) showed 7% prevalence of ocular disease in a population of 446, and 28% prevalence of skin disease attributable to onchocerciasis in a population of 789.

Kaffa, North Gondar, and Illubabor engaged in routine monitoring activities in 2004, including validation of treatment coverage, CDD and supervisor numbers and gender,

percentage of CDDs involved with other health activities, and CDD attrition rate. Although attendance at health education sessions was low (averaging 48% among approximately 2,500 people surveyed), treatment coverage rates were found to be excellent, with an average of 86.4% in the three zones. CDD numbers were shown to be accurate compared to those reported, and 96% of these planned to continue their work in 2005. Eight percent of the CDDs surveyed were female.

RECOMMENDATIONS 2005 FOR CARTER CENTER ETHIOPIA

For the time being, despite requests from the Ethiopian government that The Carter Center partner with them in more APOC projects (beyond Kaffa, Sheka, Bench Maji, North Gondar, Jimma, and Illubabor zones), The Carter Center will not take on additional APOC projects in Ethiopia. We should, however, monitor the success of Ethiopian APOC programs working without NGO support.

Monitor adverse events, which have occurred up to 7% in some areas. Although no serious events were reported in 2004, the program should remain vigilant and report any SAEs to headquarters and the Mectizan® Donation Program.

Seek to increase training, supervision, involvement of kinship groups, and improve gender balance.

Look closely at costs to the program, workload, and demands presented by The Carter Center monitoring protocol.

Discuss in detail with headquarters what is being proposed by the MOH for sentinel village monitoring prior to launching field activities supported by The Carter Center.

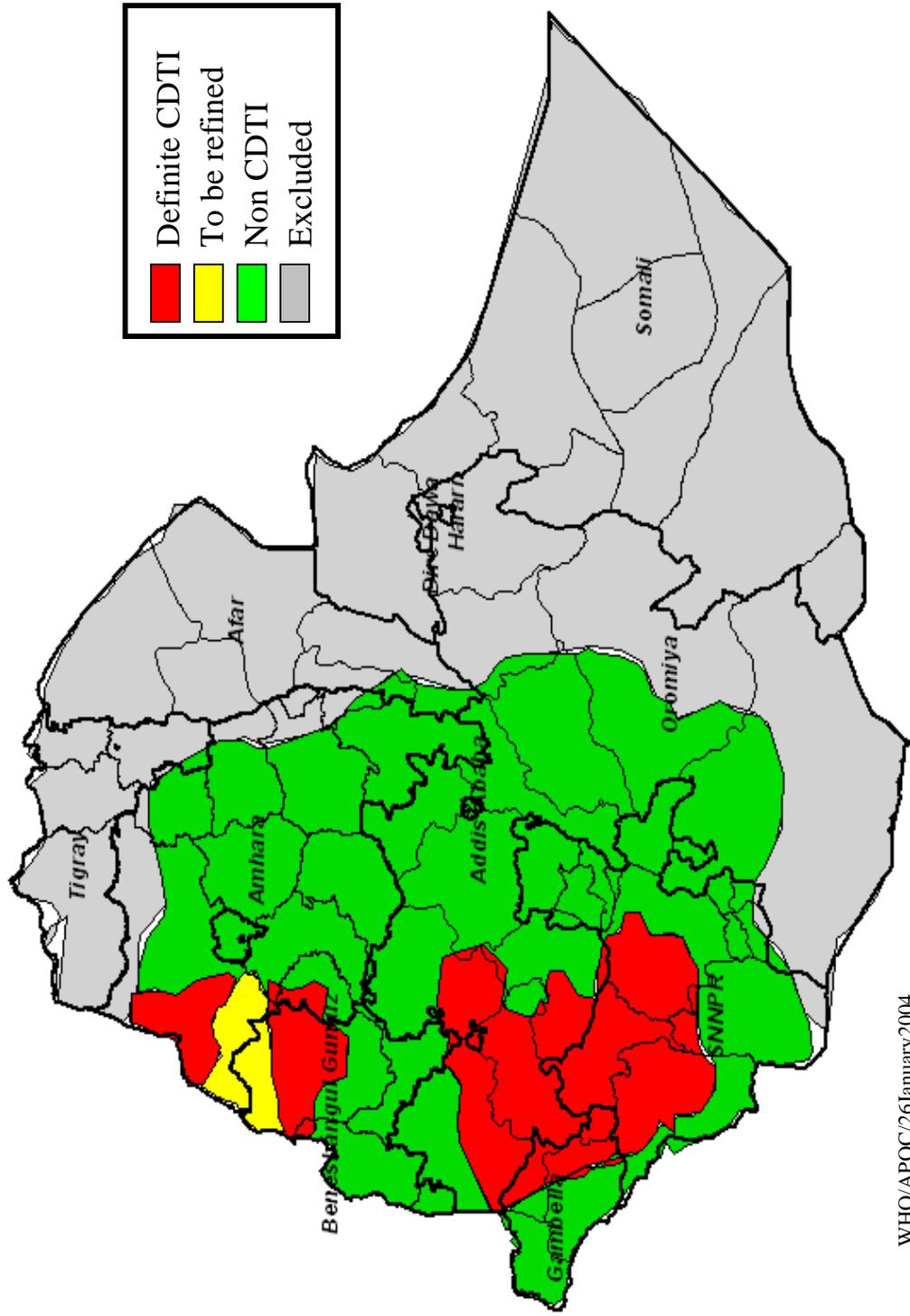
Analyze further data presented on ocular disease (MFAC, punctate keratitis). The importance of demonstrating the impact of The Carter Center on ocular disease was stressed by Lions as being very important for the second phase of SightFirst fundraising. The Carter Center programs need to review all available data from past sentinel areas that may have baseline data pertaining to visual impairment or ocular disease.

Consider a study on low CDD attrition rates. Communities should be advised not to appoint government employees as community supervisors.

Begin using UTG when reporting on treatment coverage, as the program has reached full capacity and no longer needs the ATO.

Carter Center program staff are encouraged to complete the Emory IRB ethics test, and are required to do so where research on human subjects is or will be taking place.

Map 14: Current Total CDTI Areas in Ethiopia



WHO/APOC/26January2004

Map 15: Carter Center-Assisted CDTI Projects in Ethiopia

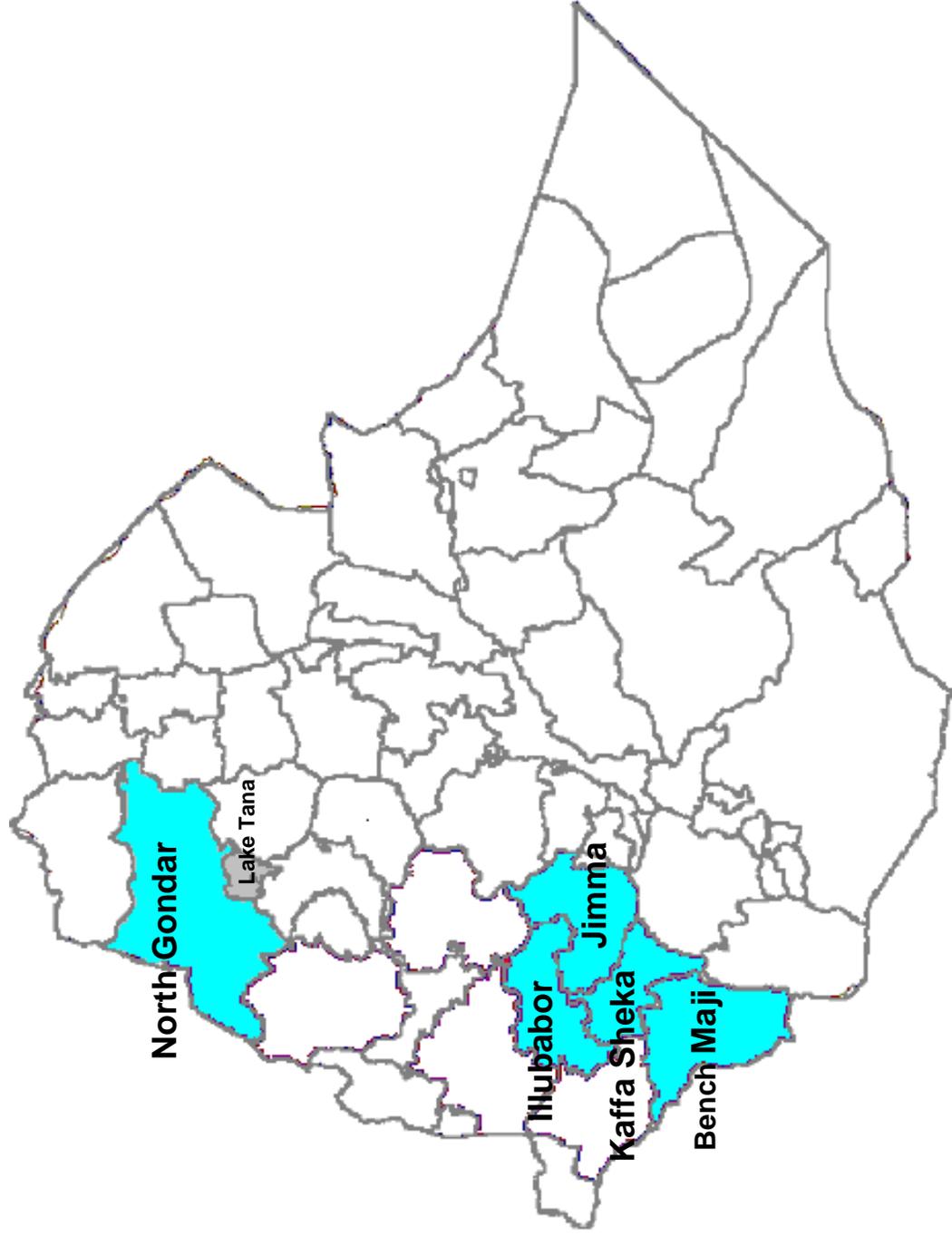
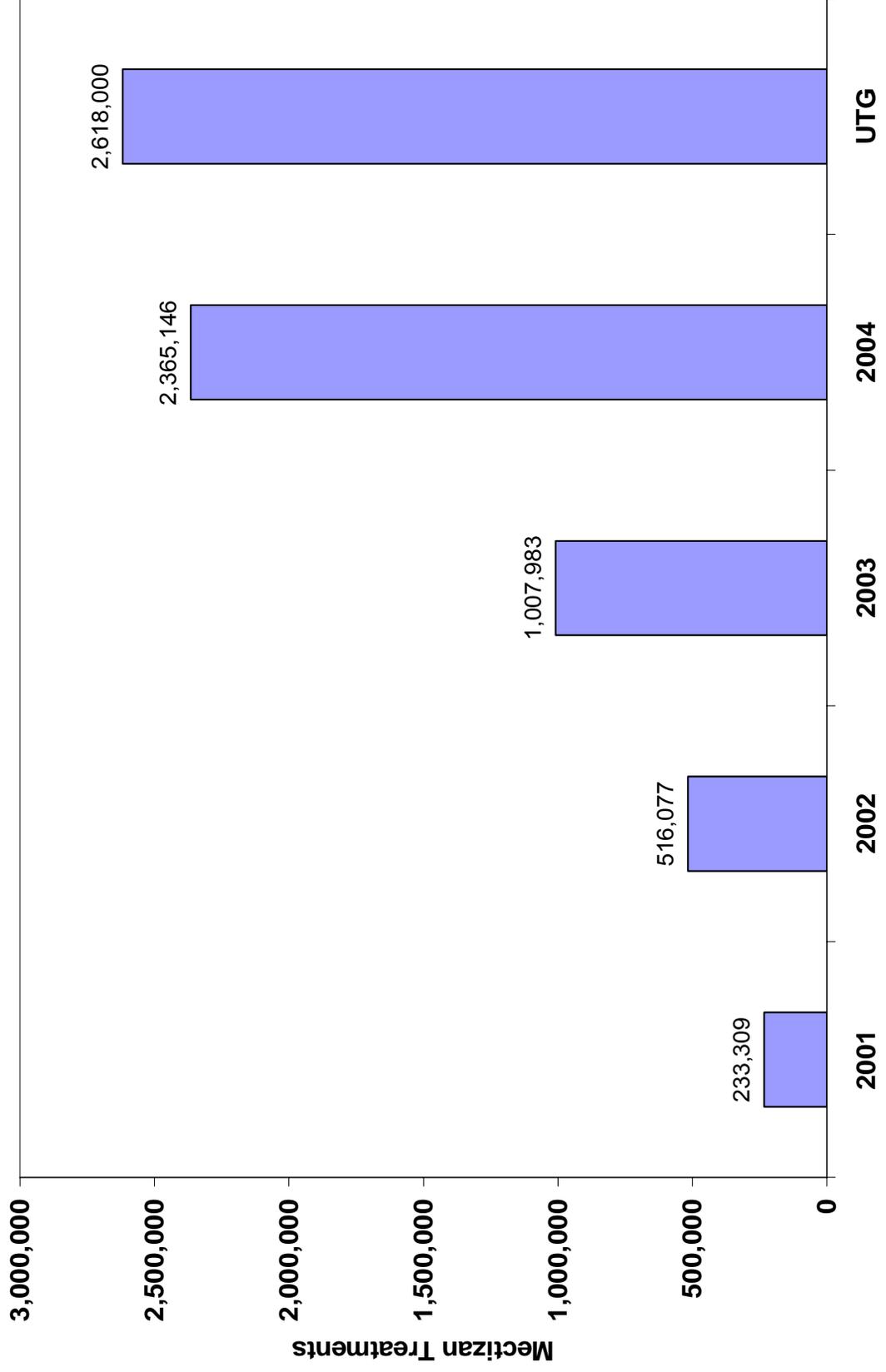


Figure 25: Ethiopia: 2001-2004 Mectizan Treatments and UTG



**Table 14: Carter Center-Assisted Areas in Ethiopia, 2004
Activities and Plans for 2005**

Projects	Number of Woredas	Total Population	ATO for 2004	Population Treated	ATO (%)	Therapeutic Coverage	Number of Villages	Geographic Coverage
Kaffa	10	795,352	668,096	620,182	93	78	3,055	100
Sheka	3	185,846	156,111	148,460	95	80	293	100
Bench-Maji	6	455,345	382,491	308,165	81	68	695	100
North Gondar	3	235,712	197,998	180,054	91	76	914	100
Illubabor	6	675,642	582,866	523,171	95	77	3,590	100
Jimma	3	748,082	614,238	585,114	95	78	3,607	100
Total	31	3,095,979	2,601,800	2,365,146	92	76	12,154	100

Acronyms

APOC	African Program for Onchocerciasis Control
arvs	at-risk villages (villages requiring community-wide active mass therapy)
ATO	Annual Treatment Objective
CDC	Centers for Disease Control and Prevention
CDD	Community-Directed Distributors (APOC strategy)
CDHS	Community-Directed Health Supervisors
CDHW	Community-Directed Health Workers
CDTI	Community-Directed Treatment with Ivermectin
CSA	Committee of Sponsoring Agencies
earp	eligible at-risk population
DEC	diethylcarbamazine
DPD	Division of Parasitic Diseases
FLHF	Front Line Healthcare Facility
FMOH	Federal Ministry of Health
GOS	Government of Sudan
GOSS	Government of South Sudan
GRBP	Global 2000 River Blindness Program of The Carter Center
GSK	GlaxoSmithKline
HE	Health Education
HNI	HealthNet International
HQ	Headquarters
IACO	InterAmerican Conference on Onchocerciasis
ICT	immunochromatographic card test
IEC	Information, Education, and Communication
ITN	Insecticide-treated bednets
JAF	Joint Action Forum
LCIF	Lions Clubs International Foundation
LCCSFI	Lions-Carter Center SightFirst Initiative
LF	Lymphatic Filariasis
LGA	Local Government Area (Nigeria)
MDA	mass drug administration
MDP	Mectizan® Donation Program
MEC	Mectizan® Expert Committee
Mectizan®	Ivermectin (Merck & Co., Inc. product name)
MOH	Ministry of Health
NGDO	Nongovernmental Development Organization
NGO	Nongovernmental Organization
NOCP	National Onchocerciasis Control Program
NOTF	National Onchocerciasis Task Force
OCP	Onchocerciasis Control Program
OEPA	Onchocerciasis Elimination Program for the Americas
OLS/S	Operation Lifeline Sudan/South
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
SAE	Severe Adverse Event
SH	<i>Schistosomiasis haematobium</i> (urinary schistosomiasis)
SNNPR.....	Southern Nations Nationalities and Peoples Region
SPLM/A	Sudan People’s Liberation Movement/Army
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

ANNEXES

ANNEX 1: THE CARTER CENTER AND RIVER BLINDNESS

The Carter Center and River Blindness: In 1987, Merck & Co., Inc. approached Dr. William Foege, then executive director of The Carter Center, for assistance in organizing the global distribution of Mectizan®. Shortly thereafter, in 1988, The Mectizan® Executive Committee (MEC)/Mectizan® Donation Program (MDP) was created and housed at the Atlanta-based Task Force for Child Survival and Development, an independent partner of The Carter Center, with Dr. Foege as Chair. The global initiative has grown to one that now enables approximately 70 million treatments per year and over 500 million treatments since the MDP began. The donation has stimulated what is widely considered a model of how industry, international organizations, donors, national Ministries of Health (MOHs) and affected communities can successfully work together toward solving a major health problem.

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), which was founded in 1990 by John and Rebecca Moores. The Global 2000 River Blindness Program (GRBP) was established at The Carter Center to assume the field activities of the RBF. The Carter Center'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 GRBP also includes the Onchocerciasis Elimination Program for the Americas (OEPA), which coordinates activities to eradicate the infection in all six onchocerciasis-endemic countries in the Americas (Brazil, Colombia, Ecuador, Guatemala, Mexico, and Venezuela). In 1997, The Carter Center's GRBP expanded to Sudan (with support from the Lions-Carter Center SightFirst Initiative -LCIF) as part of the Carter Center's peace initiative and Guinea worm disease eradication efforts in Sudan. In 1999, as part of the expanded Lions-Carter Center Sight First Initiative (LCCSFI), The Carter Center accepted an invitation to assist onchocerciasis control activities in Ethiopia, and treatments and HE began in 2001.

Partnerships: The Carter Center works through partnerships. Our primary partners are the ministries of health (MOHs) and their national onchocerciasis control programs executed within and through the indigenous primary health care system. The Carter Center and MOH staff work closely with the rural communities utilizing information, education, and communication techniques (IEC) to empower the people to be full partners in the program and in the drug delivery process. As mentioned above, The Carter Center has a long and evolving partnership with Lions Clubs and the Lions' SightFirst Initiative (please see the second paragraph the Introduction section for more details). The Division of Parasitic Diseases (DPD) at the U.S. Centers for Disease Control & Prevention (CDC), where Carter Center technical staff members are housed, is another key partner. The Carter Center also works closely with the MDP at the Task Force for Child Survival and Development, and is represented on the Mectizan® Expert Committee (MEC).

Partners in the African Programs: In Africa, the main Carter Center partners are the MOHs in host countries (Cameroon, Ethiopia, Nigeria, Sudan, and Uganda). The Carter Center also works with other NGOs through a NGO Coalition for Mectizan distribution that includes, among others, Christoffel Blindenmission, Helen Keller Worldwide, Interchurch Medical Assistance, HealthNet International, Lions Clubs International Foundation, SightSavers International, and the U.S. Committee for UNICEF. The African Program for Onchocerciasis Control (APOC), which is executed by WHO and funded through a trust fund housed at The World Bank is another important partner of The Carter Center. APOC was launched in 1995, and aims to establish, by the year 2010, “community-directed” river blindness treatment programs in an estimated 19 African countries. APOC provided funds and technical/managerial support for five-year Mectizan® distribution projects carried out by MOH/Carter Center partnerships. The Carter Center had 18 projects, which most have reached the end of their APOC funding. Dr. Moses Katarwa, Carter Center River Blindness Epidemiologist and Lions club member, serves on the Technical Consultative Committee of APOC.

Partners in the Americas Programs: The Carter Center provides the administrative framework for OEPA. Headquartered in Guatemala, OEPA is the technical and coordinating body of a multinational, multi-agency coalition working for the elimination of all onchocerciasis morbidity and transmission from the Americas by the year 2007. Through OEPA, The Carter Center 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), which is convened by OEPA and has representation from key members of the initiative. The Carter Center works with the Lions Clubs International Foundation (LCIF), Pan American Health Organization (PAHO), CDC, and several U.S. and Latin American universities. (Please see the third paragraph of the OEPA section for more details on the Lions partnership.) In 2003, this partnership expanded to include the Bill & Melinda Gates Foundation.

In 2004, The Carter Center and its partners celebrated its 60 millionth assisted treatment with Mectizan®, and the first year in which the program assisted in treating more than 10 million people.

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ANNEX 4: AGENDA

Ninth Annual Global 2000 River Blindness Program Review
Thursday March 3 – Saturday March 5, 2005
The Carter Center, Atlanta

Day 1: Thursday March 3, 2005

7:30	<i>Shuttle pickup at hotel</i>	
8:00 – 8:30	<i>Continental breakfast</i>	
8:30 – 8:40	Welcome, introduction and remarks	Dr. Donald Hopkins Dr. Frank Richards (chair)

Part 1: 2004 Treatment Activity Summary

8:40 – 8:45	Introduction to Day 1	Dr. Moses Katarbarwa
8:45 – 9:15	Nigeria presentation	Dr. Emmanuel Miri
9:15 – 9:30	Discussion	
9:30 – 10:00	LF and Schisto presentation	Dr. Abel Eigege
10:00 – 10:15	Discussion	
10:15 – 10:30	<i>Coffee Break</i>	
10:30 – 11:00	Uganda presentation	Ms. Peace Habomugisha
11:00 – 11:15	Discussion	
11:15 – 11:45	Cameroon presentation	Dr. Albert Eyamba
11:45 – 12:00	Discussion	
12:00 – 1:00	<i>Lunch</i>	
1:00 – 1:30	OEPA presentation	Dr. Mauricio Sauerbrey
1:30 – 1:45	Discussion	
1:45 – 2:15	Sudan presentation (Khartoum)	Dr. Tong Chor Malek
2:15 – 2:30	Discussion	
2:30 – 2:45	<i>Coffee Break</i>	
2:45 – 3:30	Sudan presentation (Nairobi) Discussion	Ms. Alice Onsagario
3:30 – 4:00	Ethiopia presentation	Mr. Teshome Gebre
4:00 – 4:15	Discussion	
4:15 – 4:45	Mectizan® Issues	MDP/Global 2000 Staff
4:45 – 5:00	Day 1 Conclusions	Dr. Frank Richards
5:00	<i>Shuttle Departure</i>	

Day 2: Friday March 4, 2005

7:30	<i>Shuttle pickup at hotel</i>	
8:00 – 8:30	<i>Continental breakfast</i>	
Part 2: Sustainability and Integration		
8:30 – 8:35	Introduction to Day 2	Ms. Lindsay Rakers
8:35 – 8:50	Involvement of kinship in sustaining public health programs	Dr. Moses Katarwa
8:50 – 9:20 9:20 – 9:35	Nigeria presentation Discussion	Dr. Abel Eigege
9:35 – 10:05 10:05 – 10:20	Uganda presentation Discussion	Ms. Peace Habomugisha
10:20 – 10:40	<i>Coffee Break and Group Photo</i>	
10:40 – 11:10 11:10 – 11:25	Cameroon presentation Discussion	Dr. Albert Eyamba
11:25 – 11:55 11:55 – 12:10	OEPA presentation Discussion	Ms. Alba Lucía Morales Castro
12:10 – 1:40	<i>Lunch and optional Museum tour</i>	
1:40 – 2:10 2:10 – 2:25	Ethiopia presentation Discussion	Mr. Teshome Gebre
2:25 – 2:55 2:55 – 3:10	Sudan presentation (Khartoum Office) Discussion	Mr. Raymond Stewart
3:10 – 3:30	<i>Coffee Break</i>	
3:30 – 3:45	Lions Presentation	Ms. Sonia Pelletreau
3:45 – 4:15 4:15 – 4:30	Reconstruction of health delivery services in Southern Sudan Discussion	Dr. Bellario Ngong
4:30 – 4:40	Emory IRB test presentation	Ms. Lindsay Rakers
4:40 – 5:00	Day 2 Conclusions	Dr. Frank Richards
4:45	<i>Shuttle Departure</i>	

Day 3: Saturday March 5, 2005

7:30	<i>Shuttle pickup at hotel</i>	
8:00 – 8:30	<i>Continental breakfast</i>	
Part 3: Monitoring, Evaluation and Research		
8:30 – 8:40	Introduction to Day 3	Dr. Moses Katarwa
8:40 – 9:00 9:00 – 9:10	Nigeria presentation Discussion	Dr. Abel Eigege
9:10 – 9:30 9:30 – 9:40	Nigeria presentation Discussion	Dr. Emmanuel Emukah
9:40 – 9:50 9:50 – 10:00	Hydrocele Surgery presentation	Dr. Gail Thomas
10:10 – 10:30	<i>Coffee Break</i>	
10:30 – 10:50 10:50 – 11:00	Uganda presentation Discussion	Ms. Peace Habomugisha
11:00 – 11:20 11:20 – 11:30	Cameroon presentation Discussion	Dr. Albert Eyamba
11:30 – 11:50 11:50 – 12:00	<i>Wolbachia</i> Presentation Discussion	Dr. Frank Richards
12:00 – 1:00	<i>Lunch</i>	
1:00 – 1:20 1:20 – 1:30	OEPA presentation Discussion	Dr. Mauricio Sauerbrey
1:30 – 1:50 1:50 – 2:00	Ethiopia presentation Discussion	Mr. Teshome Gebre
2:00 – 2:15 2:15 – 2:30	Sudan Eyecare Meeting summary Discussion	Dr. Adrian Hopkins
2:30 – 2:45	<i>Coffee Break</i>	
2:45 – 3:05 3:05 – 3:25	Sudan presentation (Khartoum) Discussion	Mr. Raymond Stewart
3:25 – 4:15	Summary and Conclusions, Days 1 – 3	Rapporteurs
4:15 – 4:30	Reflections and Closure of Ninth Session	Dr. Frank Richards
4:30	<i>Shuttle Departure</i>	

ANNEX 5: THE CARTER CENTER GRBP REPORTING PROCESSES

At-Risk Villages (arvs): An epidemiological mapping exercise is a prerequisite to identifying at-risk villages (arvs) 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 illustrate that the morbidity from onchocerciasis occurs primarily in villages with nodule prevalence $\geq 20\%$. In the first stage of REMO, survey villages are selected from areas that are environmentally able to support black fly breeding and therefore transmission of *O. volvulus*. In the second stage, the survey villages are visited by field teams and a convenience sample of 30-50 adults are examined (by palpation) for characteristic onchocercal nodules. The mean nodule prevalence for each village sample are mapped (often using geographic information systems) and the map is used to define endemic zones (so called ‘CDTI treatment zones’). Those zones typically are defined by sample villages having nodule prevalence of $\geq 20\%$. All villages falling within the CDTI treatment zone are offered mass Mectizan® treatment annually (this approach is modified for areas where the parasite *Loa loa* exists). 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. For the Americas, where the endemic foci are characteristically smaller and more defined than Africa, 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 in which one or more persons are positive (sample prevalence $>3\%$) are considered “at-risk,” and recommended for the mass treatment campaign. Thus, the cutoff prevalence for treatment is much lower for the Americas compared to Africa.

Data Reporting: The Carter Center program offices are required to submit reports by the tenth day of each month 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. Standardized tables and graphs are used across programs. 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 (MOH) personnel. The accuracy of these reports is routinely confirmed with random spot checks performed primarily by MOH personnel, supplemented by site visits by The Carter Center staff and/or Lions Clubs members. Summary reports of numbers of villages and persons treated are

compiled at the district level and forwarded (whenever possible through MOH surveillance and reporting channels) to both headquarters of the national onchocerciasis programs and the national Carter Center offices in Jos (Nigeria), Kampala (Uganda), Yaounde (Cameroon), Khartoum (Sudan), and Nairobi (to be relocated in 2005 to Lokichokio to support Government of Southern Sudan projects). In the Americas, the MOHs in the six countries report treatments quarterly to the OEPA office in Guatemala City, which then provides a combined regional report to The Carter Center.

The data from monthly reports are supplemented with additional information at an annual Carter Center River Blindness Program Review held during the first quarter of each year. At these Reviews, all Carter Center 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 where The Carter Center assists also are discussed.

GRBP Treatment Indices: Treatments are reported as numbers of persons or villages (communities) treated (TX) for the month, by state or province. Cumulative treatment figures are compared to the Annual Treatment Objectives (ATOs) or Ultimate Treatment Goals (UTGs). The decision whether to use ATOs or UTGs is based on projections of program capacity. Mature programs that sufficiently reach their entire program area are said to be at full geographic coverage, and use the UTG index as their coverage denominator (see below). With the exception of Sudan, all Carter Center GRBP activities operate at full geographic coverage (e.g., UTG).

Communities targeted for active mass distribution are called at-risk villages (arvs). The eligible populations of arvs receive community-wide Mectizan® treatment. The eligible at-risk population (earp) includes all persons living in arvs who are eligible to receive Mectizan® (i.e., who are over five years of age and in good health). Although mass treatment activities exclude pregnant women, these women should be treated one week after partuition (generally later during the treatment year) by community distributors; therefore they should be included in the ATOs/UTG calculation. The ATO/UTG for the earp [UTG(earp)] includes the number of persons who can receive Mectizan® and are known or thought to be living in arvs. In practice, the ATO is established in projections based on age-eligible estimates, and its accuracy is expected to improve with time. The UTG(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/UTGs using the latest epidemiological mapping information and village census data from the most recent treatment rounds. Given the complex situation in Sudan, only a rough estimate of the ATOs can be made. Hopefully this will change in the near future.

ANNEX 6: SUSTAINABILITY OF THE AFRICAN RIVER BLINDNESS PROGRAMS

In the last three years The Carter Center's African river blindness programs have been assessed using the APOC evaluation tool for sustainability. The APOC tool measured various indices such as community-ownership, simplicity, effectiveness, integration into existing health services, availability of local resources, and attitude of personnel involved. Evaluations were done at National, state, LGA, frontline health facility and community levels. Three groups of indices were considered.

- Indices of processes in support of the river blindness program (planning, leadership, supervision, monitoring, training, and health education);
- Indices of resources (financing and funding, transport, material resources, human resources, and integration with other activities);
- Indices of coverage.

There were 76 indicators in the APOC evaluation tool. Scores were provided at each level, with a perfect score being 5 points.

Using the scores and other considerations, the evaluators determined if CDTI projects are:

Fully sustainable: All *aspects* are fulfilled, and all *critical elements* are satisfied (with perhaps one or two minor imperfections). This project therefore fulfills all the conditions for becoming sustainable.

Making satisfactory progress towards sustainability: One or two *aspects* are not fulfilled, and one or two *critical elements* are not satisfied. This project is on the way to being sustainable. With feedback from the evaluation team, national and project staff should be able to undertake the required remedial action.

Not making satisfactory progress towards sustainability: Half or less of the *aspects* are fulfilled, and half or less of the *critical elements* satisfied. This project has serious barriers to sustainability. It will require rethinking and mobilization of high-level support to get it back on track.

No APOC project has ever received a rating of "Fully sustainable."

The validity of these results are being tested by The Carter Center in monitoring the "Post-APOC Scenario." In several Carter Center assisted areas that have completed their APOC funding and their APOC sustainability evaluation, The Carter Center (after advising partners) has also stopped providing funds for implementation of treatment activities. This is to test what could happen when activities are turned over to the full responsibility of the federal, state and local governments, as well as to determine the validity of the APOC scoring system for sustainability. The 'Post APOC scenario' trial

includes North Province in Cameroon, Kisoro and Mbale Districts in Uganda, and Imo and Abia States, Nigeria.

Preliminary (draft) analysis of prospects for sustainability of CDTI projects that are being supported by The Carter Center in Africa (Dr. M Katarwa).

The Carter Center is a partner in 15 APOC projects (Table 15). These projects consist of 29 "states" (province, states, zones and districts) in five African countries. Of the 15 projects, only five will still receive support from APOC Trust funds after 2005 (The Carter Center will collaborate with APOC supported projects in southern Sudan, which are in partnership with the NGO CBM.) Note that although APOC Trust funds are provided to a CDTI project for only five years, the project may continue to receive capital items and funds for advocacy and training, but is not guaranteed and does not include implementation (field) activities such as community mobilization, health education, supervision, monitoring, data collection, reporting and feedback.

Table 15: Showing The Carter Center supported CDTI projects in Africa, and those in the 'Post-APOC Scenario' as of March 2005

Country	CDTI Project (15 Projects, 29 states/districts/ provinces/zones)	End of APOC Trust funds year	Projects Post APOC with continued Carter Center support (7 projects, 17 states)	'Post APOC Scenario'=Projects no longer receiving Carter Center support in mid 2004 (4 projects, 5 states)
Cameroon	1. North Province	Oct, 03		North
	2. West Province	Jun, 06		
Ethiopia	3. Kaffa/Shekka Zones	Oct,05		
	4. Bench Maji Zone	Mar, 07		
	5. North Gondar Zone	Mar,08		
	6. Jimma Zone	Nov,08		
	7. Illubabor Zone	Nov,08		
Nigeria	8. Plateau/Nasarawa States	Oct, 03/ May, 03	Plateau/Nasarawa States	
	9. Abia/Imo States	Oct, 03		Abia/Imo
	10.Delta/Edo States	Nov, 04	Delta/Edo States	
	11. Anambra/Ebonyi/ Enugu States	Oct, 03	Anambra/Ebonyi/Enugu	
Uganda	12. Phase 1- Kisoro/Kasese districts	July, 02	Kasese	Kisoro
	13. Phase 2 - Kabale/ Mbale/Sironko districts	Oct, 03	Kabale/Sironko	Mbale
	14. Phase 3- Kanungu/Nebbi districts	July, 04	Kanungu/Nebbi	
	15. Phase 4- Adjumani/ Apac/ Gulu/ Moyo/ Nebbi districts	Feb, 05	Adjumani/ Apac/ Gulu/ Moyo/ Nebbi	

Potential for sustainability of CDTI projects without External support (Figure 26)

The ten APOC projects no longer receiving APOC support represent 22 states; five states (23%) are no longer receiving Carter Center support in the 'Post-APOC scenario' trial: North Province (Cameroon), Imo and Abia States (Nigeria), and Kisoro and Mbale Districts (Uganda). Where ongoing monitoring occurred during 2004, we analyzed data from four of these five Post-APOC scenario states (Figure 26, 'No Support'): North Province, Imo State, Kisoro and Mbale Districts. We compared those data with similar monitoring 2004 measurements taken in seven CDTI projects that no longer are supported by APOC, but still supported by The Carter Center (Figure 26, 'Support'). A trend was noted in most indices in lower results in the 'Post APOC scenario' areas. Data used to create Figure 26 are shown in Table 16.

Note that the most dramatic change in the 2004 treatment coverage figures were based on a village success rate of reaching 90% of UTG, not actual coverage figures. There is a decline from 75% to 25%, while states with external Carter Center support still decreased from about 86% to 75%. (The decline in those still with external support could be due to the substantial reduction of funds from APOC trust funds and The Carter Center policy of not filling the gap left by APOC.) There also is evidence that national and state governments are not budgeting or releasing funds to CDTI projects in both categories of projects.

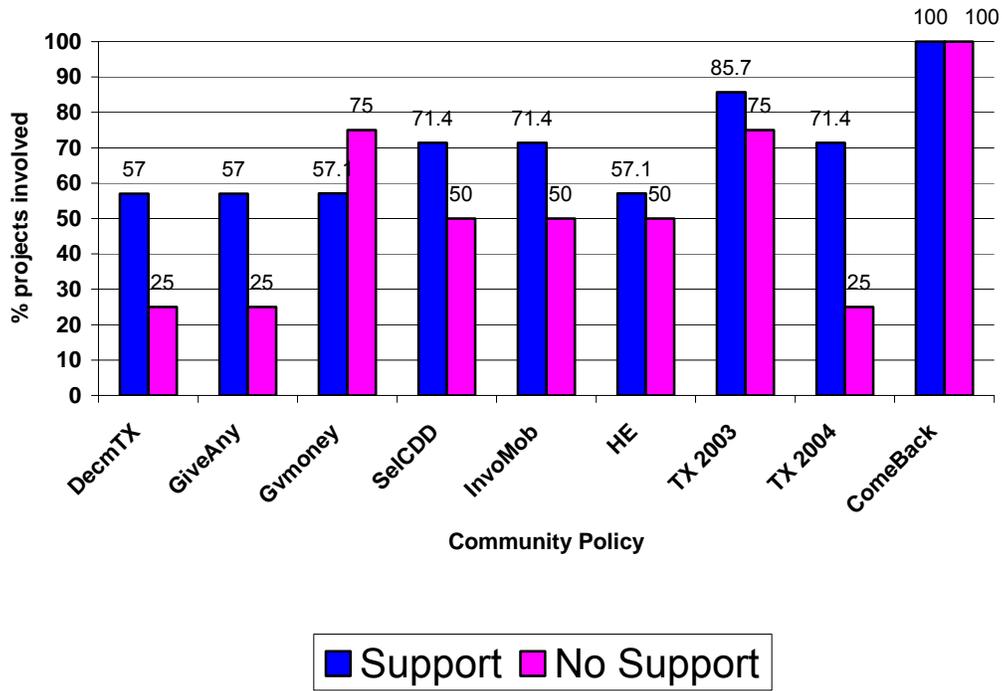
Declined indices were noted when we analyzed community members' involvement in decision-making processes, such as deciding on the location of the treatment centers and selection of the distributors. A decline in community members' involvement in mobilizing other community members for CDTI activities and attending health education also was observed.

Regarding provision of incentives (in-kind and monetary), we also noted a lower percentage of projects with low community involvement for the projects not receiving external support than for those with external support. When only monetary incentives were analyzed, more projects with a low community involvement were observed among projects not receiving external support. Demand for incentives, especially monetary, was believed to be an indication of the following:

- Few CDDs per community or population, hence heavy workload per CDD;
- Lack of involvement of the traditional kinship structures existing in all the CDTI projects;
- Health workers making decisions for community members;
- Use of CDDs in communities other than those where they live and are supposed to work; and
- Most likely a high CDD attrition rate.

The majority of community members in supported and non-supported CDTI projects continue to have faith in ivermectin for onchocerciasis control and will be available for treatment during the following year.

Figure 26: Comparing household responses in a random sample of communities for the potential for sustainability of CDTI projects with (N=4620) or with no (N=2345) external support during 2004



Key

DecmTx: Over 50% of the community members decided upon the method of treatment.

GiveAny: less than 10% provided incentives (In-kind and monetary) to the distributors of ivermectin.

Gvmoney: less than 10% provided monetary incentives to the distributors of ivermectin.

SelCDD: Over 50% participated in the selection of CDDs.

InvolMob: Over 50% of the community members were involved in mobilising other community members for health education and treatment.

HE: Over 55 % of the community members attended health education.

TX 2003: At least 90% of the community members were treated during 2003.

TX2004: At least 90% of the community members were treated during 2004.

Comeback: At least 90% of the community members will be available to receive ivermectin during 2005.

Table 16: Household responses in a random sample of communities for the potential for sustainability of CDTI projects with (N=4620) or with no (N=2345) external support during 2004

		DecmTX	GiveAny	Gvmoney	SelCDD	InvoMob	HE	TX 2003	TX 2004	ComeBack
Support	West	14.5	6.1	0	19.3	19.5	32.2	94.2	96.3	98.4
	Edo	44.7	23.6	13	49.8	51.6	58.4	92.3	95	99.8
	Plateau	66.3	87.1	52.1	63.8	59.7	35.7	93.6	94.8	99.5
	Nasarawa	21.1	43.4	36	33.3	38.2	48.6	82.2	76	98.4
	Kanungu	76.8	8	1.2	82	74.7	89.2	97.6	97.6	100
	Moyo	61.2	6.4	0	80.4	59.6	64.4	91.6	85	99.2
	Nebbi	57.8	6.8	0	76	73.1	66.3	93.6	96	99.6
No Support	North	23.4	12.1	4.6	39.5	31.9	43.8	91.6	87.5	96
	Imo	34.9	10.6	12.9	40.1	39.6	18.8	75.9	76	97.2
	Kisoro	49	1	1	56	40.6	59.4	92	84.2	94
	Mbale	53.6	18	1.6	73.2	79.2	76.4	96.8	96.8	97.6

DecmTx: Over 50% of the community members decided upon the method of treatment.

GiveAny: less than 10% provided incentives (In-kind and monetary) to the distributors of ivermectin.

Gvmoney: less than 10% provided monetary incentives to the distributors of ivermectin.

SelCDD: Over 50% participated in the selection of CDDs.

InvolMob: Over 50% of the community members were involved in mobilising other community member for health education and treatment.

HE: Over 55 % of the community members attended health education.

TX 2003 : At least 90% of the community members were treated during 2003.

TX2004: At least 90% of the community members were treated during 2004.

Comeback: At least 90% of the community members will be available to receive ivermectin during 2005.

ANNEX 7: THE NIGERIA LYMPHATIC FILARIASIS (LF) ELIMINATION AND URINARY SCHISTOSOMIASIS CONTROL INITIATIVE

Lymphatic filariasis (LF) in Africa is caused by *Wuchereria bancrofti*, a filarial worm that is transmitted in rural and urban areas by *Anopheles* 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., Inc. for LF in Africa) and albendazole (donated by GlaxoSmithKline), or diethylcarbamazine (DEC) and albendazole. Annual mass treatment with the combination of Mectizan and albendazole prevents mosquitoes from being infected, and, when given for four to six 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 subsequent passage of these eggs through human tissue leads to inflammation and organ damage. School-aged children (ages 5-14) are the most heavily affected by SH and act as 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 one to three years can significantly reduce schistosomiasis morbidity. Praziquantel (which is not routinely donated in large amounts to control programs by the pharmaceutical companies, (as are Mectizan® and albendazole) costs approximately US \$0.7 per 600 mg tablet.

Nigerians suffer in disproportionate numbers from these two parasitic diseases. The country is considered to contain the largest number of persons at risk for LF in Africa, and is ranked third globally behind India and Indonesia in the human suffering from this parasite. One recent review estimated that more than 25 million (22%) of Nigerians are infected with LF, and the mass drug administration for LF in Nigeria will need to reach many times this population. The geographic distribution of the disease appears to show a gradient increasing from north to south in the country, coinciding with increasing tropical climate. For schistosomiasis, an estimated 20 million Nigerians (the greatest of any country) need to be treated with praziquantel every one to three years. The distribution of urinary schistosomiasis (*schistosomiasis hematobium* [SH]) in Nigeria was explored in a Federal Ministry of Health survey, conducted in 1990-91, which 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 was to reduce the prevalence of the disease by 50% within five years, but few treatments had been given because of the expense of praziquantel.

The Carter Center, working with the Federal Ministry of Health (FMOH) of Nigeria and with the state and local government ministries in Plateau and Nasarawa States, has assisted in establishing an LF elimination program in Plateau and Nasarawa States and SH control programs in Plateau, Nasarawa and Delta States (Maps 3 and 4). For LF, the effort is based on a strategy of health education (HE) and annual drug combination therapy with albendazole and Mectizan®, and in two LGAs, treatment plus distribution of impregnated bednets (donated by Roll Back Malaria). The manufacturers of these drugs have global donation programs for LF: GlaxoSmithKline donates albendazole, and Merck & Co., Inc. donates 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, most recently, Shin Poong Pharmaceutical Company, Ltd. The Carter Center has purchased the remainder through funds raised from other donors. Dr. M.Y. Jinadu, the national program coordinator for the LF and SH programs in Nigeria, is actively involved in The Carter Center-assisted program.

ANNEX 8: RECENT (2004-2005) PUBLICATIONS PERTAINING TO THE PROGRAM

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“Fighting blinding diseases has profound significance, not for me as an interested observer, but for the child who will never go blind and for his parents and grandparents, who will have hope that things can improve in their lives, which quite often is the only time they've ever seen this proven.”

Former U.S. President Jimmy Carter, 9/5/2000