

SUMMARY PROCEEDINGS
TENTH ANNUAL TRACHOMA CONTROL PROGRAM REVIEW

FROM CONTROL TO ELIMINATION

THE
CARTER CENTER



Waging Peace. Fighting Disease. Building Hope.

Atlanta, Georgia
February 11 - 13, 2009

Supported by:
Conrad N. Hilton Foundation
Lions Clubs International Foundation
Pfizer Inc

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“From Control to Elimination”

The Tenth Annual Trachoma Control Program Review



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And to many others, our sincere gratitude.

ACRONYMS

ALB	Albendazole	MOH	Ministry of Health
ATO	Annual Treatment Objective	NGO	Non-Governmental Organization
BLTR	Bilamellar Tarsal Rotation	NPPB	National Program for the Prevention of Blindness
CBM	Christoffel Blindenmission	NR	Northern Region (Ghana)
CDC	U.S. Centers for Disease Control and Prevention	NTD	Neglected Tropical Disease
CDTI	Community Directed Treatment with Ivermectin	OLS	Operation Lifeline Sudan
CMA	Christian Mission Aid	ORDA	Organization for Rehabilitation and Development in Amhara
CWSA	Community Water and Sanitation Agency (Ghana)	PHAST	Participatory Hygiene & Sanitation Transformation
FAR	Fellowship for African Relief	PHC	Primary Health Care
FMOH	Federal Ministry of Health	PNLC(C)	Programme National de Lutte contre la Cecité
GOS	Government of Sudan	PZQ	Praziquantel
GOSS	Government of Southern Sudan	SAFE	Surgery, Antibiotics, Facial Cleanliness & Environmental Improvement
GRBP	Global 2000 River Blindness Program	SF	SightFirst
GTM	Garbet Tehadisso Mahber	TCP	Trachoma Control Program
GWEP	Guinea Worm Eradication Program	TRA	Trachoma Rapid Assessment
HKI	Helen Keller International	TF	Trachomatous inflammation- Follicular
IDP	Internally Displaced Persons	TI	Trachomatous inflammation- Intense
IEC	Information, Education, Communication	TT	Trachomatous Trichiasis
IMRF	International Medical Relief Fund	UIG/UTG	Ultimate Intervention/Treatment Goal
ITI	International Trachoma Initiative	UWR	Upper West Region (Ghana)
IVM	Ivermectin	VA	Visual Acuity
KAP	Knowledge, Attitudes, and Practices	VDC	Village Development Committee
LCIF	Lions Clubs International Foundation	WAWI	West African Water Initiative
LF	Lymphatic Filariasis	WHO	World Health Organization
LGA	Local Government Area (specific to Nigeria, analogous to a district)	WVI	World Vision International
LLIN	Long-lasting insecticidal Net		
MALONCHO	Malaria and Onchocerciasis Program		
MALTRA	Malaria and Trachoma Program		
MDG	Millennium Development Goal		

EXECUTIVE SUMMARY

From Control to Elimination

The Tenth Annual Program Review of trachoma control programs was held at The Carter Center, February 11-13, 2009. In addition to the seven Carter Center-assisted programs, we were joined by our donors and partners from the U.S. Centers for Disease Control and Prevention, International Trachoma Initiative, Helen Keller International, Johns Hopkins University, Research Triangle Institute, the Task Force for Global Health, World Vision, the Lions Club International Foundation, the Conrad N. Hilton Foundation, and Pfizer Inc. In keeping with the theme of “**From Control to Elimination**,” presentations focused on program progress towards elimination goals.

As in previous years, the primary objectives of the program review were to assess the status of the national trachoma control programs, identify challenges encountered in planning and implementing those programs, discuss solutions and shared experience, and to promote sharing and standardization of information. Discussions during the program review meetings are country-specific, but the impact is global. The achievements, challenges, solutions and lessons learned continue to guide the evolution of the GET 2020 Alliance.

These proceedings reflect the thoughts, discussions and proposals made during the Tenth Annual Program Review of trachoma control programs. Program review meetings offer a unique forum for trachoma control program managers, Carter Center staff, and partners to work face-to-face to review accomplishments and plan for the future. This group, representing seven country programs, is the first and only assembly of national and regional TCP coordinators and experts to meet regularly to discuss practical application of the SAFE* strategy.

Special session highlights from this year’s review included presentations from the collaborative operational research programs in Ethiopia with the London School of Hygiene and Tropical Medicine and the Francis I. Proctor Foundation, University of California San Francisco (UCSF). The work with the London School will identify best practices for the management of trichiasis cases. The collaboration with UCSF will determine the most rational use of antibiotic in trachoma control programs. The importance of operational research in refining the delivery of trachoma control programs the world over was underlined in this meeting.

The review highlighted the partnership between the Lions Clubs International Foundation and The Carter Center, with particular focus on Lions Clubs of Ethiopia leadership in reducing the burden of blinding trachoma in the Amhara Regional State. The review included presentations on a media habits survey in Ethiopia for a large-scale campaign for mass drug administration and health education, as well as the success of implementing that campaign. Not to be outdone by the Ethiopians, there were presentations on scaling up for elimination in Mali and Niger with the aggressive targets of 2015 presented for the first time as realistic and achievable, generously supported by the Conrad N. Hilton Foundation.

National and regional trachoma control program coordinators representing the ministries of health of Ethiopia, Ghana, Niger, Nigeria, the Government of Sudan and the Government of Southern Sudan attended. In addition, The Carter Center’s Trachoma Control Program staff from Ethiopia, Ghana, Mali, Niger, Nigeria Sudan, and Southern Sudan participated in the meeting. Representatives of the Arthur M. Blank Foundation, Lions Clubs International Foundation, Lions Clubs of Ethiopia, the Conrad N. Hilton Foundation, Pfizer Inc, and the Bill & Melinda Gates Foundation also attended.

* SAFE: the World Health Organization-endorsed strategy for trachoma control:
S for Surgery
A for Antibiotics
F for Facial Cleanliness
E for Environmental Improvement

Ethiopia Trachoma Control Program

Presented by Dr. Daddi Jima, Federal Ministry of Health, Ethiopia
and Tesfaye Teferi, The Carter Center Ethiopia

Background

The prevalence of blindness in Ethiopia, estimated at 1.6%, is thought to be among the highest in the world. The two major causes of blindness are cataract (50%) and trachoma (12%). A nationwide blindness and low vision survey completed in 2006 shed light on the national trachoma situation. The national prevalence of active trachoma (either TF or TI) in children 1-9 years old was 40.1%. Considerable variations are observed in the active trachoma prevalence across regional states, with the highest prevalence in Amhara (62.6%). The rural prevalence of active trachoma is almost four-fold compared to the urban prevalence (42.5% vs. 10.7%). The national average prevalence of trachomatous trichiasis (TT) is 3.1%, with the highest prevalence found in Amhara regional state (5.2%). TT is almost three-fold greater in women compared to men (4.1% vs. 1.6%).

Based on the 2007 census which estimated the population of Ethiopia at 75 million and the population of the Amhara Regional State to be 17.2 million, there are an estimated 68.7 million people at risk of trachoma nationally. Recent estimates related to trachoma included 1.2 million blind people, 2.8 million people with low vision, 9 million children 1-9 years of age with active trachoma, and 1.3 million adults with trachomatous trichiasis.

The population of 2008 intervention areas is:

Region:	Tigray	Amhara	Oromiya	Somali	Gambella	SNNPR
Population:	4,314,456	17,214,056	27,158,471	4,439,147	306,916	15,042,531

Timeline of Events – Ethiopia Trachoma Control Program

In October 2000, The Carter Center began assisting the Amhara National Region Health Bureau in trachoma control with funding from the Lions-Carter Center SightFirst Initiative. Four districts in the South Gondar Zone (Dera, Ebinat, Estie and Simada) were selected to launch activities. The initial program area comprised 155 *kebeles* (groups of villages), with a total population of more than one million persons.

In December 2000, the Amhara Regional Health Bureau, the Prevention of Blindness Team of the Federal Ministry of Health, and The Carter Center conducted a community-based trachoma prevalence survey in the four *woredas*. Survey results were consistent with reports that Ethiopia has an extremely high prevalence of both active and blinding trachoma. A knowledge, attitudes and practices (KAP) survey including focus group discussions, informal interviews and a household survey was conducted in the same four districts one month later. The findings were used to develop a school health curriculum and health education materials such as posters, flipcharts, pamphlets, and a community worker training manual. A five-year (2001-2005) action plan for the South Gondar trachoma control program was drafted in 2000.

A national strategic plan for trachoma was prepared and completed for the period 2006-2010. In the plan, the Federal Ministry of Health has set 2015 as the target for eliminating blinding trachoma. In Ethiopia, the effort to eliminate trachoma is strengthened by the highly active participation of local Lions clubs. Their leadership has made Ethiopia's trachoma control program one of the most productive in the world.

Epidemiology of Trachoma in Ethiopia

The graph below shows results from the national blindness and low vision survey that was conducted in 2005-2006. Data on prevalence of active trachoma (AT), TF, and TI are shown among children aged 1-9 years, by regional state.

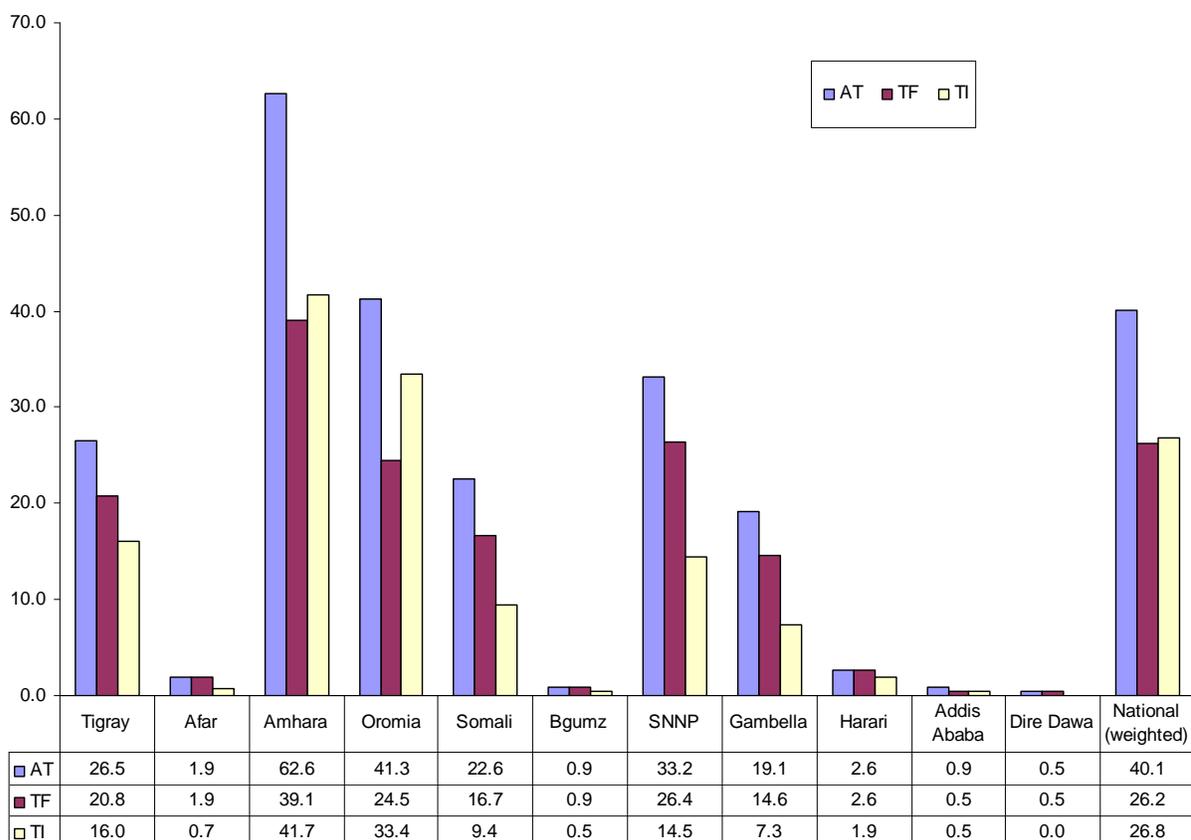


Table 1: Prevalence of Trichiasis (TT) among adults aged over 14 years by state, Ethiopia

Region	TT Prevalence (%)
Amhara	5.2
Somali	4.2
Oromia	2.8
Gambella	2.5
Tigray	2.3
SNNP	2.0
Harari	1.2
Afar	1.0
Addis Ababa	0.9
Dire Dawa	0.7
B-Gumz	0.1
National (weighted)	3.1

Table 2: Prevalence of TF and TT by zone in Amhara (data from MALTRA baseline survey, 2006-2007)

Domain	TF in children aged 1-9 years	TT in children aged 0-14 years	TT in people aged 15 and above
	Prevalence (%)	Prevalence (%)	Prevalence (%)
Amhara Region	32.7	0.3	6.2
<i>Zones</i>			
North Gondar	34.7	0	4.3
Waghemira	60.1	0.5	6.3
South Gondar	28.9	0.1	3.8
North Wollo	51.9	0.8	9.4
West Gojjam	33.1	0.4	10.0
Awil	38.9	0.1	5.4
East Gojjam	48.3	0.3	7.1
South Wollo	12.6	0.3	3.2
Oromia	28.7	0.1	2.4
North Shewa	23.2	0.3	9.0

Program Achievements in 2008

In general, the Ethiopia program set ambitious, needs-based targets for trachoma elimination in 2008 and while it fell short of its surgical objectives, still achieved remarkable record output. The historic first MALTRA week in November 2008 allowed the distribution of more than five million doses of azithromycin at one time. The 100,000th TT surgery took place in Amhara with Lions-Carter Center support; the 10 millionth dose of azithromycin was distributed in January 2008 (followed by the 20 millionth in November), and the 500,000th household latrine was constructed.

Table 3: Program Achievements in 2008

Activity	Target	Output	Carter Center Target (Amhara only)	Carter Center Output (Amhara only)
Persons operated for trichiasis	177,354	63,262	101,187	31,561
Surgeons trained	177	259	234	185
Doses of azithromycin distributed	22,750,000	15,213,333	10,938,752	12,631,132
Doses of tetracycline distributed	568,750	401,491	251,566	352,152
Villages reached through health education	3,232	3,190	2,447	2,898
Household latrines constructed	400,996	384,274	400,996	373,677

Trichiasis Surgery (S)

The Ethiopia Trachoma Control Program conducts trichiasis surgery both at static health facilities and during mobile outreach campaigns. All TT surgeons are provided with TT surgery kits and are expected to offer routine TT surgery at their health facilities. During campaigns, a team of TT surgeons travels to health facilities where routine TT surgery is unavailable and operates on all

presenting TT patients. A campaign can last from five to 10 days and helps overcome barriers of distance for those suffering with TT. In 2008, 161 trichiasis surgery campaigns were conducted, during which 24,337 surgeries were performed. An additional 7,224 surgeries were conducted during routine health service provision; 741 doses of azithromycin were distributed after surgery and 185 new TT surgeons were trained. The Ethiopian lions play a key role in the advocacy for trichiasis campaigns.

The Ethiopia program certified new surgeons using the WHO document "Final Assessment of Trichiasis Surgeons". Two separate studies have reported recurrence rates in Ethiopia of 16.6% and 9.4%. A total of 224 current TT surgeons have passed WHO certification and approximately 600 trained TT surgeons are currently active. The number of surgeons lost to attrition and the output per surgeon are both unknown. The Carter Center Ethiopia is currently investigating new ways to reach more patients in order to increase surgical uptake.

Antibiotic Distribution (A)

In Ethiopia, antibiotic distribution takes place using the existing health infrastructure, including the *woreda* (district, population upwards of 100,000) supervisor and the kebele health extension workers. The *woreda* level supervisor has overall responsibility and oversees all field supervisors. Field supervisors are health workers from health centers and they supervise three to four teams each. Antibiotic distribution is directly observed and recorded in both kebele log books and tally sheets. A distribution campaign can last for up to 10 days and is done from a convenient point within the kebele. Missing families are traced house-to-house by the trachoma volunteers.

In 2008, a total of 151 *woredas* were reached with azithromycin (113 in Amhara by the Lions-Carter Center supported program and 38 others nationally). The regional health bureaus assist in micro-planning, allocate staff to the campaigns, pay salaries during the campaign period, and provide transportation where possible. The Lions-Carter Center supported program estimates its ultimate intervention goal for antibiotic distribution to reach all 151 *woredas* in the Amhara region.

Facial Cleanliness and Health Education (F)

In Ethiopia, 3,190 kebeles received ongoing health education in 2008, of which 2,898 were in Carter Center-supported program areas. A total of 13,553 school teachers were trained in Amhara and 120 health education sessions were broadcast on radio. Trachoma messages include information on the source and cause of trachoma, the mode of transmission, trachoma treatment and prevention, a demonstration of face washing, home water management and latrine construction. The ultimate intervention goal for Amhara is to reach all 3,232 endemic kebeles with health education by 2009.

Environmental Improvement (E)

In Ethiopia, latrine construction is a priority of the federal government and is promoted in pursuit of the Millennium Development Goal 7 ("to halve the proportion of households without access to sanitation by 2015"). The national latrine promotion program is based on behavior change and empowering community members to build their own pit latrines using only local materials. Community input in latrine building includes labor and all the materials. The program promotes individual household pit latrines in all project areas, with no specific training of masons or artisans. A key component of the National Health Service Extension program is latrine promotion.

The Amhara region trachoma control program has estimated its regional ultimate intervention goal for latrine construction to be 1,217,944 (to halve the proportion of households that do not have a latrine by 2015, a total of 3,824,000 households in Amhara). To achieve total latrine coverage, a total of 2,435,888 household latrines would need to be constructed.

Current access to potable water is estimated to be about 47%. The program's ultimate intervention goal for water is to have 100% of households in endemic communities with access to potable water within one kilometer or a 40 minute round-trip walk. The Federal Ministry of Water

Resources is responsible for planning and execution of safe water provision. In 2006, Lions Clubs of Ethiopia, with CBM, ORDA, and The Carter Center built 119 small-scale water schemes in Lions-Carter Center supported trachoma-endemic areas. Approximately 10,613 households in 57 kebeles, around 38,098 people, benefited from this project.

Table 4: Lions-Carter Center SightFirst Assisted Areas Achievements from 2001 – 2008
Amhara Region, Ethiopia

	2001	2002	2003	2004	2005	2006	2007	2008
TT surgeons trained	8	11	19	67	75	27	193	185
Persons operated for trichiasis	815	4,019	6,840	23,676	22,097	7,283	28,425	31,561
Doses of azithromycin distributed	0	0	100,256	625,422	1,680,394	2,925,569	5,195,937	12,631,132
Doses of tetracycline distributed	1,042	7,964	35,106	125,208	256,048	261,733	343,963	352,152
Persons trained for trachoma control mobilization	N/A	1,080	138	6,021	8,624	3,366	11,185	36,846
Villages implementing health education strategies regularly	N/A	138	155	654	654	654	1,447	2,898
Latrines constructed	N/A	1,333	2,151	89,096	144,750	75,621	41,228	373,677

Targets for 2009

The national program has targeted to operate on 207,480 persons with TT, to train 177 TT surgeons, to distribute 18,861,860 doses of azithromycin and 627,500 doses of tetracycline, to reach 3,374 villages with health education, and to construct 439,915 household latrines. Of these, the targets below are for the Lions-Carter Center assisted areas in Amhara Region.

Surgery (S)

- Operate on 95,000 persons with trichiasis

Antibiotics (A)

- Distribute azithromycin to 13,500,000 persons
- Distribute tetracycline to 270,000 persons

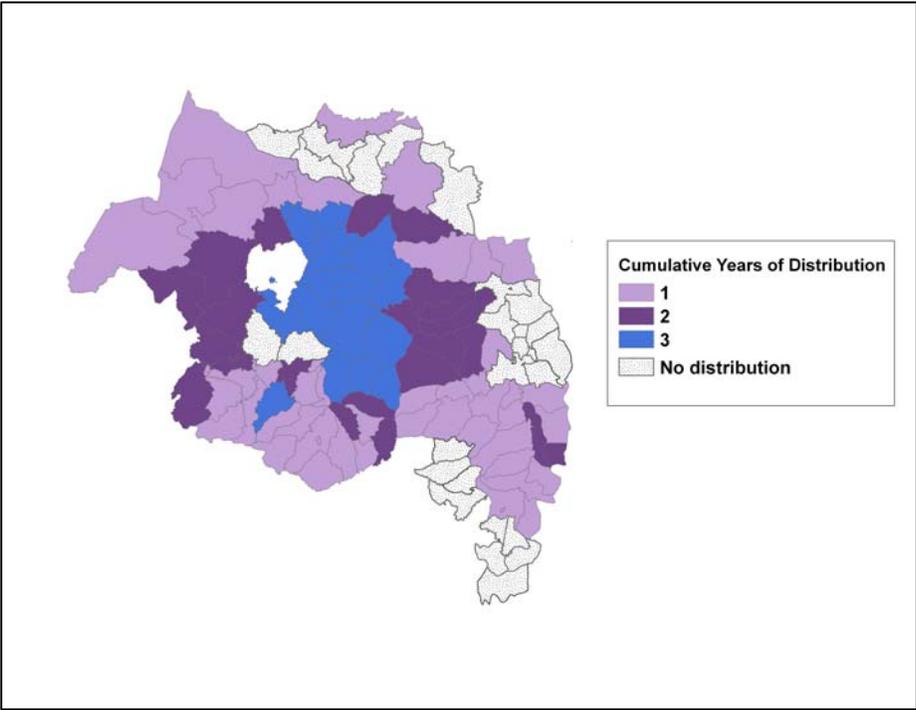
Health Education and Facial Cleanliness (F)

- Conduct health education in 3,232 trachoma-endemic villages

Environmental Improvement (E)

- Facilitate construction of 157,648 household latrines

Map1: Lions-Carter Center supported antibiotic treatment woredas, Amhara Regional State (2001-2008)



A health worker distributes azithromycin during the November 2008 MALTRA week.

Ghana Trachoma Control Program

Presented by Dr. Oscar Debrah, Head of Eye Care, Ghana Health Service

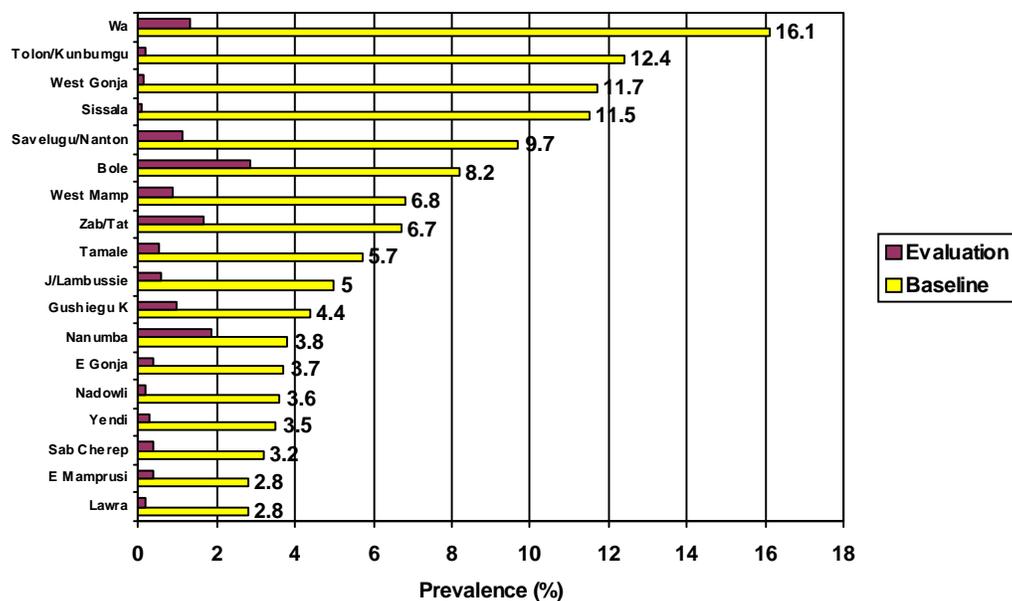
Background

Trachoma historically has been the third leading cause of blindness in Ghana, after cataract and glaucoma. Since 2001, the Ghana Health Service has implemented the SAFE strategy in the endemic Upper West and Northern regions of the country, assisted by the International Trachoma Initiative, The Carter Center, and Pfizer Inc. In late 2007 and early 2008, the impact of the program was assessed through epidemiologically rigorous surveys in each of the 18 endemic districts. The program found that active trachoma was reduced in all districts compared to the baseline surveys (see Figure 1 below). The overall prevalence of trichiasis (TT) in adults 15 years and older was 0.31%, which is below the 1.0% threshold, indicating active community surgical outreach is no longer needed. Ghana, however, has not achieved the ultimate intervention goal of less than 1 TT case in 1,000 persons. The Ghana Trachoma Control Program has set the goal of eliminating blinding trachoma by 2010. Ghana successfully has eliminated blinding trachoma in all endemic areas and is thus a leading example in the WHO Global Alliance for the Elimination of Blinding Trachoma by the year 2020.

Timeline of Events – Ghana Trachoma Control Program

- 1999: Trachoma rapid assessment in all 18 districts of Northern Region (NR) and Upper West Region (UWR)
- 1999-2000: Epidemiological survey in five districts of NR and UWR
- 2001: Implementation of full SAFE strategy began in five surveyed districts
- 2002: Baseline prevalence survey in one additional district
- 2003: Baseline prevalence survey in 13 other districts
- 2005: Five-year strategic plan for 2005-2009 launched
- 2005: District-wide antibiotic distribution started in five (now nine) additional districts
- 2007: Epidemiological survey conducted in the Upper East Region (UER)
- 2007-2008: Impact assessment survey and mid-term review of five-year plan
- 2010: Target date for elimination of blinding trachoma in Ghana

Figure 1: Prevalence of active trachoma at baseline and after intervention



Program Achievements in 2008

Trichiasis Surgery (S)

No surgical campaigns were conducted in 2008; 130 surgeries were conducted during routine health service provision (after which one oral dose of azithromycin was administered). The Ghana program does not know the recurrence rate for trichiasis after surgical intervention. The program was able to certify 28 existing surgeons using the WHO certification methodology; 16 surgeons are currently active. From the 2007-2008 prevalence surveys, the program estimates the current backlog of TT cases to be 4,950. To reach the certification requirement of a prevalence of TT lower than 0.1%, the program needs to operate on 2,019 patients. From 2000-2008, the program has reported operating on a total of 4,652 persons with trichiasis.

Antibiotic Distribution (A)

The Ghana program uses Pfizer Inc-donated Zithromax® for mass distribution. District-wide mass drug administration takes place in all districts with TF greater than or equal to 10%. In districts with TF less than 10%, only communities with TF greater than or equal to 5% are given mass treatment. From 2001-2008, the program distributed more than three million doses of drug to endemic communities in Upper West and Northern Region. After the results of the 2007-2008 impact evaluation, there is no need to continue mass antibiotic distribution in Ghana.

Health Education (F)

In Ghana, health education is conducted by community volunteers, health workers, environmental health officers, school teachers and NGO staff. The key messages are centered on the importance of facial cleanliness and the promotion of construction, maintenance and use of household latrines. The health education strategy focuses on community sessions (house-to-house, home visits, drama groups, durbars), school-based education (discussions using a manual developed for teachers and pupils, playing cards, and radio programming in local languages (Dagbani, Gonja and Dagaare). Radio programming is broadcast in the three major languages of the two regions, with more than two million people targeted. Local musicians and celebrities are becoming an active part of the campaign to improve sanitation. Trachoma has also been included in the school curricula in trachoma-endemic regions. The national program has advocated for the inclusion of trachoma-specific education in the national basic school curriculum.

Environmental Improvement (E)

The Mozambican type of latrine is promoted in Ghana. Latrine slab artisans have been trained by the Community Water and Sanitation Agency who, in turn, train apprentices. The beneficiary household is responsible for digging of the hole and building and roofing the superstructure. The average cost per latrine in 2007 was \$43.25. The program estimates the ultimate intervention goal for the endemic populations to be 150,000 household latrines to construct to meet the Millennium Development Goal 7.

Table 1: Ghana Trachoma Control Program Achievements in 2008

	Targets	Output
Persons operated on for trichiasis	1,000	130
Surgeons trained	0	0
Doses of azithromycin distributed	950,000	147,122
Doses of tetracycline distributed	36,400	0
Health education sessions	6,000	1,120 (villages reached)
Household latrines constructed	5,000	1,808
Household latrines constructed with Carter Center support	1,500	1,808

Table 2: Ghana Trachoma Control Program's Achievements 2001-2008

	2001	2002	2003	2004	2005	2006	2007	2008
Number of TT patients operated	336	421	383	951	1,146	626	504	130
Number of persons receiving azithromycin	71,438	101,174	163,931	292,715	740,884	825,217	899,065	147,122
Number of persons receiving tetracycline	6,292	6,668	9,785	15,101	12,697	20,134	25,311	0
Number of household latrines constructed	14	206	791	1,141	3,828	889	3,438	1,808

Targets for 2009

- Initiate plans to develop and implement a surveillance plan

Surgery (S)

- Detect and operate 2,000 persons with trichiasis

Antibiotics (A)

- Given the current low level of active trachoma, distribution of antibiotics is no longer necessary according to WHO guidelines.

Facial Cleanliness/Health Education (F)

- Reach all communities in the two formerly endemic regions with health education

Environmental Improvement (E)

- Construct 5,000 household latrines

Mali Trachoma Control Program

Presented by Dr. Sanoussi Bamani, Coordinator, National Blindness Prevention Program, Mali

Background

The first national trachoma prevalence survey, conducted in 1996-1997, found that trachoma is endemic in every region of Mali. At that time, the overall prevalence of active trachoma (TF and/or TI) in children under 10 years of age was 35% and the prevalence of trichiasis among women over 15 years of age was 2.5%. With these results, a national Prevention of Blindness Program was established in 1994. In October 1999, the Mali Trachoma Control Program was launched in Koulikoro in an official ceremony with former U.S. President Jimmy Carter, then former head of state General Amadou Toumani Touré (currently President of Mali) and then Lions Clubs International President, Jim Ervin.

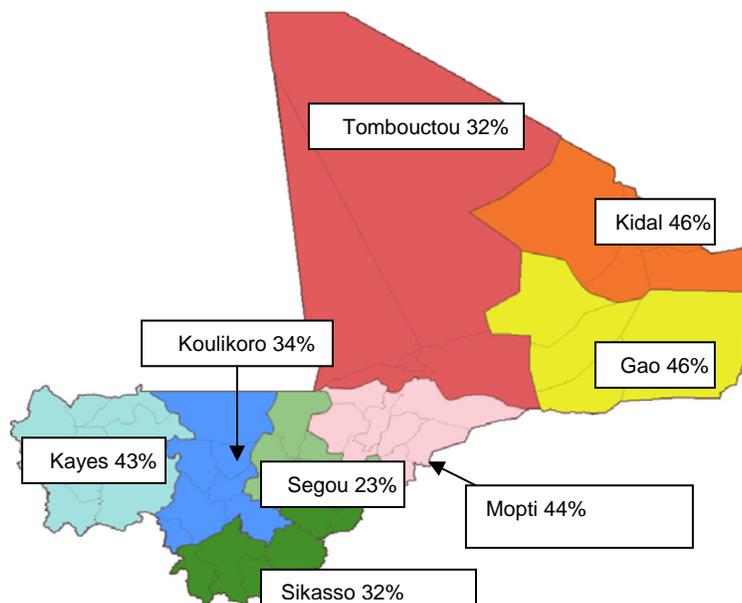
Trachoma knowledge, attitudes, and practice surveys conducted in Koulikoro Region in 1996 and 2000 provided baseline sociological data for the development of health education strategies and materials. A national survey found that in 2001, 23% of households did not have a latrine in Mali (30% in rural areas). In 2003, the Mali National Division of Hygiene and the Trachoma Control Program began household latrine promotion in Kayes and Ségou regions with assistance from the International Trachoma Initiative (ITI) and The Carter Center. A national five-year plan finalized in 2005 still is awaiting official government approval. The Carter Center historically assisted the national program by supporting F&E interventions in Segou and Mopti regions. In late 2008, Carter Center support was expanded to include support of the full SAFE strategy in the Ségou, Mopti, and Sikasso regions, complementing the activities of other partners.

Program highlights in 2008 included trachoma prevalence surveys in Gao and Sikasso regions, the training of 35 new trichiasis surgeons, the continuation of the Neglected Tropical Disease Program with the support of Helen Keller International, a planning workshop for trachoma elimination activities in November, and renewed support from the Conrad N. Hilton Foundation.

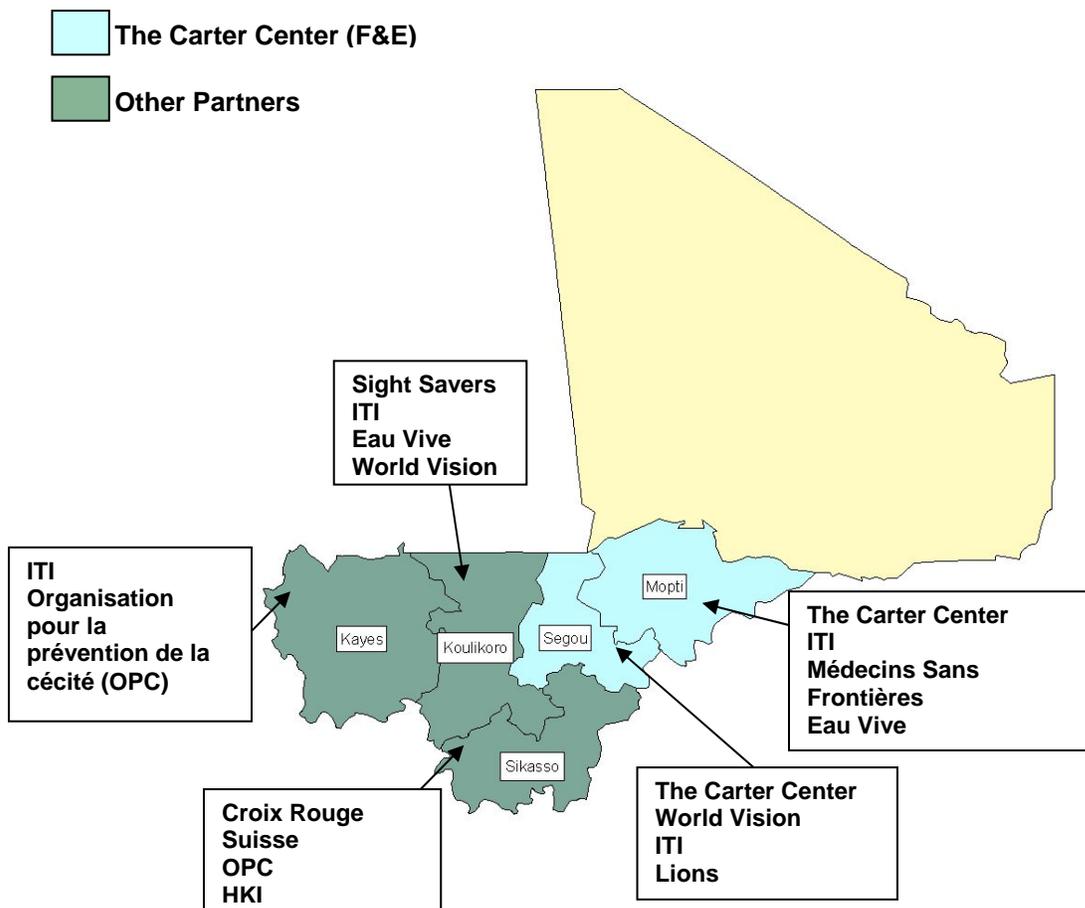
Timeline of Events

1994:	National Blindness Prevention Program launched
1996-1997:	National baseline prevalence survey
1999:	Mali Trachoma Control Program launched
2006:	Launching of the Neglected Tropical Disease Program
2015:	Target date for elimination of blinding trachoma

Map 1: Prevalence of TF by region, national baseline survey, 1996-1997



Map 2: Partners supporting trachoma control in Mali in 2008



Program Achievements in 2008

Table 1: Mali Trachoma Control Program Achievements in 2008

	Targets	Total Output	Output with Carter Center support
Persons operated on for TT	12,000	4,180	1,491
Surgeons trained	0	35	25
Doses of azithromycin distributed	9,520,739	5,445,392	0
Doses of tetracycline distributed	0	98,232	0
Villages reached with health education	4,000	8,487	206 (6,554 via radio)
Household latrines constructed	14,000	13,410	12,271

Surgery (S)

Trichiasis surgery is conducted in fixed locations throughout Mali, as well as during routine rural outreach and rural trichiasis surgery campaigns. In 2008, 12 trichiasis surgery camps were conducted, during which 1,381 surgeries were performed. The national program was not able to distribute azithromycin after surgery, but did provide tetracycline as recommended. Currently, none of the 150 operating TT surgeons have been certified using the WHO certification manual. The program estimates the average number of patients operated on per surgeon to be 35. With current prevalence data, the estimated backlog of persons living with TT in Mali is 91,588.

Antibiotic Distribution (A)

Since 2001, the Malian program has distributed Pfizer Inc-donated azithromycin in mass distribution campaigns in selected districts. Distribution takes place both door-to-door and in public gathering places and is community-directed. Antibiotic coverage surveys have not yet taken place in Mali. Through the end of 2008, Kayes and Koulikoro regions had each benefited from three years of azithromycin distribution; Segou, Mopti and Sikasso had each received two years, and Tombouctou received one year of azithromycin. Distribution of 5,543,924 doses took place in Segou, Mopti, Sikasso, and Tombouctou regions (in 29 districts) in 2008.

Facial Cleanliness and Health Education (F)

In Mali, health education activities are carried out through multiple channels: by rural radio broadcasts, primary school teachers, environmental health agents, village educators, NGO supervisors and field officers, and during village gatherings such as naming ceremonies and weddings. The program estimates that it reached 8,487 villages with ongoing health education in 2008 (approximately 6.1 million persons). Trachoma education also has been included in primary school curricula in Mali. In order to reach large numbers of persons at risk for trachoma, the program conducts radio and television campaigns to broadcast information about trachoma and its prevention. They estimate reaching 6.1 million people with rural radio broadcasts on 24 stations. In 2008, the program supported the training of 43 women's groups in trachoma health education. To reach all of the six known endemic regions, the program would have to reach approximately 10,491 villages.

Environmental Improvement (E)

The national program promotes construction of household latrines with Sanplat slabs. Masons are trained in Sanplat slab construction over two days and receive approximately \$1 from the household for their work. The cost of the latrine is estimated at \$51 including: cement and iron bar at \$10 and an estimated \$41 of contribution from the household for labor, sand and superstructure costs. The program now estimates its ultimate intervention goal to achieve the Millennium Development Goal 7 to be 158,653 latrines.

Water provision is supported by partners such as: World Vision, Water Aid, UNICEF, and WAWI. A total of 1,354 modern water points were built or rehabilitated in 2008.

Targets for 2009

Survey 27 districts for trachoma prevalence

- Eight in Segou region; eight in Mopti region (October-December 2009)
- Three districts in Kayes region (March 2009)
- Four districts in Kidal region (March 2009)
- Four districts in Koulikoro (May 2009)

Surgery (S)

- Operate on 17,100 persons with trichiasis (4,200 of which with Carter Center support)

Antibiotics (A)

- Distribute 7,245,423 doses of azithromycin
- Distribute 147,866 doses of tetracycline (all with Carter Center support)

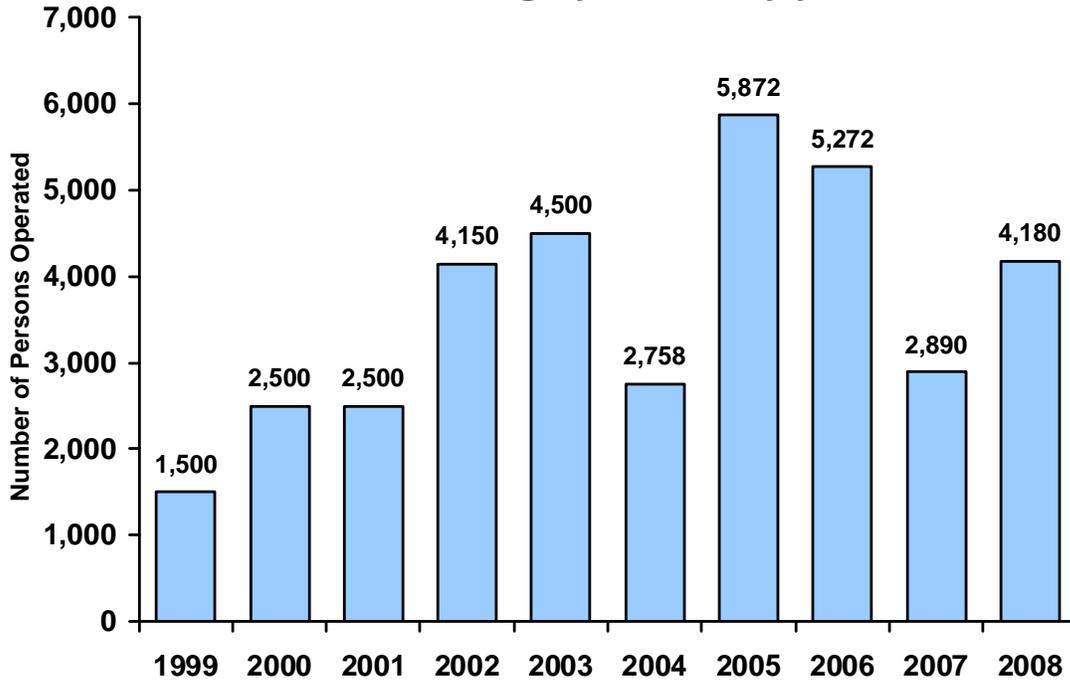
Facial Cleanliness and Health Education (F)

- Reach 9,000 villages with health education (1,834 of which with Carter Center support)

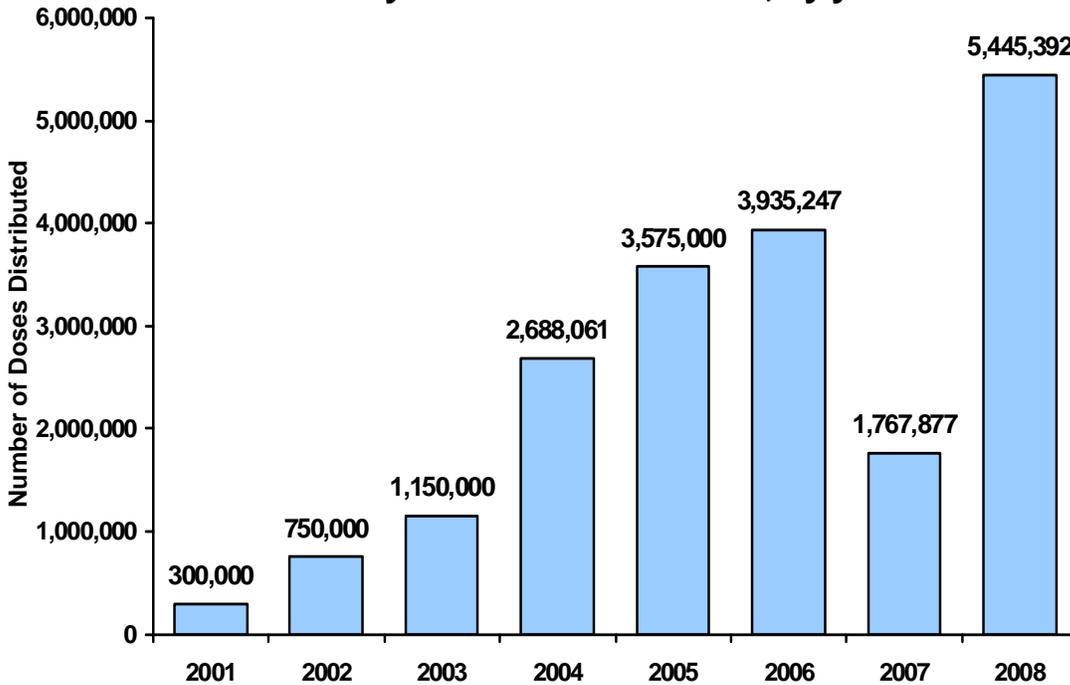
Environmental Improvement (E)

- Build 16,000 household latrines (15,000 of which with Carter Center support)

Trichiasis Surgery in Mali, by year



Azithromycin Distribution in Mali, by year



Niger Trachoma Control Program

*Presented by Dr. Kadri Boubacar, Deputy Director, National Prevention of Blindness Program,
Ministry of Health of Niger*

Background

Niger's National Prevention of Blindness Program (PNLCC) was established in 1987. The Ministries of Health, Education, and Water & Social Development formed a National Trachoma Task Force in 1999. Representatives of partner health organizations including The Carter Center, local Lions Clubs, Helen Keller International, CBM, the Niger Association for the Blind, the African Muslim Agency, and the World Health Organization are also Task Force members.

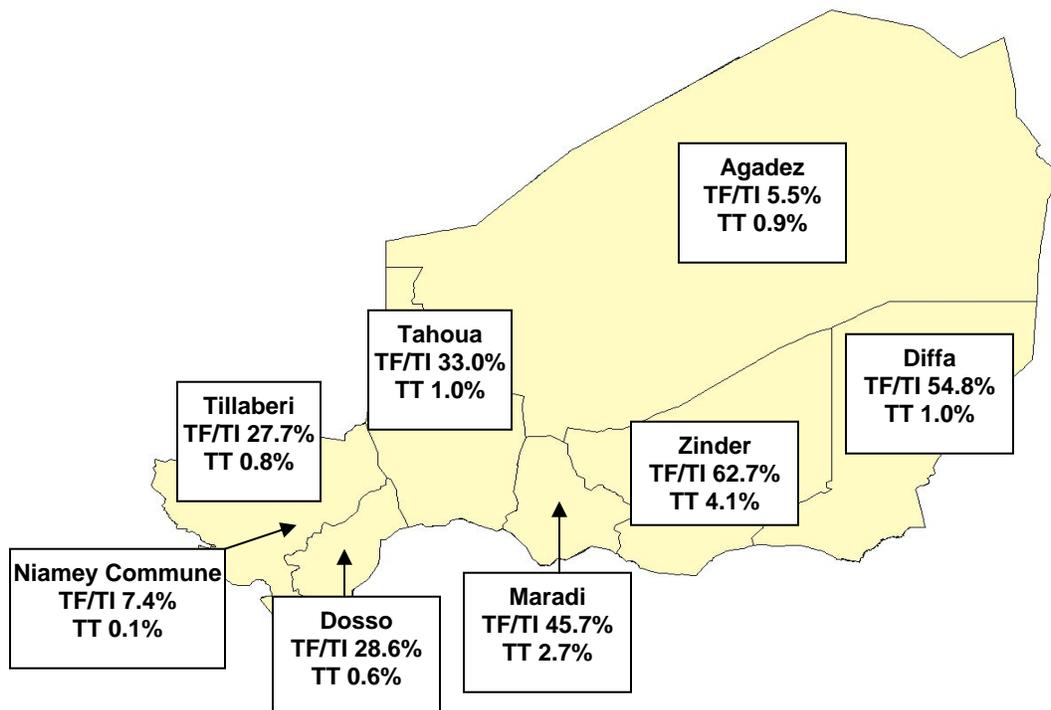
The most recent national trachoma prevalence survey was conducted in 1997-1999, with financial assistance from the European Union and The Carter Center. It found that an average of 44% of children under 10 years old had active trachoma (TF/TI), and 1.7% of women over 15 years old had trichiasis. Nationwide, an estimated 68,300 men and women needed trichiasis surgery at that time. The highest prevalence of trachoma was identified in the regions of Zinder, Diffa and Maradi. That baseline assessment showed that approximately 50% of households had access to clean water within one kilometer, and approximately 4% of households had access to a latrine. The national baseline (2001) prevalence of clean faces in children aged 1-10 years was 52%.

In late 2008, Carter Center support was expanded to include the full SAFE strategy in select areas of Niger. The Carter Center and other partners have worked with the national program to deliver SAFE throughout the country.

Timeline of Events – Niger Trachoma Control Program

- 1997-2001: Baseline trachoma prevalence surveys conducted
- 2002: Program launched five-year strategic plan
- 2005: Impact surveys in two districts of Zinder Region
- 2006: Impact surveys in four districts of Zinder region
- 2007: Launch of the Neglected Tropical Disease Program
- 2008: Carter Center and Helen Keller expand to include support for the full SAFE strategy
- 2015: Target date for elimination of blinding trachoma

Map 1: Prevalence of TF/TI and TT by Region, Baseline Prevalence survey, 1997-1999



Program Achievements in 2008

	Target	Output
Persons operated on for trichiasis	12,530	2,500
Surgeons trained	0	0
Doses of azithromycin distributed	8,008,098	5,750,612
Doses of tetracycline distributed	146,843	146,843
Women trained in local soap production	372	1,290
Communities receiving health education	4,500	4,500
Household latrines constructed	11,400	11,636
Household latrines constructed with Carter Center support	5,000	6,594
Masons trained in Sanplat slab construction	266	765
School latrines constructed	60	69

Surgery (S)

In 2008, both health center-based surgery and outreach strategies were used, with a total of five camps conducted. Challenges to the delivery of surgical activities included the demands of cost-recovery for health clinic activities; competing, non-trachoma related activities; as well as the irregular supervision of the trichiasis surgeons. The program was able to distribute azithromycin after surgery to 900 persons. No currently active TT surgeons have been certified using the WHO certification methodology. The program now estimates a backlog of 106,289 persons with trichiasis.

Antibiotics (A)

Distribution of azithromycin in Niger is community-based and is carried out door-to-door in the villages by community distributors. Mass distribution in 2008 took place in 23 districts of five regions—Diffa, Maradi, Tillaberi, Tahoua, and Dosso—and was supported by the Neglected Tropical Disease initiative. Preferring to reach districts with rates of TF believed to be greater than 10%, the national program has made the decision not to re-treat districts that have already received three annual rounds of antibiotic and have a resulting rate of TF between five and 10%.

Facial Cleanliness and Health Education (F)

A total of 557 villages in three target regions (Zinder, Maradi and Diffa) received regular health education sessions for trachoma prevention in 2008 with Carter Center support. The program uses mass media to broadcast messages on all four components of the SAFE strategy for trachoma control. They distributed cassettes, fabric, t-shirts, and posters to educate on facial cleanliness and used sketches, songs and theater works.

To broaden the reach of the program's educational campaign throughout Niger, health education messages are produced and broadcast in local languages on local radio stations. Radio listening groups gathered to hear some of the 2,516 broadcasts during the year. To reach persons without access to radio, artists and health educators performed theatrical dramas in large villages and weekly markets. The program is unable to estimate the number of persons reached with health education via radio.

Environmental Improvement (E)

Latrine promotion began in 2002 with the aim of reducing the population of *Musca sorbens* flies in trachoma-endemic villages and to improve general hygiene. The national program promotes Sanplat latrines. In 2008, partners assisted the program to build 11,636 household latrines at an average cost of \$48 to \$61. The Carter Center supported the construction of 6,594 latrines in 2008 in Diffa, Zinder and Maradi regions. The increased cost of cement and iron bars in Diffa

region contribute to the higher cost per latrine there. To reach the seventh Millennium Development Goal of halving the proportion of households without access to sanitation by 2015, the program will need to build 863,572 latrines. In order to achieve this goal, 208 masons were trained in latrine construction.

In regards to water provision, the program seeks to construct new water points and rehabilitate nonfunctioning ones. WAWI, UNICEF and the Ministry of Hydraulics all support water provision in trachoma-endemic zones.

Targets for 2009

Complete 21 district-level impact prevalence surveys

- N'guigmi and Maine-Soroa (Diffa region, March)
- Dosso region (all five districts in April)
- Tillaberi region (all six districts in May)
- Tahoua region (all eight districts in October)

Surgery (S)

- Operate on 15,659 persons with trichiasis (3,000 with Carter Center support)

Antibiotics (A)

- Distribute 8,206,388 doses of azithromycin (848,680 of which were in Zinder region with Carter Center support)
- Distribute 164,128 doses of tetracycline (17,320 of which with Carter Center support)

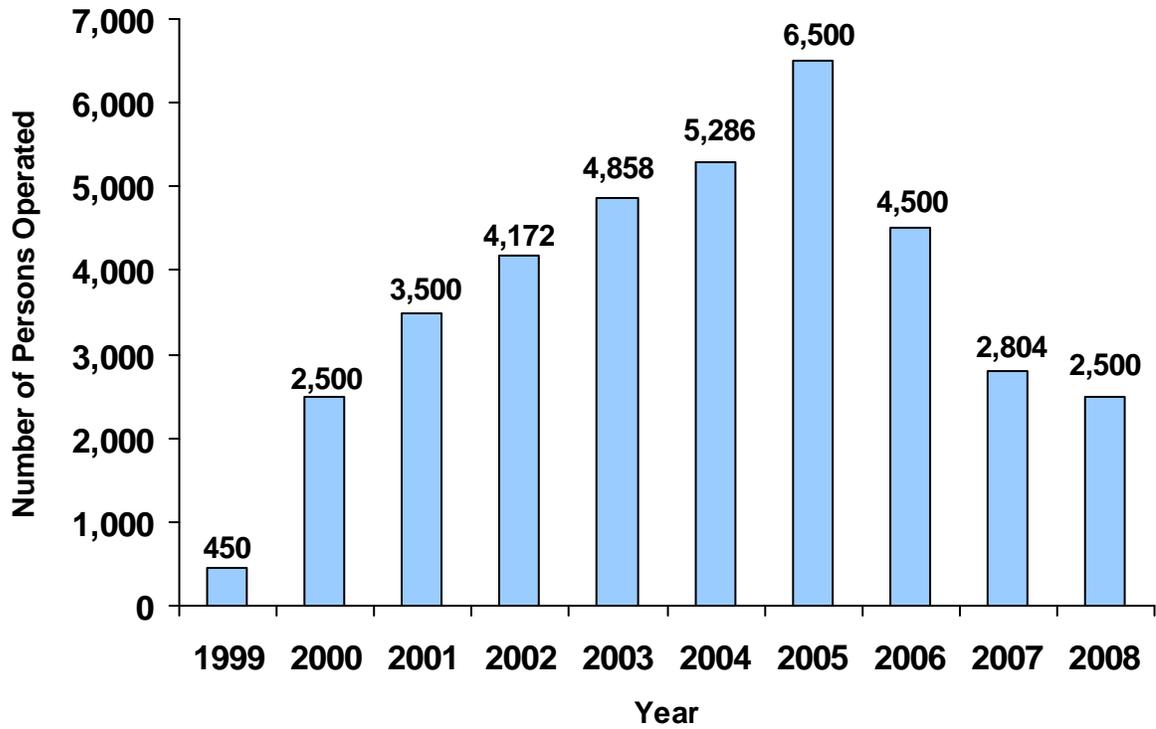
Facial Cleanliness and Health Education (F)

- Reach 561 villages with health education

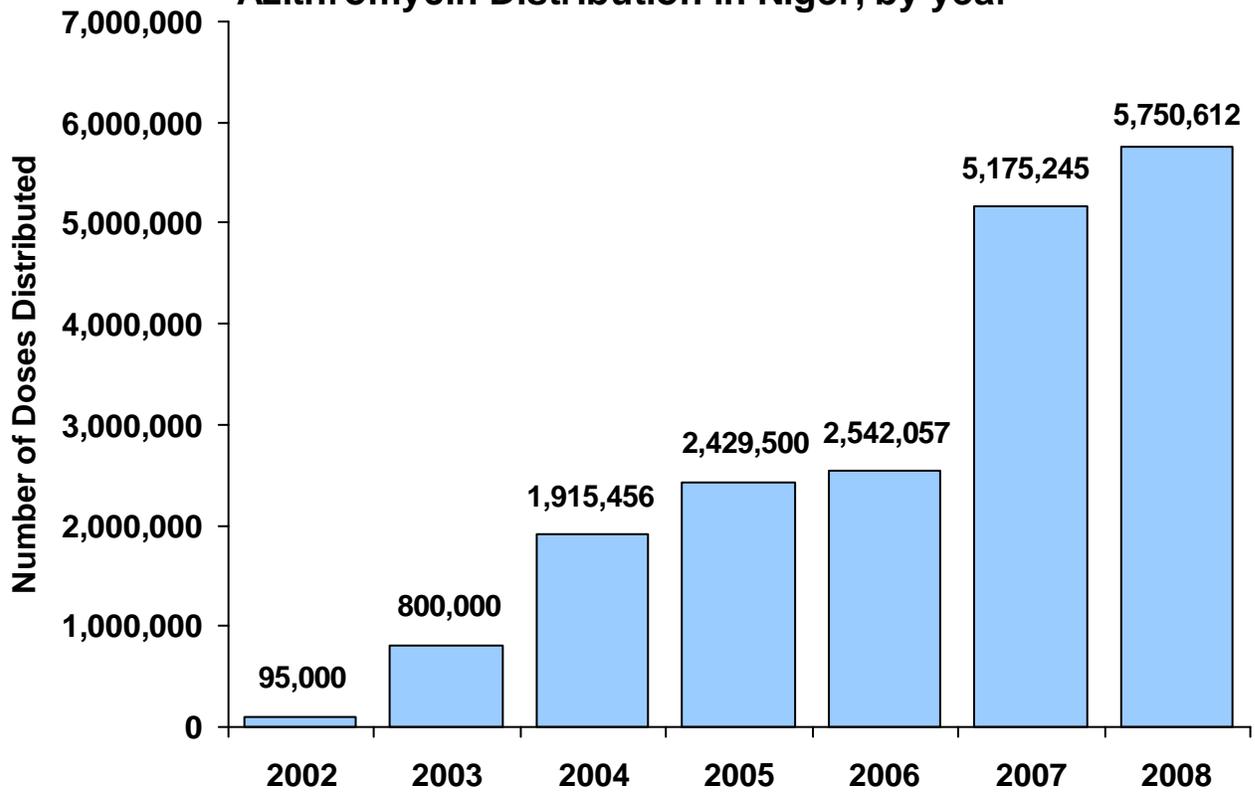
Environmental Improvement (E)

- Build 15,000 household latrines (8,000 of which with Carter Center support)

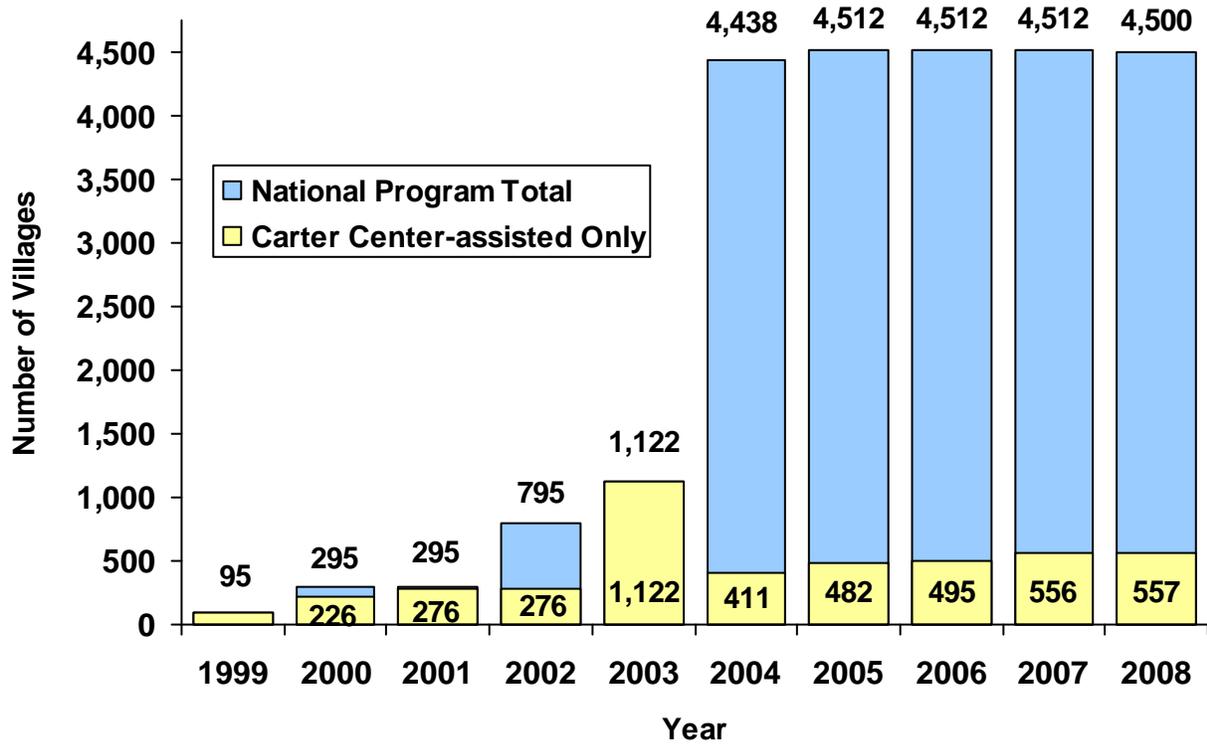
Individuals Receiving Trichiasis Surgery, Niger



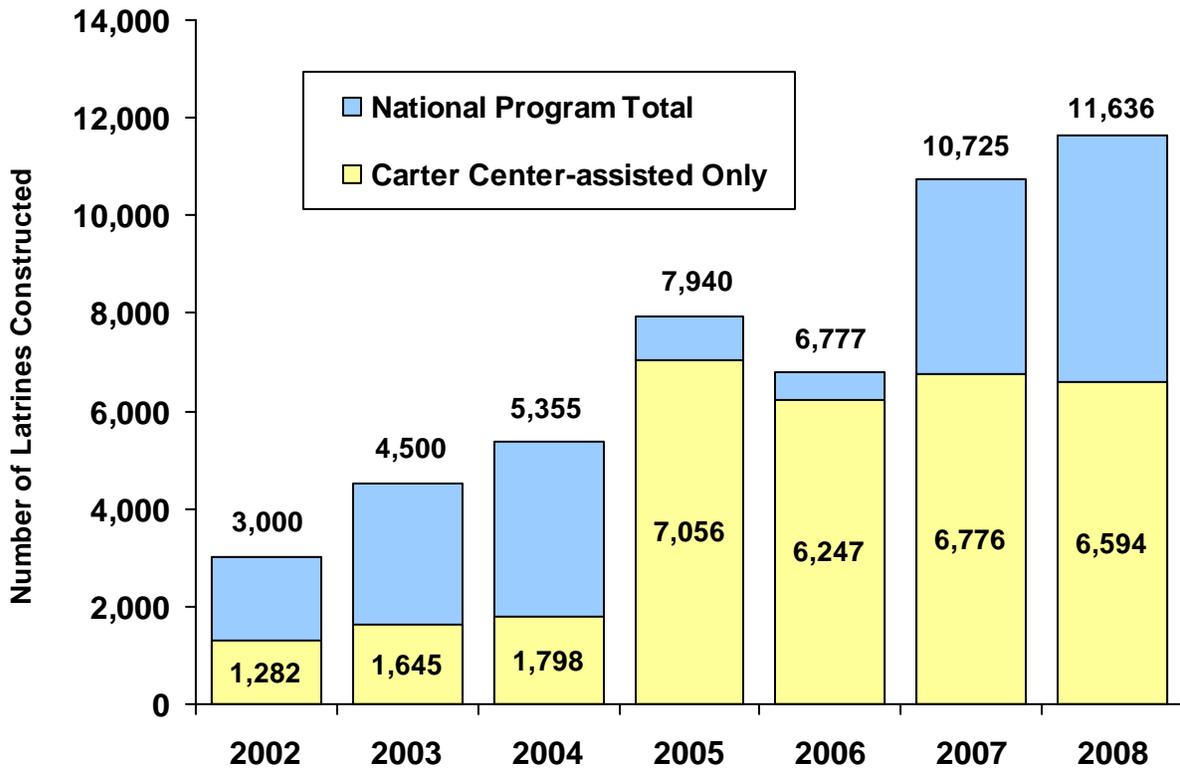
Azithromycin Distribution in Niger, by year



Villages Receiving Health Education, Niger



Household Latrines Constructed in Niger, by year



Nigeria Trachoma Control Program

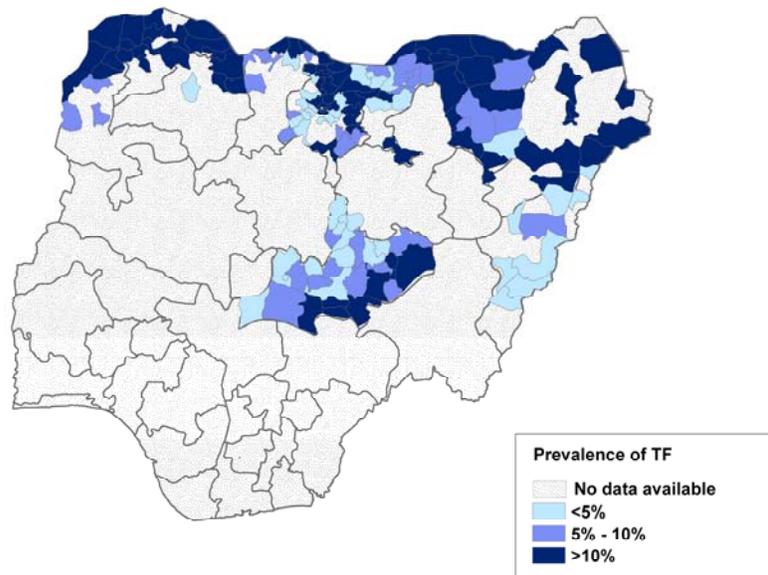
*Presented by Dr. Uwaezuoke Onyebuchi, National Coordinator,
National Program for the Prevention of Blindness*

Background

Trachoma control in Nigeria is done under the auspices of the National Program for the Prevention of Blindness (NPPB); the NPPB national coordinator directs trachoma control activities through the coalition of the Ministry of Health, nongovernmental organizations (NGOs), and United Nations agencies.

The population of Nigeria is estimated at 140 million, according to the 2006 census. The population of 2008 trachoma program intervention areas is 28 million (in the 11 known endemic states). There is incomplete trachoma mapping in Nigeria, though past review of existing data and anecdotal reports suggested that trachoma is a significant cause of blindness in the northern states. Since October 2000, blindness prevention partners have conducted trachoma prevalence surveys in four states and trachoma rapid assessments in five others. A national survey for blindness and low vision supported by Sight Savers International began in February 2005; results are not yet available, though they will only provide information on rates of trichiasis, not active trachoma. In general, Nigeria's 19 northern states are assumed to be endemic with trachoma, with 10 of these believed to be highly endemic (see map below).

Map 1: Prevalence of TF in children ages 1-9 years



Timeline of Events – Nigeria Trachoma Control Program

The National Trachoma Control Program commenced in 2001, including the formation of the National Trachoma Task Force. Partners joined at various times, including Helen Keller International and The Carter Center in 2001, and Sight Savers International and Christoffel Blindenmission (CBM) in 2003. The National Program was approved for the azithromycin donation from Pfizer Inc in 2007 and hopes to receive drug in 2009. The federal government has established 2015 as its target date for elimination of blinding trachoma.

Program Achievements in 2008

Trichiasis Surgery (S)

In Nigeria, trichiasis surgery takes place in health facilities and during village-based outreach camps. In 2008, 85 surgeries were conducted during campaigns and 9,587 during routine health service provision. The program reports a recurrence rate between one and five percent. Eighteen current surgeons have passed WHO certification and eighteen surgeons are currently active. The program reports having lost no surgeon to attrition. The program has not begun distributing a single oral dose of azithromycin post-surgery yet due to the absence of the azithromycin donation in Nigeria.

Surgical output is estimated at 339 operations per surgeon, with a minimum of 252 and maximum of 427 per year. With incomplete mapping, it is difficult to estimate the backlog of trichiasis in Nigeria. Current estimates from existing survey data indicate a backlog of as high as 1,291,000 people with trichiasis requiring surgery.

Antibiotic Distribution (A)

The Nigeria Trachoma Control Program does not receive Pfizer Inc-donated azithromycin yet, though the donation was approved in late 2007. Sight Savers International purchased azithromycin for distribution from 2004-2006, and reached two communities of Sabon Birni local government area (LGA) of Sokoto State. A total of 10,782 doses of tetracycline eye ointment were distributed in 2008. The national program has planned a "pilot phase" for mass azithromycin distribution to take place in Borno state (three LGAs), Kebbi state (three LGAs), Sokoto State (three LGAs), Zamfara state (three LGAs), Katsina state (three LGAs), Plateau state (three LGAs), Nasarawa state (two LGAs) and Yobe state (three LGAs), reaching a target population of 3,493,405 persons in 23 LGAs.

Facial Cleanliness and Health Education (F)

In Carter Center-assisted areas of Plateau and Nasarawa states, health education sessions are conducted in the community using posters and flipcharts that are distributed for use by trained community health workers. T-shirts and baseball caps with health education messages are produced and distributed to help promote trachoma prevention. No new schoolteachers, religious leaders or radio producers were trained in 2008. A meeting was held in December 2008 to review existing IEC materials. In 2008, 6,425 villages benefited from ongoing health education activities nationally, 326 of which with Carter Center support. The national program reports approximately 50% of the population in endemic areas is reached through health education and approximately 50% of the total population is reached by rural radio. The ultimate intervention goal for the program is to reach the 13,240 known endemic villages in the 11 endemic states. Health education has been integrated with mass drug administration activities in Plateau and Nasarawa states.

Environmental Improvement (E)

A latrine promotion project was launched with Carter Center support in Plateau and Nasarawa states in 2003. The Carter Center-assisted program promotes household Sanplat latrines through the training of masons and the provision of construction materials. Two masons are typically trained per village. Materials provided include cement, blocks, spades, diggers, rakes and head pans, while the communities provide the labor and support the masons. There is no standard type of superstructure prescribed for the community, although they are encouraged to build a roof. The estimated total cost per household latrine is the equivalent of \$66, 60% of which is contributed by the household. Without accurate survey data, calculation of a national ultimate intervention goal for household latrines is not possible.

In late 2008, the Carter Center supported program tested a new latrine model that uses 95% local materials. The cost of this latrine is estimated at \$2.80 for the purchase of ¼ bag of cement. This latrine slab has neither been tested nor observed by headquarters staff and has not been promoted widely. It has not yet been proven whether the slab is a sustainable technology and the

ideal strategy for its promotion. The national program estimates its ultimate intervention goal for latrine promotion to be 962,638 household latrines.

The National Blindness Prevention Program encourages state prevention of blindness committees to advocate to state and local governments to construct wells and provide potable water for trachoma-endemic communities. Partners supporting water provision in trachoma-endemic areas include: RUWATSAN, Water Aid, UNICEF, state and local governments, and the Tulsi Chanrai Foundation. Thirty villages in Kebbi and Borno States benefited from new water points in 2008 with support from the state governments.

Additional Activities

Special advocacy events in 2008 included World Glaucoma Day and World Sight Day which featured distribution of IEC materials, cataract surgery camps, and media talks. A trachoma prevalence survey was completed in Kano state with CBM in 2008. There was an evaluation of the trachoma control programs in Kebbi and Zamfara states and dissemination workshops for the national blindness and low vision survey. The program also initiated a compulsory monthly environmental sanitation/village clean up day.

Table 1: Program Activities in 2008

	National Targets	National Output	Carter Center Targets	Carter Center Output
Persons Operated	9,950	9,672	N/A	N/A
Surgeons Trained	0	0	N/A	N/A
Doses of Azithromycin Distributed	1,435,800	0	N/A	N/A
Doses of Tetracycline Distributed	14,000	10,782	N/A	1,500
Villages reached with Health Education	6,460	6,425	326	326
Household/ Community Latrine Construction	7,500	6,121	7,500	6,121

Targets for 2009

- District-level prevalence surveys are planned for Taraba state in April 2009 with support from MITOSATH

Surgery (S)

- Operate on 8,000 persons nationally
- Train 15 surgeons

Antibiotics (A)

- Distribute 1.44 million doses of azithromycin (672,885 with Carter Center support)
- Distribute 40,000 doses of tetracycline (13,732 with Carter Center support)

Health Education and Facial Cleanliness (F)

- Continue on-going health education activities in 13,240 villages (853 with Carter Center support)

Environmental Improvement (E)

- Construct 10,500 household latrines (7,500 with Carter Center support)
- Continue on-going village clean-up activities in intervention villages

Sudan Trachoma Control Program: Government of Sudan

*Presented by Dr. Awad Hassan, National Coordinator, Trachoma Control Program
Federal Ministry of Health, Government of Sudan*

Background

Sudan is the largest country in Africa, with an area of about 2.5 million km². Sudan was affected by civil war for 38 of the 51 years since its independence in 1956. On January 9th, 2005, a peace agreement ended the 21-year civil war with the Sudan Peoples' Liberation Army in the south which had been the longest lasting war in Africa. Under the terms of the Comprehensive Peace Agreement, Sudan is one country under two systems: the Government of Sudan (GOS) governs the 15 northern states; the Government of South Sudan (GOSS) governs the 10 southern states. Both GOS and GOSS are part of the Government of National Unity. GOS areas have a population of about 26 million, including four million internally displaced persons (IDP).

Pfizer Inc began to donate azithromycin (Zithromax®) to Sudan through the International Trachoma Initiative in August 2000. In March 2005, the Federal Minister of Health signed a resolution stating that the Trachoma Control Program had officially joined the National Program for Prevention of Blindness (NPPB), and was under the responsibility of its coordinator, Dr. Kamal Hashim. Carter Center-supported activities in GOS areas continue to be coordinated and monitored from Khartoum. In 2005, the program started the process of decentralizing implementation of program activities to the state ministries of health and localities. Sudan's first Lions Club was inaugurated in Khartoum in June 2005 with the help of the Carter Center Khartoum, benefiting from previous work by the Lions-Carter Center SightFirst Initiative in Sudan. The Khartoum Lions Club has the intention of strengthening collaboration with the GOS Trachoma Control Program.

Timeline of Events – Government of Sudan

- 2000: Azithromycin donation began
- 2005: National Program re-launched
- April 2005: Baseline prevalence surveys started
- December 2005: Five-Year Strategic Plan established
- 2006: Community Participation Protocol
- 2006: TT surgery manual locally adopted for training in Arabic; primary eye care manual modified to include WHO grading for trachoma; survey protocol developed
- 2015: Target for elimination of blinding trachoma

Epidemiology of Trachoma in Sudan

Trachoma has long been known to be a public health problem in Sudan, but little data were available until May 1999. At that time, the Sudanese Federal Ministry of Health (FMOH) completed the first population-based trachoma prevalence surveys with Carter Center assistance. One survey was done in Wadi Halfa, in the north, and the other in Malakal, in the south. Trachoma was previously believed to be a significant problem only in the north, but the surveys confirmed that trachoma is a cause of severe disability and significant blindness in southern as well as northern Sudan. In 2006, surveys were conducted in Jabal Awlia internally displaced persons (IDP) camp in Khartoum State, Dongola locality of Northern State, Haj Yusif IDP camp, and Kassala locality of Kassala State. The program is currently mapping trachoma prevalence. Recent results show lower levels of endemnicity than were reported earlier.

Program Achievements in 2008

Trichiasis Surgery (S)

In GOS program areas, routine trichiasis surgery is performed by ophthalmologists and trained ophthalmic medical assistants at central and state hospitals. During eye camps in rural areas, ophthalmologists conduct trichiasis surgery in addition to routine cataract surgeries. Payment is levied on a sliding scale for TT surgery in the hospitals but is provided free in eye camps.

In 2008, 10 surgical campaigns were conducted, during which 403 persons underwent operations. In addition, 977 surgeries were conducted during routine health service provision. The program has begun providing a single oral dose of azithromycin post-surgery and distributed 81 doses in that fashion in 2008.

Ten of the 61 current surgeons have passed the WHO certification for trichiasis surgeons. The surgical output per operator and the recurrence of trichiasis are unknown. The estimated minimum existing backlog is 28,700 persons, although not all states have been surveyed and the backlog will change as new information becomes available.

Antibiotic Distribution (A)

Antibiotic distribution in GOS areas is decentralized and implemented by the state ministries of health, assisted by the national program. Local supervisors and village-based health workers organize and conduct drug distribution house-to-house, which is preceded by community mobilization and health education. Endemic communities establish distribution dates, select the volunteers and supervisors, and are involved in raising awareness of the campaign. A national policy has established that cash incentives will not be paid to drug distributors. Data collection is done in two registries, one for the whole village or block, and a second for the household. The program conducts spot checking of drug registers immediately after distribution during which 30 households are randomly identified and pertinent family cards are paired. Through the end of 2008, 11 villages in Dongola locality (Northern State) had received three years of mass drug administration (MDA), the rest of Dongola locality had received two years, and Baw locality in Blue Nile state had received one year of antibiotic distribution.

The national program has adopted a strategy for districts that are surveyed and found to have a prevalence of TF between five and 10% in children aged 1-9 years. In these cases, the program will: implement all components of SAFE; register and organize TT surgery; conduct intensive education in the importance of face-washing; advocate for the accessibility of water and construction of latrines; and conduct education on the importance of a clean environment and sanitation.

Facial Cleanliness and Health Education (F)

In 2008, 239 villages benefitted from ongoing health education in Baw and Dongola localities with Carter Center support, reaching approximately 380,930 people. There is daily dissemination of health messages in local language through loudspeakers, during lectures in mosques, and through community radio. During mass antibiotic distribution (MDA), a total of 200 short radio messages were broadcast, 2,500 posters were distributed, 660 JAMAL t-shirts were given out, and 660 volunteers were educated about trachoma. In Damazine and Rosaries localities (Blue Nile state), awareness activities included: 56 primary schools were covered with posters; individuals were interviewed; picture and slide shows were projected; and awareness-raising songs were sung. In addition, the trachoma training manual was revised, the Rabbit Hasson Booklet was updated and printed for distribution to primary school students, and new flipcharts, posters and stickers were designed and printed.

Environmental Improvement (E)

The GOS Trachoma Control Program does not yet promote household latrines in its intervention areas. It is estimated that 382,677 households in current intervention areas do not have household latrines. The program has been represented in the UNICEF Water and Environmental Sanitation task force since 2005. Trachoma-endemic communities themselves play a strong role in water provision. UNICEF/WES is represented on the Trachoma National

Program Taskforce since 2005. Partners supporting water provision include: state ministries of engineering, WES, and the endemic communities themselves. In 2008, one water pump was installed in every village in Baw locality. Special advocacy for environmental improvement included a decree by the Baw Commissioner that every household should have its own latrine and that the locality would support latrine construction and maintain the water collection point (Hafeer).

A national program review meeting was held in Khartoum in July 2008 with the objectives of reviewing the progress of the program, identifying priorities, and making recommendations for future implementation.

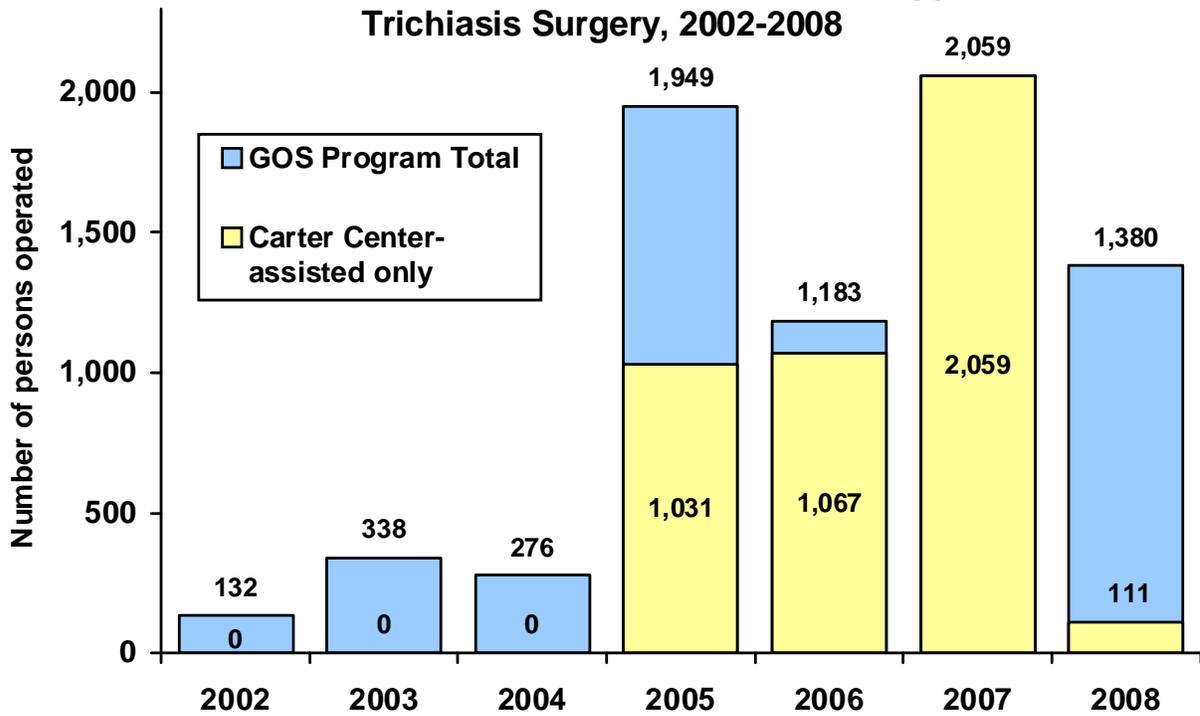
Table 1: Program Achievements in 2008

	Targets	Outcome
Persons operated on for Trichiasis	3,000	1,380 (111 with Carter Center support)
Trichiasis Surgeons Trained	8	10
Doses of Azithromycin Distributed	292,164	248,559
Doses of Tetracycline Distributed	5,743	4,072
Villages reached with Health Education	120	239

Targets for 2009

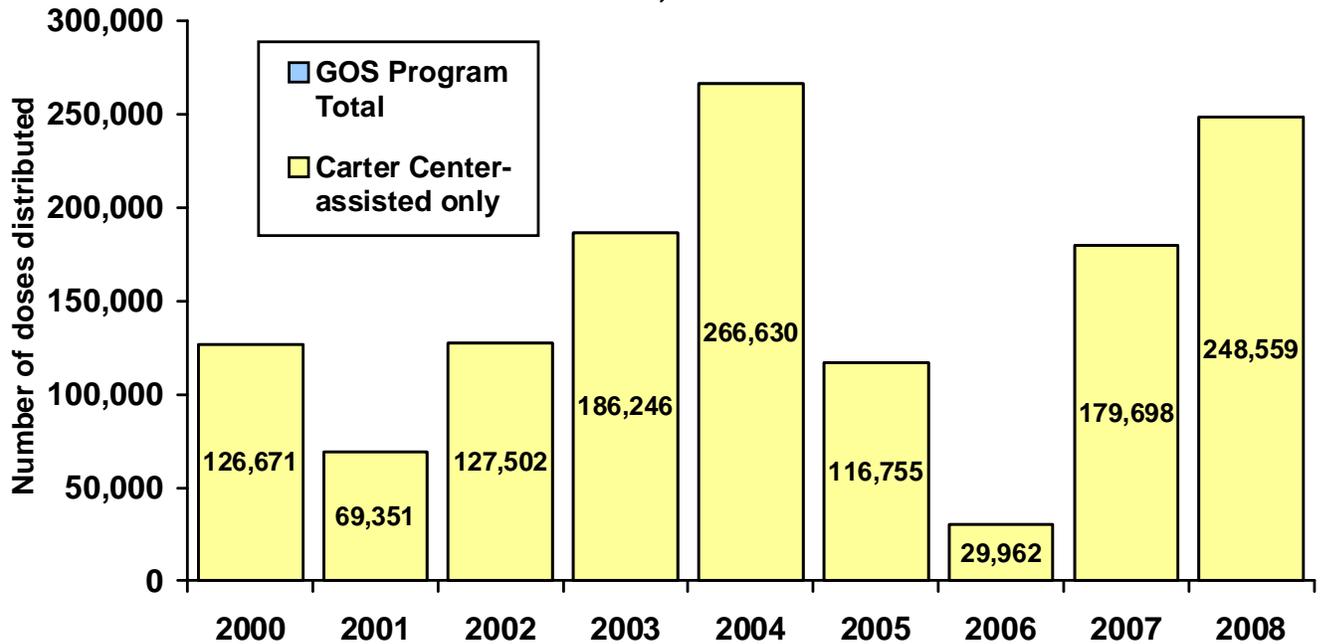
Targets for 2009 revolve around continuous mapping of trachoma. The program intends to train additional trachoma graders on WHO grading and will test inter-observer reliability before every survey. State level prevalence surveys include: White Nile, Al Gedarif, Kassala, Blue Nile, Sennar, River Nile, Red Sea, North Kordofan, and South Kordofan.

**Government of Sudan, Lions-Carter Center supported
Trichiasis Surgery, 2002-2008**



N.B. After the signing of the Comprehensive Peace Agreement in January 2005, the Government of Sudan was no longer responsible for program implementation in the south.

**Government of Sudan, Lions-Carter Center supported Azithromycin
Distribution, 2000-2008**



Sudan Trachoma Control Program: Government of Southern Sudan

*Presented by Dr. Lucia Kur, Coordinator, Southern Sudan Trachoma Control Program
Ministry of Health, Government of Southern Sudan*

Background

Sudan is the largest country in Africa, with an area of about 2.5 million km². Sudan was affected by civil war for 38 of the 51 years since its independence in 1956. On January 9th, 2005, a peace agreement ended the 21-year civil war with the Sudan Peoples' Liberation Army in the south, which had been the longest lasting war in Africa. Under the terms of the Comprehensive Peace Agreement, Sudan is one country under two systems: the Government of Sudan governs the 15 northern states; the Government of Southern Sudan (GOSS) governs the 10 southern states. Both GOS and GOSS are part of the Government of National Unity.

Between 1989 and 2005, humanitarian aid to Southern Sudan was carried out under the auspices of Operation Lifeline Sudan (OLS), a consortium of United Nations agencies and over 40 non-governmental organizations. The initial partners for trachoma control in southern Sudan began working with non-governmental organizations in the OLS consortium to plan a broad trachoma control effort based on the SAFE strategy. Pfizer Inc began to donate azithromycin (Zithromax®) to Sudan through the International Trachoma Initiative in August 2000.

In 2000, The Carter Center began collaboration with NGOs to implement the SAFE strategy in some OLS-supported areas. Activities in these areas were coordinated by The Carter Center from Nairobi with assistance from partner NGOs and humanitarian units in South Sudan. Trachoma prevalence surveys were done in four locations in 2001 and an additional three in 2002. The Carter Center office that supports activities in GOSS areas began its relocation from Nairobi, Kenya, to Juba, Sudan, in 2005. The program now estimates there to be more than 1.6 million individuals at-risk of trachoma in Southern Sudan. The Carter Center in Southern Sudan now supports the full SAFE strategy with funding from the LCIF.

Timeline of Events – Government of Southern Sudan

- January 2005: Comprehensive Peace Agreement (CPA) signed
- 2006: Ministry of Health, Government of Southern Sudan established
- 2007: MOH GOSS Trachoma Control Program established
- 2008: First annual Trachoma Control Program Review was held; trachoma task force was established

Epidemiology of Trachoma in Southern Sudan

The GOSS Trachoma Control Program operates in areas with extremely high prevalence of blinding trachoma, where trichiasis is found even in some children under five years old. It is sometimes difficult for the program to gain access to those most at risk because of insecurity and seasonably impassable roads. This situation is complicated by a poor health infrastructure, minimal physical infrastructure, and strong cultural beliefs and practices that inhibit behavior change. There are many mobile nomadic populations and a large number of internally displaced persons.

Prevalence surveys conducted in Upper Nile, Jonglei, Unity, Eastern and Central Equatoria states indicate prevalence of active trachoma among children aged 1-9 years of 54.4%. The prevalence of TT among children aged less than 15 years was 1.4% and among persons aged 15 years and above was 11%.

Table 1: Prevalence of Trachoma in Southern Sudan

County	Children aged 1-9 years			Children aged < 15 years	Persons aged 15 and above
	TF	TI	TF & TI	TT	TT
South Bor (Paluer)	77.2	63.6	87.8	0.5	10.0
South Bor (Padak)	65.2	63.6	76.5	0.1	10.0
Twic East (Kongor)	33.2	29.2	43.3	0.1	5.5
Pibor (Boma)	53.1	39.4	60.3	3.0	12.3
Kiech Kuon	63.0	51.9	80.2	2.2	14.7
Ayod	80.1	60.7	88.3	5.2	14.6
Juba (Katigiri)	45.5	24.5	50.0	0.2	1.3
Terekeka (Tali)	64.7	35.3	72.6	0.3	4.1
Kapoeta East (Narus)	35.4	23.8	41.5	0.6	6.3
Budi (Kimatong)	40.0	41.9	60.3	3.5	17.0

Program Achievements in 2008

Surgery (S)

In Southern Sudan, trichiasis surgery takes place in health facilities such as Juba teaching hospital, Normeca Hospital in Kapoeta, and the Ayod Primary Health Care Center. Partners supporting surgery by the Government of Southern Sudan in 2008 include: The Carter Center, CBM, and the International Medical Relief Fund (IMRF). A total of 11 surgery camps were conducted in 2008, during which 2,000 persons were operated. In addition to those, 1,704 surgeries were conducted during routine health service provision. Currently, 17 surgeons have passed WHO certification and 14 are active.

Until other prevalence surveys are conducted, the program cannot estimate a realistic backlog for surgery in Southern Sudan. The current estimate from surveyed areas is 244,563 persons of all ages with trichiasis. Surgical provision for children poses a programmatic challenge believed to be unique to Southern Sudan and parts of Ethiopia.

Antibiotics (A)

In Southern Sudan, mass distribution of antibiotics takes place at selected locations within the community. The distribution stations are chosen with input from field officers, the endemic communities, and local government, taking into account population movements towards animal grazing grounds and water points. Mobilization takes place at least five days in advance and the distribution teams are composed of four to five trained community health workers, in addition to Carter Center field officers. The communities' strong role in drug distribution contributes to the successful mobilization of all community members. The program is unable to calculate an accurate ultimate intervention goal for antibiotic distribution until surveying is complete. A total of 14 districts have benefited from antibiotic distribution through the end of 2008.

Facial Cleanliness and Health Education (F)

In Government of Southern Sudan intervention areas, health education is conducted by trained community based health workers, including:

- Trachoma, Guinea worm and primary health care supervisors
- Community health workers at NGO primary health care units
- Maternal and child health care workers (Traditional birth attendants and vaccinators)
- Primary school teachers

- Community hygiene promoters from NGO partners involved in water and sanitation
- Community animal health workers under NGOs providing veterinary services

Field officers, technical advisors and volunteers conduct trachoma night video showings to raise awareness. Eleven schools in Greater Bor counties are receiving routine health education with trachoma flipcharts, and there have been ongoing trachoma trainings during religious services in Greater Bor counties. A SAFE training video was produced in 2008, as well as three trachoma videos in Dinka, Nuer and Toposa languages. The program estimates reaching 3,081 villages with ongoing health education. The ultimate intervention goal for health education is to reach all of the 4,662 known endemic villages. The program hopes to encourage communities to identify their own indicators, set strategies and goals, and develop tools for program implementation.

Environmental Improvement (E)

Latrine construction progresses slowly in Southern Sudan due to unstable soil conditions and high costs of materials that cannot be purchased in the local market and have to be imported overland from Uganda or Kenya. Ventilated improved pit latrines are typically promoted, with NGO partners providing all supplies and digging tools and household owners providing the labor. The program intends to evaluate the possibility of constructing household latrines in Southern Sudan using sustainable technology in 2009.

In Southern Sudan, water provision falls under the Ministry of Cooperative and Rural Development. This same ministry is responsible for the development of water provision guidelines and for rehabilitation and protection and rehabilitation of shallow hand dug wells and bore holes constructed by NGO partners. Due to the co-endemicity of Guinea worm disease and trachoma, the trachoma program has benefited from Guinea worm safe water interventions.

Table 2: Program Achievements in 2008

Activities	Targets	Output	Carter Center Targets	Carter Center Output
Persons Operated on for Trichiasis	6,000	3,704	5,000	1,700
Trichiasis Surgeons trained	37	10	11	8
Doses of Azithromycin Distributed	1,326,194	464,974	1,326,194	464,974
Doses of Tetracycline Distributed	33,154	13,668	33,154	13,668
Health Education (villages)	4,662	3,081	4,662	3,081

Targets for 2009

- Conduct a trachoma prevalence survey in two counties of Upper Nile State and in unidentified counties of Lakes and Unity state.

Trichiasis Surgery (S)

- Train 12 new trichiasis surgeons (11 with Carter Center support)
- Operate on 5,000 people with trichiasis (3,000 with Carter Center support)

Antibiotic (A)

- Distribute azithromycin to 480,000 people (in Carter Center intervention zones in Eastern Equatoria and Jonglei States)
- Distribute tetracycline eye ointment to 20,000 people

Facial Cleanliness and Health Education (F)

- Target 4,662 accessible villages for health education on personal hygiene and latrine construction

Environmental Improvement (E)

- Promote construction of 500 household latrines in endemic villages



Surgeon training in Akobo, May 2009.

Table 1. Summary of Trachoma Control Program Interventions (Carter Center-Assisted Countries)

National data as reported for 2008 at the Tenth Annual Program Review, Atlanta, February 11-13, 2009

	Ghana	Mali	Niger	Sudan		Ethiopia	Nigeria	Totals
				GOS*	GOSS**			
F & E								
Number of villages with hygiene education	1,120	8,487	4,500	239	3,081	3,190	6,425	27,042
Villages targeted	6,000	4,000	4,500	120	4,662	3,232	6,460	28,974
Percent coverage	18.7%	212.2%	100.0%	199.2%	66.1%	98.7%	99.5%	93.3%
Number of household latrines constructed	1,808	13,410	11,636	N/A	-	384,274	6,121	417,249
Target for household latrines	5,000	14,000	11,400	N/A	1,000	400,996	7,500	439,896
Percent coverage	36.2%	95.8%	102.1%	N/A	0.0%	95.8%	81.6%	94.9%
Antibiotics (A)								
Azithromycin								
Treatments	147,122	5,445,392	5,750,612	248,559	464,974	15,213,333	N/A	27,269,992
2008 target	950,000	9,520,739	8,008,098	292,164	1,326,194	22,750,000	1,435,800	44,282,995
Percent coverage	15.5%	57.2%	71.8%	85.1%	35.1%	66.9%	N/A	61.6%
Tetracycline								
Treatments	-	98,232	146,843	4,072	13,668	401,491	10,782	675,088
2008 target	36,400	-	146,843	5,743	33,154	568,750	14,000	804,890
Percent coverage	N/A	N/A	100.0%	70.9%	41.2%	70.6%	77.0%	83.9%
Surgery (S)								
Surgeries	130	4,180	2,500	1,380	3,704	63,262	9,672	84,828
2008 target	1,000	12,000	12,530	3,000	6,000	177,354	9,950	221,834
Percent coverage	13.0%	34.8%	20.0%	46.0%	61.7%	35.7%	97.2%	38.2%

*GOS: Government of Sudan

**GOSS: Government of Southern Sudan

**Table 2. National Trachoma Control Program Annual Targets 2009 (Carter Center-assisted countries)
As presented at the Tenth Annual Program Review, Atlanta, February 11-13, 2009**

	Ghana	Mali	Niger	Sudan		Ethiopia‡	Nigeria	Total
				GOS*†	GOSS**			
Surgery								
Persons for trichiasis surgery	2,000	17,100	15,659	-	5,000	95,000	8,000	255,239
Antibiotic								
Azithromycin mass distribution (persons)	N/A	7,245,423	8,206,388	-	480,000	13,500,000	1,435,800	36,229,471
Tetracycline ointment distribution (persons)	N/A	147,866	164,128	-	20,000	270,000	40,000	999,494
Facial cleanliness								
Health education (villages)	N/A	9,000	561	-	4,662	3,232	13,240	30,837
Environmental change								
Household latrines to construct	5,000	16,000	15,000	-	500	157,648	10,500	481,915

* GOS: Government of Sudan

†Mapping of trachoma prevalence is ongoing in GOS areas.

**GOSS: Government of Southern Sudan

‡Targets presented are for Amhara Regional State only.

Table 3. Carter Center-Assisted Trachoma Control Programs

Cumulative Interventions per Country, 1999-2008									
Indicators	Ghana**	Mali**	Niger**	Sudan		Ethiopia	Nigeria**	Total	
				GOS***	GOSS***				
S	People operated for trichiasis	N/A	1,491	0	2,251	3,817	124,716	26	132,275
	New trichiasis surgeons trained	N/A	25	0	66	69	585	N/A	745
A	Azithromycin doses distributed	N/A	0	0	1,299,697	1,293,840	22,753,291	N/A	25,346,828
	Doses of tetracycline ointment distributed	N/A	0	0	8,128	211,127	1,383,216	N/A	1,602,471
F	Villages with ongoing health education*	50	1,334	557	239	3,081	2,898	321	8,480
	Schools with ongoing health education	49	138	374	49	80	1,362	211	2,263
	New persons trained for health education	8,079	15,815	4,450	1,654	20,070	61,524	3,041	114,633
E	Household latrines built	6,997	48,011	31,308	0	439	727,856	26,947	841,662
	New masons trained	N/A	2,896	936	0	N/A	N/A	1,910	5,742

*2008 Data Only.

**Carter Center support in Nigeria and Ghana is focused on F & E interventions. The Carter Center began supporting the full SAFE strategy in Niger and Mali in September 2008. Indirect support for implementation of all four SAFE components in terms of logistics and technical advice are offered to the national programs when requested.

***GOS/GOSS: Government of Sudan/Government of Southern Sudan.

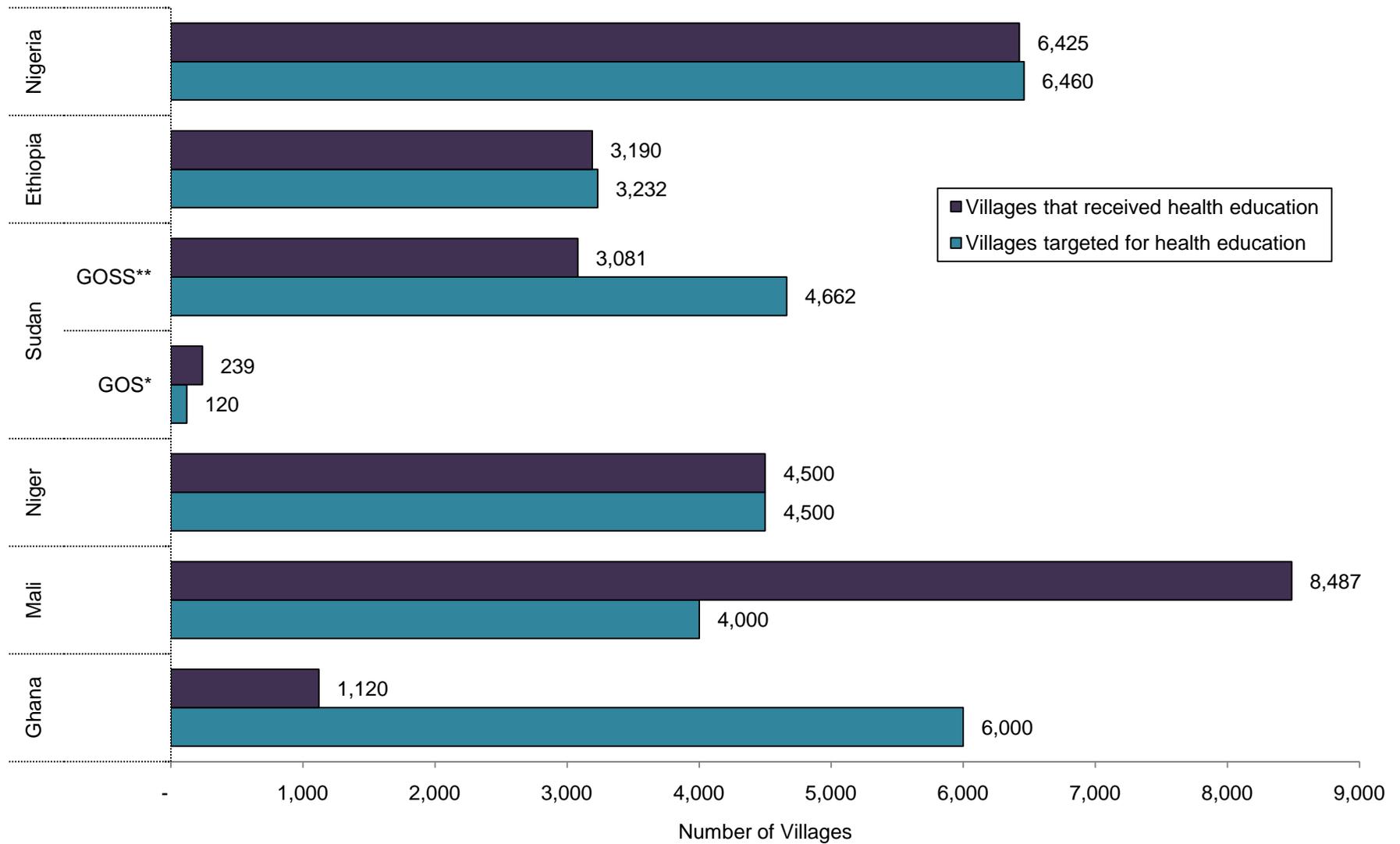
Table 4. Carter Center-Assisted Trachoma Control Programs
Summary of Interventions per Country, January - December 2008

Indicators	Ghana	Mali*	Niger*	Sudan		Ethiopia	Nigeria	Total	
				GOS**	GOSS**				
S	People operated for trichiasis	N/A	1,491	0	111	1,700	31,561	N/A	34,863
	Target persons	N/A	N/A	N/A	N/A	6,000	101,187	N/A	107,187
	Percentage	N/A	N/A	N/A	N/A	28.3%	31.2%	N/A	32.5%
	New operators trained	N/A	25	0	10	8	185	N/A	228
A	Doses of azithromycin distributed	N/A	N/A	N/A	248,559	464,974	12,631,873	N/A	13,345,406
	Target population	N/A	N/A	N/A	292,164	1,326,194	10,938,752	N/A	12,557,110
	Percentage	N/A	N/A	N/A	85.1%	35.1%	115.5%	N/A	106.3%
	Doses of tetracycline ointment distributed	N/A	N/A	N/A	4,072	13,668	352,152	N/A	369,892
F	Villages with ongoing health education	50	1,334	557	239	3,081	2,898	326	8,485
	Schools with ongoing health education	0	N/A	374	28	0	6,181	N/A	6,583
	New persons trained for health education	0	657	418	664	17,823	36,846	1,228	57,636
E	Household latrines built	1,808	12,271	6,594	N/A	N/A	373,677	6,121	400,485
	Target for latrines	5,000	12,500	5,000	N/A	N/A	400,996	7,500	430,996
	Percentage	36.2%	98.2%	132.2%	N/A	N/A	93.2%	81.6%	92.9%
	New masons trained	N/A	512	165	N/A	N/A	N/A	1,330	2,007

*Carter Center support for surgical activities in Mali and Niger began in September 2008. Annual surgical targets for 2008 are not applicable.

**GOS/GOSS: Government of Sudan/Government of Southern Sudan.

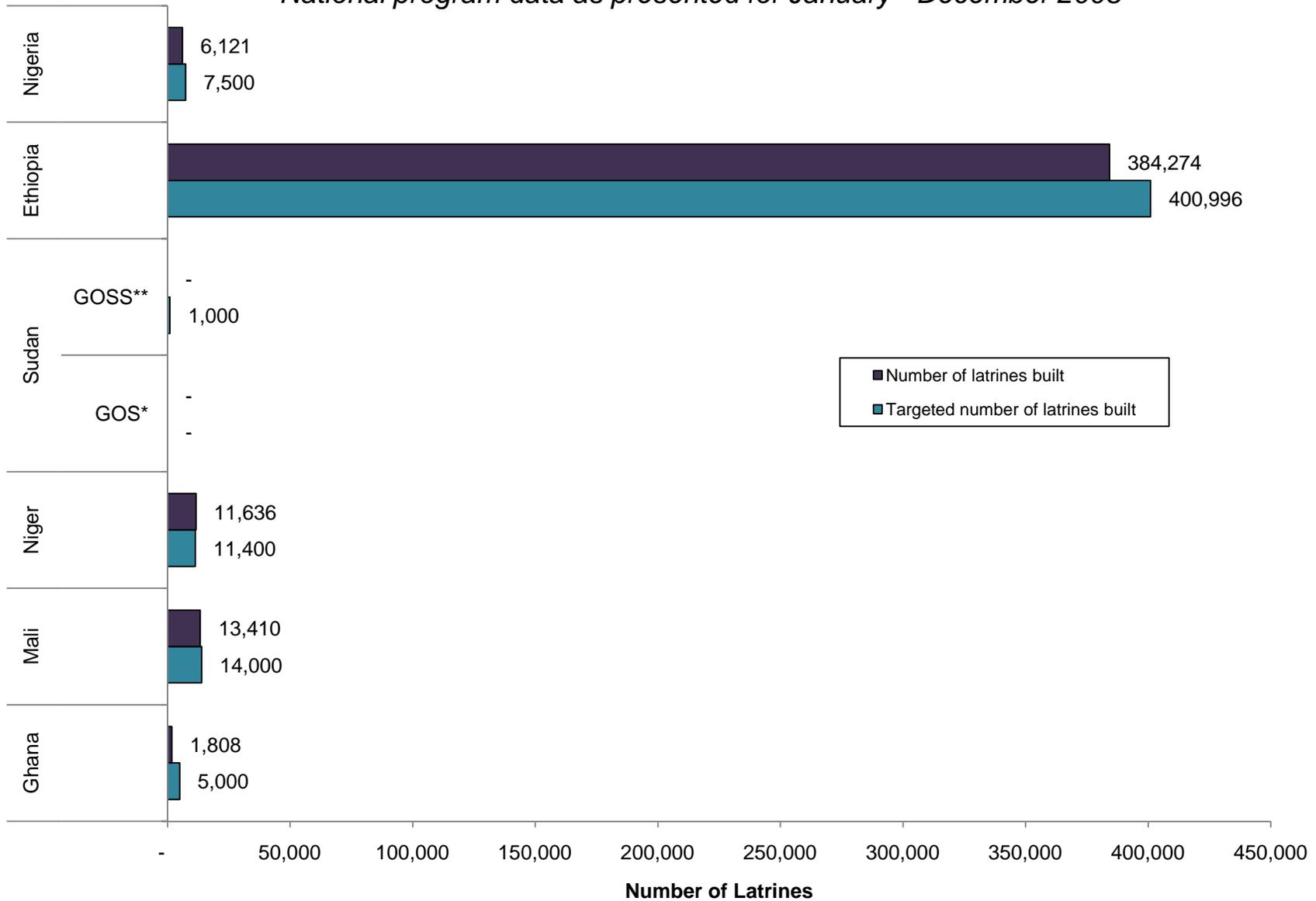
Figure 1. Villages Receiving Health Education, Carter Center-Assisted Countries
National program data as presented for January - December 2008



*GOS: Government of Sudan

**GOSS: Government of Southern Sudan

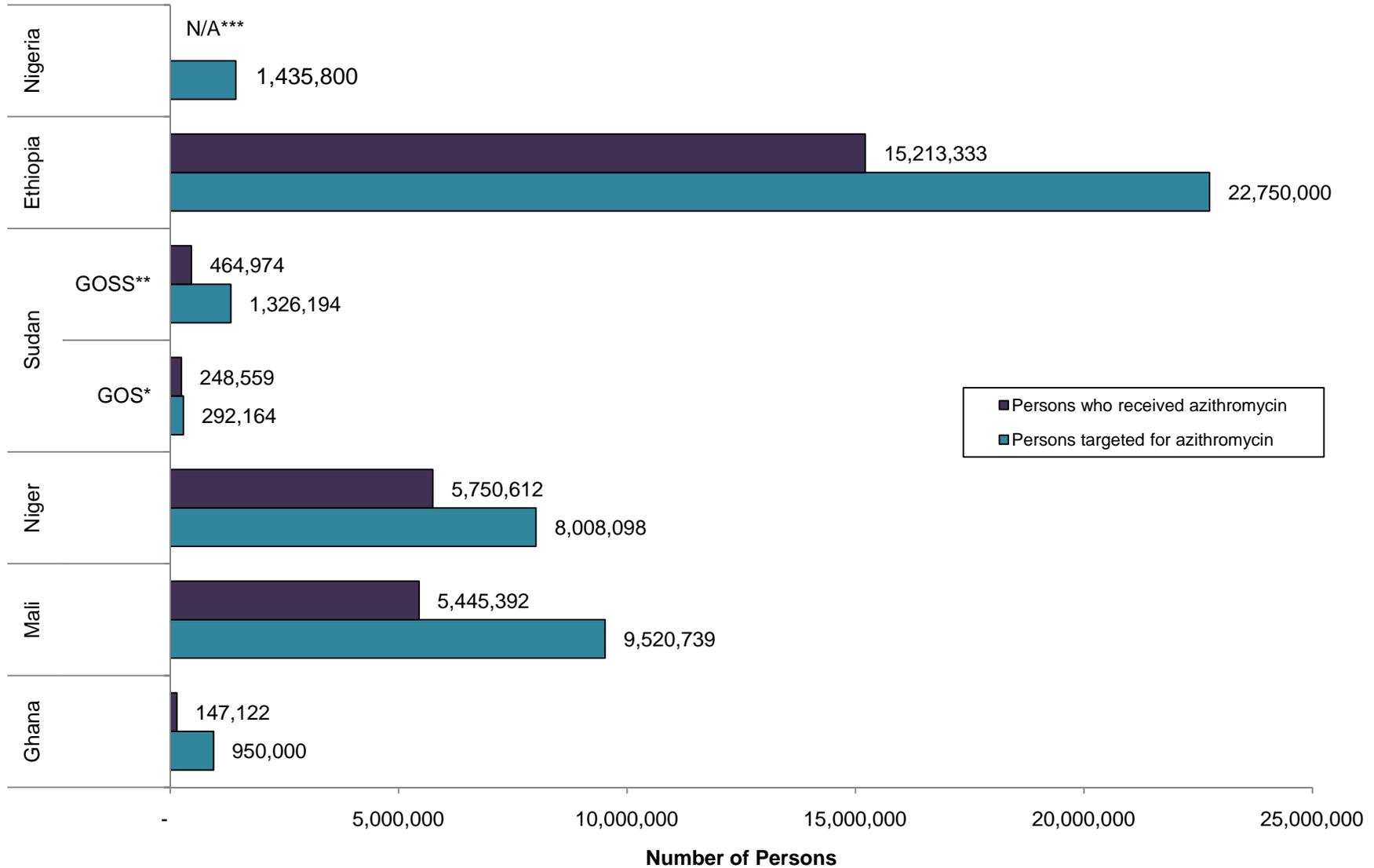
Figure 2. Household Latrines Built, Carter Center-Assisted Countries
National program data as presented for January - December 2008



*GOS: Government of Sudan

**GOSS: Government of Southern Sudan

Figure 3. Azithromycin Distribution, Carter Center-Assisted Countries
National program data as presented for January - December 2008

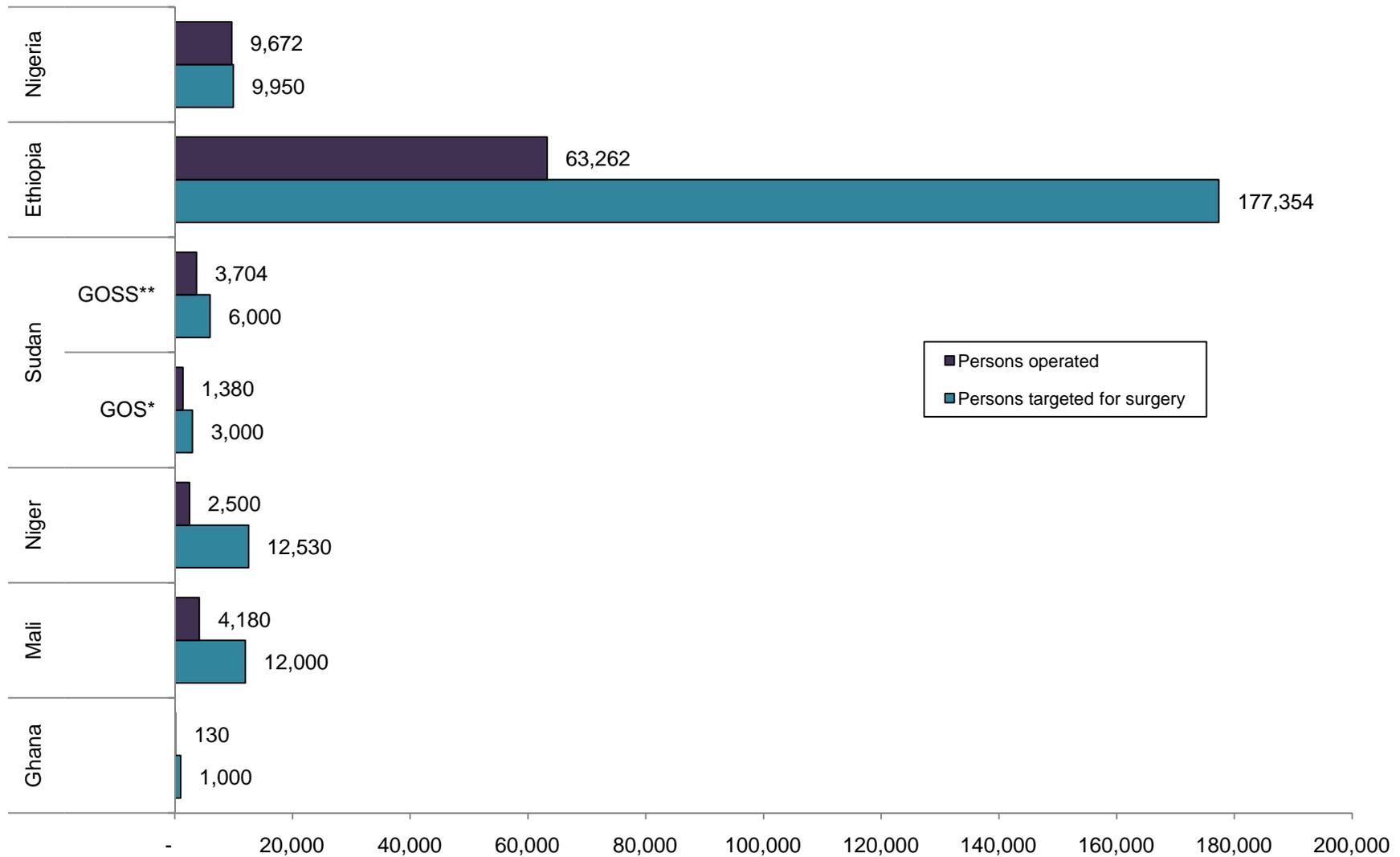


*GOS: Government of Sudan

**GOSS: Government of Southern Sudan

***Although a distribution target was presented, Nigeria did not receive Pfizer-donated azithromycin in 2008.

Figure 4. Persons Operated for Trichiasis, Carter Center-Assisted Countries
National program data as presented for January - December 2008



*GOS: Government of Sudan

**GOSS: Government of Southern Sudan

Figure 5. Villages that Received Ongoing Health Education
National data from Carter Center-assisted countries as presented for 2001 - 2008

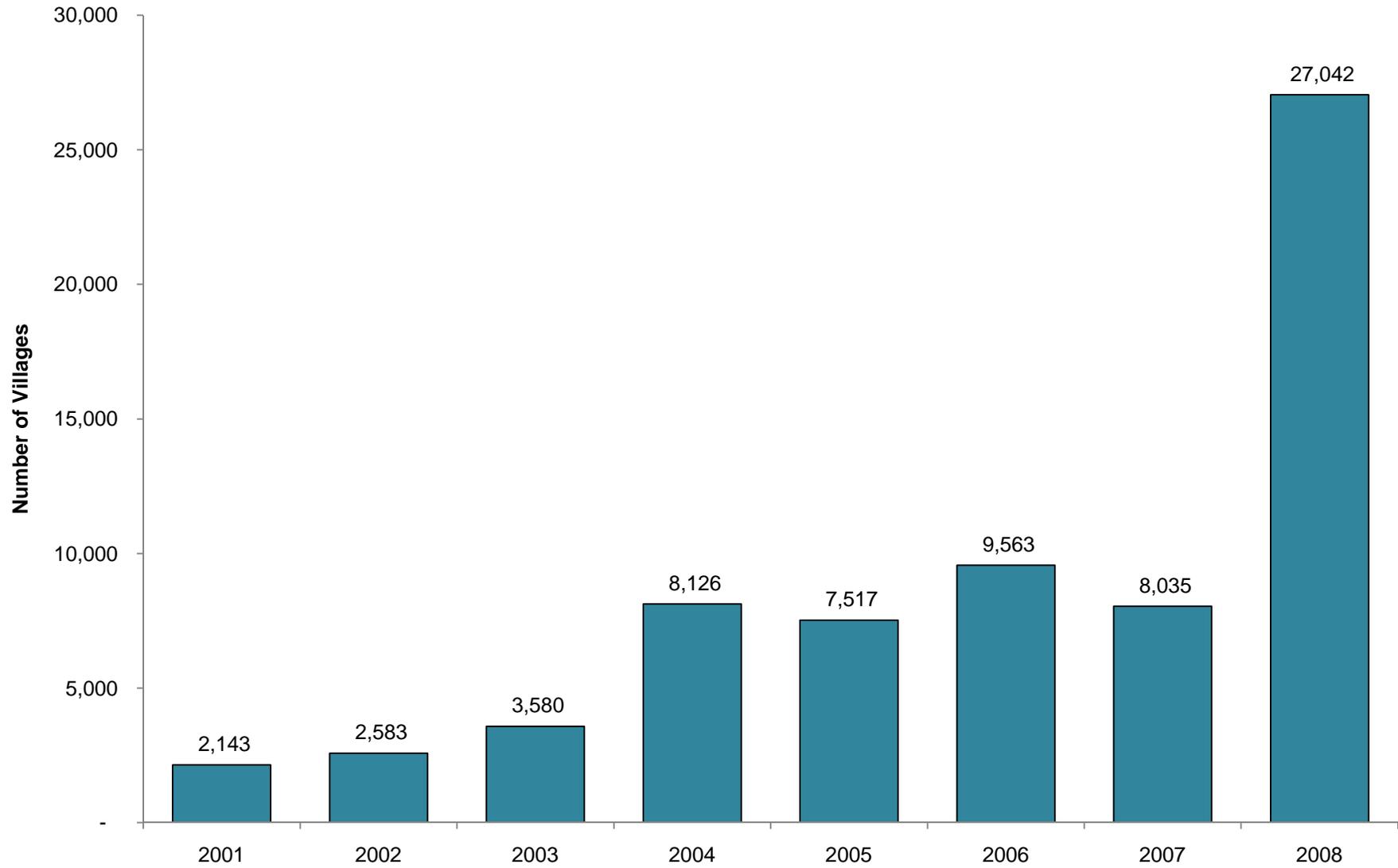


Figure 6. Household Latrines Built

National data from Carter Center-assisted countries as presented for 2002 - 2008

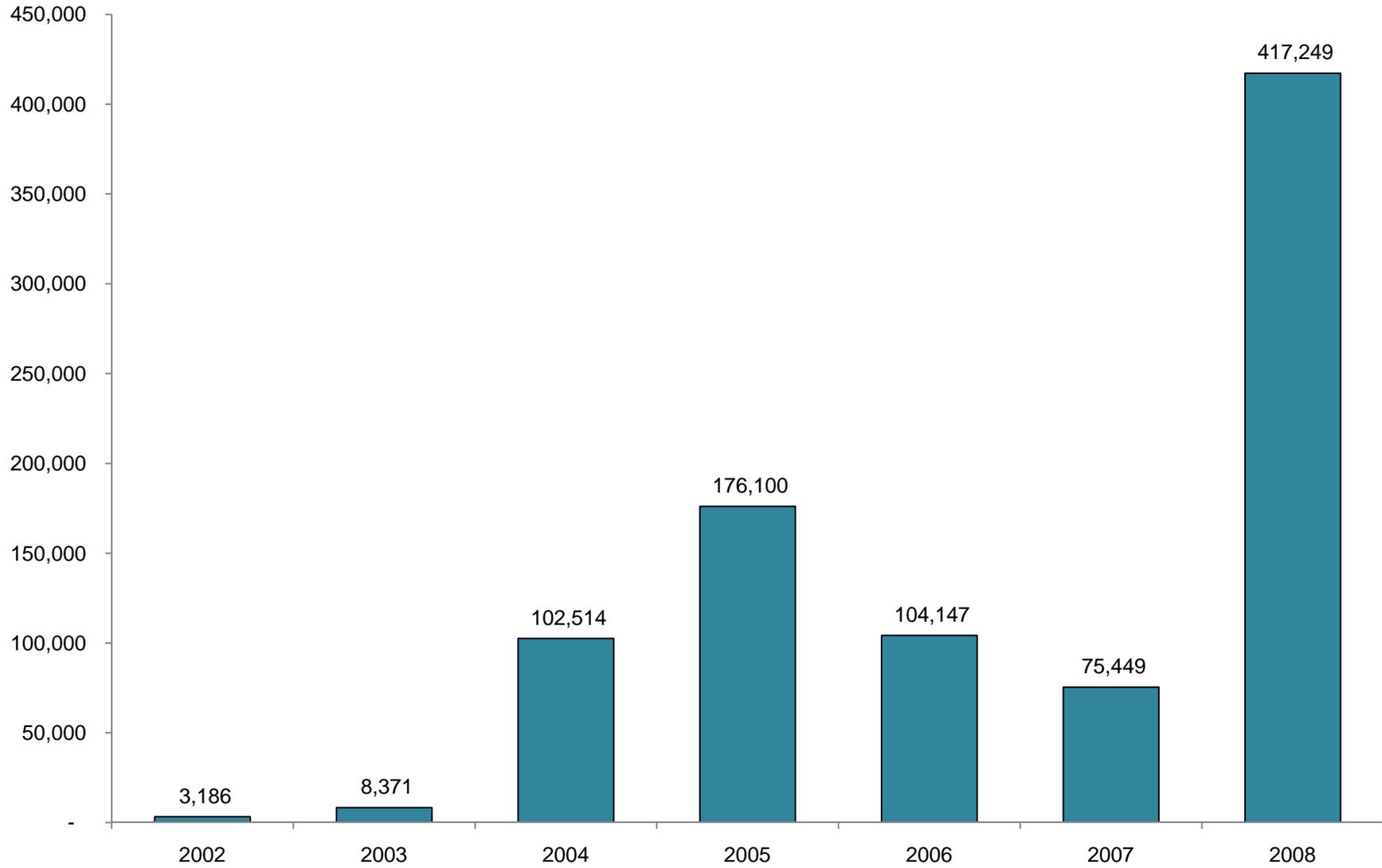
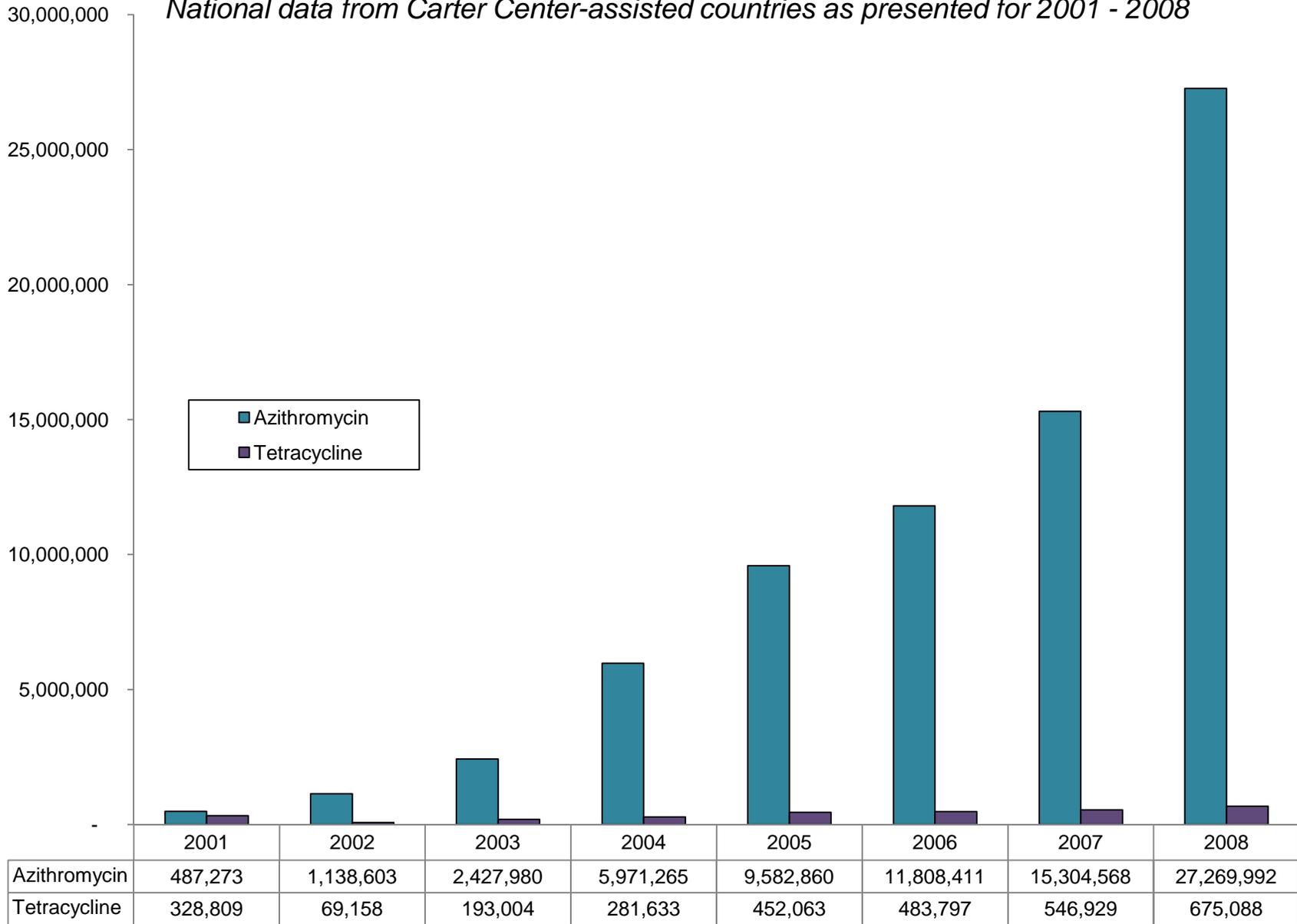


Figure 7. Annual Treatments of Antibiotics

National data from Carter Center-assisted countries as presented for 2001 - 2008



The Collateral Benefits of SAFE

Presented by Paul Emerson, The Carter Center

Trachoma control is part of a suite of health interventions in endemic countries which have the common goal of increasing the overall health of a population so that the development and economic goals of the country can be achieved. A healthy nation is a productive nation. Trachoma is, above all else, an environmental disease of poverty. There is no single transmission route and the manifestation comes in two forms: benign active disease in children and crippling and disabling trichiasis in adults. Trachoma control is based on an integrated strategy of prevention and cure which when applied in totality gives the opportunity to transform communities, breaking the cycle of disease and poverty. These benefits not directly associated with trachoma have been called "collateral benefits."

Collateral benefits of surgery

Operating TT cases not only prevents future blindness but also has dramatic benefits for the operated person and their family. Life expectancy of the blind and disabled is lower than that of sighted peers, so we expect a significant increase in life for those operated. Trichiasis is associated with pain, inability to work, stigma, shame and other factors that reduce the quality of life. Reversing TT has been described as a re-birth by patients who are able to become productive members of their families again, farming, cooking and looking after children. Disabled and visually impaired parents are dependent on children to guide them and care for them on a day-to-day basis. TT surgery releases the care-giving children from their obligations and allows them the opportunity to attend school and have active enjoyable childhoods.

Collateral benefits of antibiotics

Major causes of childhood mortality in trachoma-endemic countries are typically malaria, respiratory tract infections and diarrheal disease. Children are often poly-parasitized and affected by more than one of these conditions at a time, and co-infection coupled with poor nutrition makes them more vulnerable to super-infections with malaria or respiratory tract infections that ultimately kill them. The macrolide antibiotic, azithromycin, whilst given for trachoma control, is effective against blood forms of malaria parasites, respiratory tract infections, diarrheal diseases, and other bacterial infections. In environments where access to antibiotic is limited, the effect of treating many co-existing conditions can be profound. Stronger children are able to better defend themselves from additional infections that might otherwise have had a drastic effect. Adults treated with azithromycin also benefit by accidental treatment for sexually transmitted diseases and other conditions.

Collateral benefits of health education and behavior change

It is not possible to wash the face without also washing the hands. We know that of all interventions for respiratory tract infection and diarrheal disease, hand-washing with soap has the greatest single effect. In addition to hand-washing, trachoma control programs seek to identify and promote positive hygiene and sanitation behaviors linked to water and latrine use. Promoting existing positive behaviors may reduce transmission of all feco-oral pathogens, including soil-transmitted helminths and schistosomes.

Collateral benefits of latrines and water promotion

Latrine promotion is included in trachoma control as a means of reducing the population of eye-seeking flies. In order to achieve this, human feces must be disposed of safely. The net effect is that transmission of all feco-oral pathogens is reduced. In addition, school latrines where provided in a separate and secure block for girls, increases school attendance in older children. Water is essential for health and hygiene. Promotion of safe drinking water is probably the single most effective way of increasing the health of a community.

Overview of The Carter Center Malaria Control Program

Presented by Aryc Mosher, The Carter Center Atlanta

In 2006, the Ethiopia Federal Minister of Health invited The Carter Center to join the Ethiopian effort to fulfill the need for 20 million long-lasting insecticidal nets (LLIN). This invitation led to the creation of The Carter Center Malaria Control Program. Since 2006, the program has supported LLIN procurement and distribution for Ethiopia and Nigeria, operational research for malaria control, and the development and implementation of a behavior change and communication strategy.

The Carter Center has provided a total of three million LLINs to malaria control in Ethiopia. An additional 278,000 LLINs were provided for distribution in Nigeria to reduce both malaria and lymphatic filariasis transmission. The Carter Center has also partnered with the Nigerian Ministry of Health to assist with the distribution of more than 500,000 additional nets procured through other sources.

Ethiopia

In Ethiopia, the Center has integrated malaria control interventions with the existing trachoma and onchocerciasis control programs to create two new programs: MALTRA in the Amhara Region and MALONCHO in the Beneshangul Gumuz, Gambella, Oromiya and SNNPR regions. This integrated approach uses locally identified leaders and community volunteers to assist health workers in the delivery of these interventions to maximize program resources and efficiency.



Health Education for malaria and trachoma conducted during MALTRA Week.

In addition to LLIN distribution, The Carter Center reviewed several knowledge, attitude and practice (KAP) studies to identify commonly positive behaviors and held misconceptions about malaria transmission. The program created four key behavior change communication messages to address those misconceptions. The health education component of the program also provided each target audience with “doable” actions to prevent malaria transmission. These messages included: “sleep under an LLIN every night all year long”; “give priority of LLIN to pregnant women and children under five years old”; “hang and care for your LLIN properly”; and “take all febrile cases to a clinic for diagnosis.” These messages were an integral part of the major media campaign undertaken in the Amhara region of Ethiopia called MALTRA Week. For a full week, prior to the mass distribution of azithromycin, a mobile media van canvassed the participating

zones, delivering the malaria messages described above, information on transmission and prevention of trachoma, as well as broadcasts of the dates and times of the up-coming drug distribution.

The Carter Center provides additional support to the Federal Ministry of Health through data management training for Regional and Zonal level health staff. This training will increase the capacity of national and regional staff to identify and respond to malaria epidemics and support trachoma and onchocerciasis control interventions. The MALONCHO project uses the community-directed treatment with ivermectin data management and distribution model to measure uptake and coverage of LLIN distribution.

The Carter Center also has supported operational research to increase the capacity of the Ethiopian Federal Ministry of Health to implement a comprehensive malaria control program. In December 2006, a baseline malaria indicator survey was conducted to assess the coverage of malaria interventions and treatment seeking behavior as well as the malaria prevalence in all age groups. A follow-up malaria indicator survey was conducted in late 2007. An assessment of LLIN durability is currently underway. This study will determine the rate of insecticide loss and the physical deterioration of LLINs annually over a period of three years.

Nigeria

The Carter Center Malaria Control Program has conducted a malaria prevalence survey and an LLIN distribution survey in South East Nigeria. The results from these surveys allow the malaria control program to assess malaria indicators and compare distribution strategies among different regions. In addition, the Nigeria malaria program plans to examine the impact of LLIN distribution on malaria and lymphatic filariasis prevalence. The Nigeria malaria control program is active in Ebonyi, Imo, Nassarawa and Plateau states.

Trachoma Amelioration in Northern Amhara (TANA) Study Update

Presented by Nicole Stoller, The Francis I. Proctor Foundation

The purpose of the TANA study is to investigate the role of antibiotics and latrine construction in trachoma control for hyperendemic areas in the Goncha Seso Enesie district in the Amhara region of Ethiopia. This study is made possible through a partnership between The Carter Center, the Ethiopian Ministry of Health, and the Francis I. Proctor Foundation at UCSF and is funded by the National Institutes of Health.

Study Design

The TANA study has three main research aims:

- 1. To study the optimal frequency of mass antibiotic distribution:* The WHO recommends annual treatments of communities. However, a previous study conducted by the Francis I. Proctor Foundation has shown that biannual distribution of azithromycin might be more effective in eliminating ocular infection at the local level. We will compare communities receiving annual treatments (Arm A) and those with biannual treatments (Arm B).
- 2. To investigate the possible protective effect of treating children only:* Most ocular infections are found in children between one to five years of age and most adults do not harbor infection. However, the WHO currently recommends treatment of an entire community. In this research aim, we are attempting to see if treating children only has a protective effect on the entire population. In Arm C, only children will be treated every three months for one year. In Arm D, all members of participating communities will receive delayed treatment at one year and will be compared to Arm C.
- 3. To study the effect of latrines on trachoma infection:* Intensive promotion of latrine construction and use will be examined to determine the effect of latrines on the rate at which ocular infection returns to a community after mass antibiotic distribution. Communities in Arm F will receive baseline treatment with no further interventions. Communities in Arm G will receive baseline treatment with intensive latrine construction and promotion on latrine use.

The ancillary aim is to study the impact of community-wide distribution of antibiotics on 1) child mortality and 2) antimicrobial resistance.

Study Progress and Preliminary Results

The TANA study team has successfully completed eight research visits to date, completing the 30-month follow up visit in December 2008. Nearly 25,000 participants have been enrolled.

Latrine Efficacy

In study year one, the project undertook intensive latrine construction activities, forming “latrine teams” in the latrine arm. Eighteen health extension workers received latrine construction training and together constructed a total of 2,193 new latrines. Latrine coverage was nearly 80%, including both new and existing latrines.

This study was unable to show an effect of latrines on infection in two years. At baseline, infection in children was 43% in the arm without latrines (Arm F) and 45.5% in the latrine arm (Arm G). At 24 months, after one antibiotic distribution and latrine construction efforts, infection levels had dropped in both arms – to 14.6% and 14.8% respectively.

Herd Effect of Mass Distribution of Antibiotics

Arms C and D of the study were designed to look at the question: Can we treat only children and see a change in prevalence community-wide? The ‘child-only’ arm was treated quarterly for one year. Infection rates in children dropped from 48.4% at baseline to 3.6% at 12 months. In the comparison arm, infection was 45.6% at 12 months.

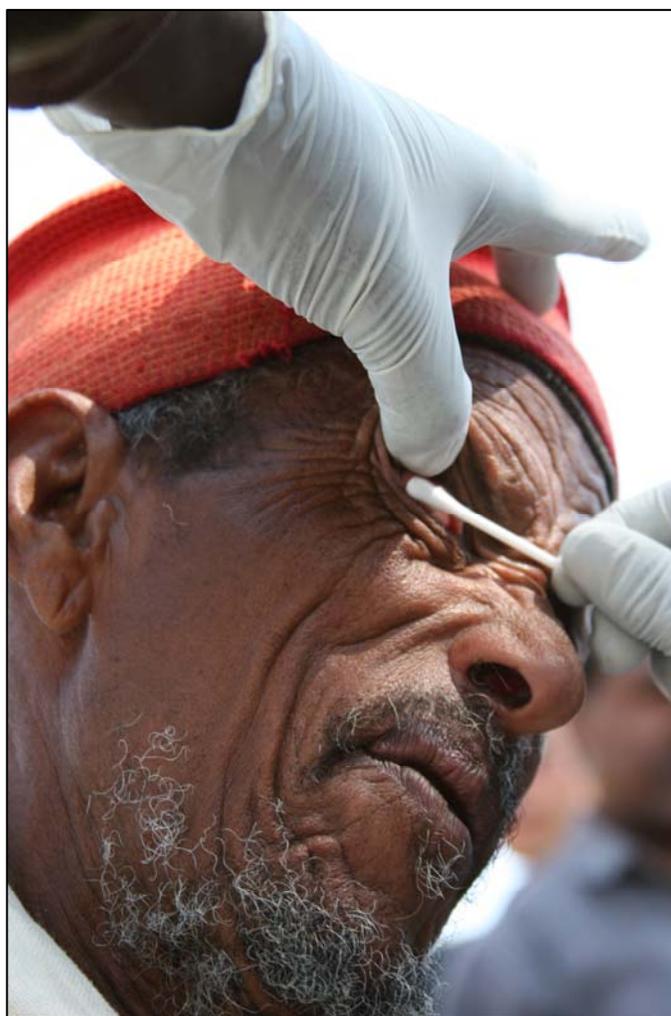
As a result of treating only the children, infection in adults was cut almost in half – from 15.5% at baseline to 8.2% at 12 months. Prevalence in the comparison arm was 12.7% at 12 months.

It is important to note that quarterly treatment far exceeds the current WHO recommendations. We are interested in studying this idea further – looking at whether adult infection would be eliminated over three years of annual or biannual treatment of children.

Pneumococcal Resistance

Nasopharyngeal (NP) swabs were collected in an effort to examine pneumococcal resistance in the arm where only children were treated. Swabs were collected in Arm C at baseline and again at 12 months. NP swabs were also collected from the delayed treatment arm at 12 months (Arm D).

Macrolide (antibiotics such as azithromycin or clindamycin) resistance increased significantly in the treated arm. Other studies have shown that pneumococcal resistance disappears two years after antibiotic distribution ends. Tetracycline resistance also increased which may or may not be related to our topical tetracycline distribution. There was no change in the resistance to penicillin. Penicillins are much more commonly used than macrolides in this particular region of Ethiopia.



PCR swab collection for the TANA study.

Investigation of High Prevalence of Active Trachoma in Sudanese Adults

*Presented by Jonathan King, The Carter Center Atlanta and
Bruce Gaynor, The Francis I. Proctor Foundation*

The Sudan Trachoma Control Program requested and welcomed an evaluation of prevalence survey results showing active trachoma reported more frequently in adults than in children. In July 2008, Dr. Bruce Gaynor and Mr. Jonathan King joined the Sudan Trachoma Control Program to investigate this finding.

Clinical signs of active trachoma (WHO grade TF and TI) are seen most often in young children as infection with *Chlamydia trachomatis* is most prevalent in this age group. Scarring as well as trichiasis is more prevalent among adults, likely due to repeated infection and inflammation throughout life. In 2006, trachoma surveys in Dongola locality reported a prevalence of TF greater than 20% for adults ages 30 years and older while prevalence of TF in children aged 1-9 years was less than 10%. During recent surveys in 2008, reports of high prevalence of TF in adults were similar in the localities of Gezira state. To explain these unique findings, we considered the following hypotheses: antibiotic coverage among children in past distributions was higher than among adults; an alternate eye condition that mimics trachoma was being reported as TF; or coding errors occurred during collection and analysis of survey data.

The first objective of the investigation was to hold a workshop with the examiners from previous prevalence survey teams to review the WHO Simplified Trachoma Grading System. Participants practiced grading both digital photographs and patients. The performance of individual examiners was measured against a standardized photograph set in a classroom setting and then a standardized test with patients in the field. Statistical analysis of the grading exercise was conducted to determine the inter-observer agreement with a senior examiner. This process allows the national program to select the best examiners to conduct trachoma prevalence surveys. The training tools used to conduct this exercise are available from The Carter Center Trachoma Control Program and were developed by Dr. Jeremiah Ngondi.

All participants traveled to the field to examine residents of two villages in Gezira state where surveys (conducted three months prior to this evaluation) reported TF of greater than 10% among adults. In each site, prior to the participants' arrival, residents of the village were gathered in one area waiting for examination. We took a systematic sample of 50 residents of men and women of all ages. Workshop participants examined the eyes of each selected resident. Out of the 100 persons examined, we found five cases of active trachoma and six cases of conjunctival concretions in adults.

We also wished to re-examine patients reported to have TF and who were treated. We visited one village where 13% of examined patients from recent surveys were reported to have TF, the majority being adults. Out of eighteen patients, eleven were available for re-examination. One adult case of TI was found, two adults had concretions and eyes of the remaining eight were normal.

Additionally, we performed PCR analysis to detect the presence of *Chlamydia* DNA from ocular swab specimens of individual residents in a community reported to have a high occurrence of active trachoma in adults. We selected a systematic, random sample of 50 residents in the reported endemic community whom had not been examined or received treatment during survey activities. The right tarsal conjunctiva from each selected resident was examined for the presence of clinical signs of trachoma and then swabbed for PCR sample collection. In total, 50 swabs and five random control swabs were collected, processed and analyzed. All 55 swabs were negative for the presence of *C. trachomatis* DNA and none of the examined residents had WHO grade TF or TI.

A systematic review of the management of survey data and analysis was also performed. Data is double entered from standardized forms into an Epi-Info database. Double data sets are compared and entry errors are corrected. The re-coding and analysis programs were reviewed and no errors existed in the presence or absence of clinical signs by age.

During the exercise, Dr. Gaynor documented our observations using digital photography. Figure 1 shows the presence of concretions commonly observed in adults. Conjunctival concretions are small, white to yellow nodules superficially buried within the conjunctiva. They are benign, granular membranous masses that may occur in both the upper and lower lid. They are associated with aging, recurrent episodes of chronic conjunctivitis and have been associated with trachoma. Most concretions are asymptomatic and no management is needed. In symptomatic or severe cases they can be excised.

Given the results of the investigation, the most plausible explanation of high reported prevalence of TF among adults was the misdiagnosis of concretions as trachomatous follicles. Concretions are common among adults globally and may be difficult to discern from trachomatous follicles. Through repeated and practical training using both digital photographs and field examinations of patients, national programs may improve the skills of examiners and increase the validity of results from trachoma prevalence surveys.

Figure 1. Concretions which can be misdiagnosed as TF.



MALTRA Week

Presented by Teshome Gebre, Carter Center Ethiopia

The combined malaria and trachoma (MALTRA) week sought to provide health education on trachoma and malaria prevention, treat the eligible population with azithromycin or tetracycline eye ointment, test presenting febrile cases for malaria infection with rapid diagnostic tests, and provide treatment for those positive for malaria. Mass health education and community mobilization was conducted through rural radio broadcasts, health service support and a mobile media van. This innovative approach to scaling-up activities had two distinct features: the integration of malaria control with a neglected tropical disease (trachoma) and the treatment of millions of people with azithromycin in a short time span.

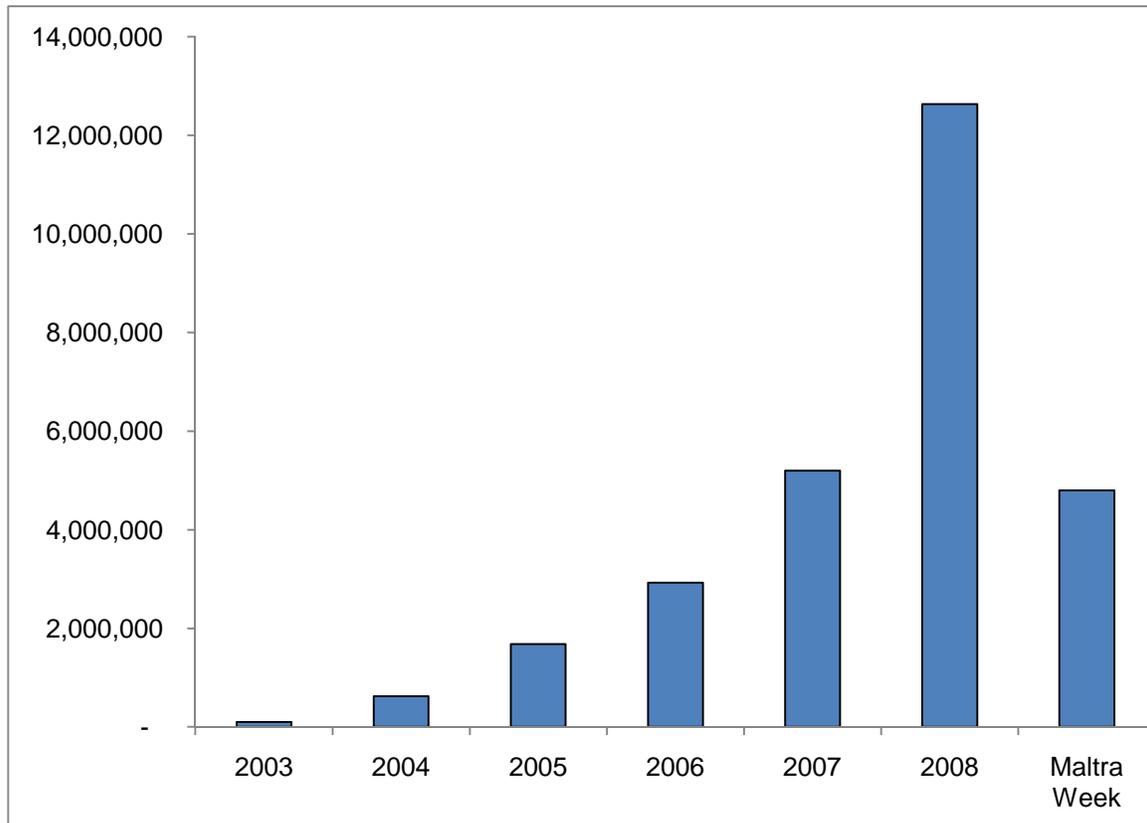
On November 17, 2008, His Excellency Girma Wolde Giorgis, President of the Federal Democratic Republic of Ethiopia, gave the first of a planned five million doses of the antibiotic azithromycin for trachoma control in Abaye Piccolo in the presence of the head of the Regional Health Bureau, Amhara Regional State President, local Lions and Carter Center and ITI staff. On the same morning, an army of 13,000 health workers, volunteers, Carter Center staff and Ethiopian Lions went to work throughout Western Amhara targeting the entire population of 135 districts, some five million people. Said Lion Dr. Tebebe Y. Berhan, "The phenomenal success of the MALTRA week is a testament to the power of the Lions-Carter Center partnership and what can be achieved when we all work together."

In the previous year, a considerable amount of time was spent by the integrated malaria and trachoma program staff in Amhara on antibiotic distribution. The focus on this activity reduced available time for planning surgery campaigns, health education and latrine promotion. In order to improve efficiency it was decided that all the planned treatments (10-17 million per year) would be conducted in two massive campaign weeks held six months apart, one in the eastern half of the state, the other in the west. The integrated malaria and trachoma week was welcomed by the Minister of Health Dr. Tedros Adhanom Ghebreyesus and enthusiastically supported by the Regional Health Bureau.

A total of 2,467 teams composed of a health extension worker or other health staff and three local volunteers were each equipped with measuring sticks, azithromycin tablets and suspension, rapid diagnostic tests for malaria, first line treatment for malaria (with artemisinin combination therapy and chloroquine), census books, treatment guidelines and health education materials. Over 7,000 community volunteers supported distribution activities. The teams worked on foot in and around their home villages, starting with health education and providing treatments from central places in their villages then mopping-up missing households through door-to-door visits. There were 93 senior health staff designated as woreda level coordinators and a total of 551 field supervisors deployed to closely monitor the performance of the community level treatment teams.

A total of 45 woredas (districts) were targeted for the MALTRA Week. Within just one week, a total of 4.8 million people residing in 1,052 kebeles (villages) received mass antibiotic treatment against trachoma. Figure one compares the MALTRA week antibiotic distribution with the annual output for mass drug administration in the Amhara region.

Figure 1: Trend of Mass Drug Administration in the Amhara Region, 2003-2008



The scale of the MALTRA week achievement is not to be underestimated. During this first MALTRA week, Lions-Carter Center supported programs treated more individuals than the cumulative program output 2000-2006. MALTRA week demonstrated the capacity of an integrated program to deliver unprecedented levels of output in a short period of time.

Ethiopia Bednet Durability Study

Presented by Stephen Smith, Centers for Disease Control and Prevention

Malaria control programs in Africa distribute long-lasting insecticidal bednets (LLINs) assuming that the nets have a useful life of three to five years. This assumption is based on laboratory tests that only measure the rate of insecticide loss by washing. Information regarding insecticide loss and physical deterioration of LLINs in real settings is sparse and may be highly dependent on climatic and cultural factors. A clearer understanding of LLIN deterioration in the field is needed to inform agencies responsible for procurement and planning and to guide manufacturers toward developing improved LLINs.

As a follow-up to the 2007 Carter Center-supported distribution of PermaNet™ 2.0 LLINs, 200 bednets were collected from households in Amhara region (East Gojjam and South Gondar zones, SNNPR (Kaffa zone) and Oromiya (Jimma zone) in Ethiopia at either three or six months after distribution to assess physical and insecticidal deterioration after short-term use. In each zone, two *kebeles* were selected and 25 nets were collected from each *kebele*. Although efforts were made to randomize the collection sites, logistical and time limitations prevented a true random collection. Nets collected from Jimma had been in use for six months and those collected from the other zones had been in use for three months.

At each house, Carter Center-provided nets were confirmed by matching the batch number printed on the label with the batch number known to have been distributed in the zone. Of the 200 nets collected, 169 were confirmed to belong to the batch of LLINs procured by The Carter Center. The 31 unconfirmed nets (all collected in Kaffa zone) were collected because householders claimed that they had been acquired during the Carter Center distribution; there was insufficient time to conduct a more widespread search for confirmable nets.

Of the 169 confirmed nets, 57.4% of the LLINs were damaged. Holes of at least 0.5 cm in the longest axis were found at a rate three per net used for three months and six per net used for six months. Large holes (greater than 10 cm in longest axis) were found at a rate of 0.03 per net after three months and 0.20 after six. No attempts to repair damage to any of the nets were evident.

The level of deltamethrin (insecticide) in 166 of the total 169 LLINs was in the range expected for new nets, while all nets performed well in the bioassay to measure insecticidal capacity. The data from this durability study show that although the nets procured by The Carter Center retained their insecticide, physical deterioration of the nets began early and proceeded rapidly. The deterioration of the nets may cause a potential premature reduction in protective efficacy. It is recommended that health education campaigns stress the importance of bednet care and repair as a means of extending the useful life of LLINs.

The TTT studies: The Treatment of Trachomatous Trichiasis

Presented by Saul Rajak, London School of Hygiene and Tropical Medicine

Background

Repeat infection with *Chlamydia trachomatis* results in the development of scar tissue on the inside of the eyelid, the conjunctiva. Over time, the eyelid rolls in (entropion) and the lashes scratch the cornea leading to blinding corneal scarring, a condition known as trichiasis. To prevent trachomatous blindness, eyelid surgery is performed to correct the in-turned lashes. However, this treatment is only partially effective, as the trichiasis frequently returns. This research project aims to develop strategies to provide better treatment for people with trichiasis and to strengthen the training of health care workers involved in providing surgical services.

Project Overview

This study is based in Bahir Dar, Amhara Regional State, Ethiopia. It is a collaborative project between the London School of Hygiene and Tropical Medicine, The Carter Center and the Ethiopian Regional Health Bureau and is funded in large part by the Band Aid Trust.

The project involves two large randomised controlled trials to investigate methods of trichiasis case management. The first clinical trial compares the use of two different suture materials in the trichiasis operation: silk sutures, which need to be removed after one week, and Vicryl sutures that are left *in situ* until they dissolve. It is thought that the recurrence rate after surgery may be lower with the Vicryl sutures. If this can be confirmed, it would have a large impact on the success of this very widely practiced operation. The second trial compares early eyelid surgery with epilation (eyelash plucking) for the management of minor trichiasis during the early, less severe stages of the disease.

The project also includes a study to investigate the productivity of trichiasis surgeons in Ethiopia. It is anticipated that the findings of this study will help guide the surgical programme in Ethiopia and increase the output of individual surgeons. A trachoma surgery training DVD is also being produced for use in surgical training.

Progress to Date

The project team consists of a coordinator, a field coordinator, two driver-logisticians, five nurse surgeons, eight field assistants and five laboratory workers. As part of this study, the surgeons were provided additional training to standardize their surgical technique. Seventy-three local community health workers (health extension workers) were trained to identify and mobilize patients with trichiasis in their locality.

Between March and July 2008, 1,300 patients were recruited to each of the two randomised controlled trials. The patient recruitment (and treatment) was carried out in 16 campaigns at different peripheral health clinics in the Amhara region. A total of 3,410 eyelid surgeries were performed and a further 882 patients in the epilation trial received high quality eyelash forceps and training in how to use them to epilate the lashes that are scratching the eye.

Follow-up at six months was completed from September 2008 and January 2009. Despite heavy rains, and impassable mud tracks, 90% of the study participants were located. Further follow-ups will occur every six months until the middle of 2010 at which point the trial results will be analyzed and published.

The study to investigate the productivity of trichiasis surgeons in Ethiopia and the development of a surgical training DVD are both planned to occur in 2009.

Available Results

The baseline data from all the patients recruited to the trials is currently being analysed. Preliminary results have shown that a proportion (30-40%) of the patients with TT have aberrant lashes rather than frank entropion and that epilation appears to be protective against corneal opacity for patients with major TT and does not appear to be affect the level of corneal opacity in minor TT.

Anticipated Results

Over the course of the next two years, these trials should inform the management of trichiasis. The future results of the studies are expected to answer the following questions:

1. Are Vicryl absorbable sutures at least as good as silk for TT surgery?
2. Is epilation a suitable alternative to surgery for patients with minor TT?
3. What are the surgical recurrence rates for TT surgery in Amhara region, Ethiopia?
4. Is conjunctival bacteriological infection associated with recurrence?
5. What are the levels of Chlamydial infection in patients with TT in Amhara region?
6. What inflammatory markers are associated with conjunctival inflammation and TT recurrence?

Niger and Mali: From Control to Elimination

Presented by Lisa Rotondo, The Carter Center Atlanta

During 2008, Carter Center support to the national blindness prevention programs in Niger and Mali underwent a restructuring process. After 10 years of work, process indicators revealed that The Carter Center had supported the two Ministries of Health in: implementing health education in 1,800 villages; training nearly 20,000 people in health education; constructing more than 70,000 household latrines; and training 3,500 masons in slab construction. In order to redirect the programs toward their elimination goals, the programs took a larger assessment to determine how far they were from their goals of eliminating blinding trachoma by 2015. The Carter Center was reinvigorated by renewed support from the Conrad N. Hilton Foundation and by a strengthened partnership with Helen Keller International.

In order to reorient Carter Center support to the programs' elimination targets, the programs gathered, analyzed, and, most importantly, organized program data, including prevalence survey results and intervention data. Workshops were held during which the national programs, the implementing regions and their partners determined current gaps in interventions and planned future implementation of the SAFE strategy. The process was guided by the use of the World Health Organization's document "Trachoma Control: A guide for Programme Managers" which can be downloaded at http://www.who.int/blindness/causes/trachoma_documents.

The countries began by organizing prevalence survey data in order to know in detail how each country is affected with disease. For each known endemic district, it was important to determine the population with active trachoma and the population with trichiasis. The most recent survey data were compiled into one spreadsheet, creating a simple tool to guide the programs in planning. It was useful to organize the survey data in the terms of the elimination criteria:

- To achieve a rate of TF less than 5% in children aged 1 to 9 years;
- To achieve a rate of TT less than one case per 1,000 persons in the total population (lower than 0.1% in the total population).

After combining all survey results in one table, color can be used to identify intervention needs. The total TT backlog was calculated per district (using updated population figures), as well as the minimum backlog of persons to operate on to meet the intervention threshold. Programs are advised to plan interventions to reach all persons suffering with TT—100% of the backlog. The prevalence data spreadsheet should be updated regularly when new surveys are conducted and should use formulas for automatic calculations.

Based on the prevalence data, the programs calculated updated ultimate intervention goals (UIGs). National programs should be aware that UIGs are fluid, and that once new survey data are available the findings will enable the programs to calculate more precise UIGs and annual intervention targets. Programs can then prioritize interventions based on disease burden, examine current gaps in implementation, and discuss how to reach all regions and districts in need so as to achieve elimination targets.

Surgical programming should consider all strategies possible to reach all TT patients by assessing the human and logistical resources on hand, establishing national guidelines for surgical interventions (including training of active surgeons using the WHO TT certification manual), and establishing a supervisory structure for ongoing activity. To plan antibiotic distribution activities, the programs found it useful to create one table with all distribution data. Programs should use actual estimates for rural population size and aim to reach 100% of those at risk. General approximate guidelines for planning mass distribution are:

- 98% of the target population will receive azithromycin (80% tablets, 18% suspension);
- 2% of the target population will receive tetracycline.

To plan health education activities, programs should assess where activities currently take place and where they are needed. Programs and organizations should consider combining forces to have a larger reach and assess how to scale up activities for larger impact, working where partnerships already exist. Programs should particularly consider how health education activities can bolster the implementation of surgery and MDA. For environmental improvements, programs should calculate latrine construction using updated national sanitation estimates from the Demographic and Household Surveys (DHS), Multiple Indicator Cluster Surveys (MICS) or other national records and the most current population estimates available.

National programs and their partners should continue looking for opportunities to maximize program impact. There will be chances to harmonize or integrate activities between national programs and between NGOs. For example, one set of health education materials can be used nationally, or one overarching radio contract be used to reach all endemic regions. There are also opportunities to share resources. The Ministries of Health, supporting NGOs and partner organizations should have a common objective and contribute the maximum according to ability.

Recognizing that funds are limited, the programs in Niger and Mali created realistic targets and a timetable for implementation of the SAFE strategy from now until elimination. Provisional calendars of future prevalence and coverage surveys were developed and gaps in resources were identified. The programs have begun 2009 with a re-energized sense of program direction and renewed commitment to reaching elimination of blinding trachoma by 2015.



Mali national program workshop participants, November 2008.

Trichiasis and Gender

Presented by Paul Courtright, Kilimanjaro Centre for Community Ophthalmology

Many trachoma prevalence surveys have found excess trichiasis in women compared to men. The frequency of trichiasis in women is often explained in terms of the excess exposure to ocular *Chlamydia* infection due to domestic responsibilities and proximity to children throughout the day and when sharing bed space with children at night. Although it is widely accepted that women carry an increased burden of trichomatous trichiasis compared to men, there was no previous systematic review of the available prevalence surveys in the peer-reviewed literature.

In 2008, a literature search was conducted to identify population-based trachoma prevalence surveys utilizing the WHO simplified grading system which included data for trichiasis. Of 53 identified studies, 24 from 12 different countries met the following inclusion criteria: (1) published in a peer-reviewed journal; (2) used a population-based sampling methodology to determine the prevalence of trichiasis; (3) used the WHO simplified grading system; and (4) reported either sex-specific trichiasis prevalence, or provided sufficient information to allow back calculation of the number of TT cases (numerator) and number of people screened (denominator) for both sexes.

Prevalence data were pooled in a meta-analysis to estimate an overall odds ratio. The overall odds of trichiasis in women compared to men was 1.82 (95% Confidence Interval [CI] 1.61-2.07). Individual survey odds ratios ranged from 0.83 (95% CI 0.40-1.73) in Myanmar to 3.82 (95% CI 2.36-6.19) in Ethiopia. There were statistically significant differences in odds of trichiasis by gender in 18 of 24 studies, all of which showed increased odds of trichiasis in women compared to men. These data confirm the perception that women have a greater burden of trichiasis, and that this burden persists across all populations studied. Women must be targeted specifically and deliberately for trichiasis surgery if the aim of eliminating blindness from trachoma is to be achieved.

Programmatically, the summary odds ratio is a stark reminder that it will simply not be possible for trachoma-endemic countries to reach the goal of elimination of blinding trachoma (currently the definition includes reduction of TT in the whole population to 0.1% or less) without paying particular attention to the gender bias, and without targeting women for trichiasis surgery. If the aim of the global alliance to eliminate blindness from trachoma by 2020 (GET 2020) is to be achieved, programs must provide surgical services that specifically and deliberately target women.

Coverage Survey of Mass Antibiotic Distribution

Presented by Elizabeth Cromwell, The Carter Center Atlanta

National trachoma control programs currently estimate population coverage of antibiotic distribution by dividing the number of doses distributed by either (1) the total population in endemic areas or (2) the total population targeted by the distribution. Although these calculations produce an overall estimate of distribution coverage, there is currently no standard method to validate the distribution reports from which programs derive these results. These calculations have several limitations which may introduce bias as follows: a reliance on distribution reports which may be incomplete; forged or missing records; and quantities of drug that are lost, stolen (or otherwise misused) reported as consumed can inflate coverage estimates. Where population data are unreliable, population coverage is often over or under estimated.

Without a reliable method to assess coverage, national country programs are prone to inaccurately measure the extent of "A" program interventions and misrepresent the impact of antibiotic distribution in program evaluations. This survey aimed to compare self-reported population coverage and positive validated self-reported coverage against the traditional population coverage calculation.

A mass antibiotic distribution was conducted in May 2008 in three *payams* (sub-districts) of Akobo County, Southern Sudan. This distribution utilized a central-site approach; the population was mobilized to report to the nearest distribution site located no further than a two hours' walk from the community. At the time of treatment, recipients were marked on the last finger of either hand with an indelible ink.

To estimate distribution coverage, a two-stage population-based cluster random survey was conducted in 25 villages randomly selected from the three *payams*. Ten households were randomly selected in each cluster. Each household head was interviewed using a standard questionnaire to record reported participation in the distribution, and all household members were counted using a census form which reported participation status and checked for presence of an ink mark. A total of 247 head of household interviews were conducted and 1,101 people were enumerated in the household census. An additional 257 responses were obtained by proxy for absent household members.

A total of 11,149 doses were reported distributed during the Akobo distribution. The routine method to calculate coverage over the total eligible population estimated population coverage to be 20.9% (11,149/50,000). According to the survey, the overall population coverage estimate (un-weighted) for the entire distribution was 61.4%. The discrepancy in coverage results suggests that the population estimate is inaccurate. The results also showed an average of 57.8% of self-reporting participants could be verified with ink. Statistically significant predictors of participation were identified as: younger age; presence of a health worker in the community; head of household knowledge of the distribution; and a distribution site located within the community. Where population data and distribution records are not reliable, programs should utilize a cluster survey of antibiotic coverage to validate reports.

Women and Trachoma Manual

Presented by Paul Courtright, Kilimanjaro Centre for Community Ophthalmology

In trachoma-endemic countries, gender and equitable access to the SAFE strategy usually go together. Trachoma affects both men and women, but women and girls are disproportionately affected by the disease and are often disproportionately served by trachoma control programs. Women and girls can face limited access to surgery, antibiotic coverage, and hygiene and sanitation interventions when they need them the most. The “Women and Trachoma” technical manual serves as a tool for trachoma control program managers, policy makers and international organizations to aid in the development and implementation of trachoma control programs to reach both men and women, whilst providing suggestions of ways to deliberately and purposefully improve access to interventions for women.

The Women and Trachoma manual is designed to improve the capacity of trachoma control programs to set targets, monitor coverage of program activities and improve behavior change interventions with a gender perspective. Through a comprehensive review of the SAFE strategy, the manual provides programmatic guidance to develop gender-equitable access to the curative parts of the strategy, including surgical delivery and antibiotic distribution. It also addresses ways to target the preventative aspects, behavior change and health education, to women and girls. It includes tools that program managers can use to mobilize individuals and communities and encourage the adoption of positive behaviors that will reduce trachoma transmission. Environmental change and gender are reviewed to highlight the role of women in community-led sanitation projects. The manual also includes case examples and stories from the field that reinforce the thematic outline. Although the manual largely focuses on sub-Saharan Africa, case examples from Asia are also included and the tools presented are applicable to a wide range of other contexts.

There is currently a need for technical support to trachoma control program managers, planners, and international partners to promote the equitable application of the SAFE strategy for trachoma control. At an individual level, women in trachoma-endemic communities will directly benefit from interventions tailored to their unique socio-economic position. By examining gender, regional and national health authorities will be able to measure progress against ultimate intervention goals. In addition, gender-sensitive program management will empower ministries of health with tools for strategic planning. With a stronger evidence base, national and international partners can provide meaningful technical support and advocacy on behalf of women at risk of trachoma.

Financial support for this publication was provided by the Elfenworks Foundation.

The manual is available in print from The Carter Center Trachoma Control Program and can be downloaded from www.cartercenter.org or www.kcco.net.

Intensifying Health Education in Ethiopia

Presented by Mulat Zerihun, The Carter Center Ethiopia

In 2008, The Carter Center Ethiopia and the Amhara Regional Health Bureau recognized the need to reinforce the ongoing implementation of the SAFE strategy and mobilize communities for participation in the November MALTRA week activity. A comprehensive approach was required to enhance mobilization and health education to increase community support for trachoma control program interventions, encourage high levels of uptake among the target population and create a sustainable behavior change program.

In order to develop an appropriate and accessible behavior change program, The Carter Center Ethiopia and the Amhara Regional Health Bureau first identified the need to quantify existing media and information-gathering practices using a media habits survey. The purpose of the survey was to measure the frequency of radio and television ownership, access and preferred listening times, availability of print media, signs and billboards for targeting the literate population and the role of community leaders and elders as a health information source. This survey was implemented in five zones of West Amhara. Using a multi-stage random sample design, a total of 1,499 individuals were interviewed using a standardized questionnaire administered in Amharic, the local language. The survey participants included heads of households, mothers of children less than 10 years of age and young adults 11-18 years of age.

In this survey, 52% of the respondents were women and one-third of the participants were young adults aged 11-18 years. Almost all respondents self-identified as belonging to the Amharic ethnic group (92.0%) and farming was the most frequently reported occupation (68.0%). Overall, 51.0% of the respondents reported that they owned a radio and 66.0% reported ever having listened to a radio. The majority of those surveyed preferred listening to the Amhara Radio station (77.0%). News and drama were the most preferred radio programs. The survey measured preferred radio-listening times and identified the morning and evening time slots as the most popular among the survey respondents.

A bivariate analysis of radio listening and age of respondent showed that the younger respondents reported ever having listened to radio more frequently than their older counterparts, but the difference was not statistically significant. Similarly, the difference between males and females in radio listening was not statistically significant. Education was correlated to radio listening. The higher the level of education, the more likely the respondent reported listening to the radio; this difference was statistically significant.

Television ownership was not reported frequently (1.0%); however, 33.0% reported ever having seen television outside of their home. Respondents reported watching TV on a weekly basis in public places like markets and schools in the afternoon. This suggests that transmitting health education videos weekly in public places may be an effective method to reach the target audience.

Of the 48.4% of the respondents who self-identified as literate, 65.0% reported ever having read a newspaper or magazine. The data showed that the health clinic and market place were the most important locations where respondents had seen posters and 53.0% reported that they read posters when they saw them. In low literacy settings, the use of print media is not effective at reaching communities at the grassroots level.

The results of this survey enabled the trachoma control program in Amhara to develop six new radio messages and broadcast them on the preferred radio station and at preferred times. These messages promoted latrine construction and use, face-washing, participation in antibiotic distribution and surgical treatment of trichiasis for trachoma, and use of a mosquito net, wash and repair instructions for bednets, and to report to a health clinic upon presentation of a fever for malaria. A total of 120 broadcasts were aired before, during and after the MALTRA week activities. A total of 20,000 leaflets, 20,000 brochures, and 4,000 integrated (malaria and

trachoma) t-shirts also were produced. A mobile video van was hired to conduct health education and mobilize communities for trachoma and malaria control interventions. Table 1 presents the total activity of the video van by zone.

The program estimated that the social mobilization program increased uptake of the SAFE strategy during MALTRA week to greater than 90.0%. In particular, there was also no reported refusal or resistance to participating in the antibiotic distribution activities. The program plans to use the data from the media habits survey to promote community-led total sanitation activities.

Table 1: Number of woredas covered by the Health Education Van, events and people reached

Zone	Malaria sensitization				Trachoma sensitization			
	No. of days	# of woredas covered	# of evening events	People Reached	No. of days	# of woredas covered	# of evening events	People Reached
East Gojam	8	8	8	118,600	18	13	14	247,950
West Gojam	7	7	7	218,650	13	10	17	414,000
South Gondar	5	5	5	107,450	2	2	2	28,500
North Gondar	7	6	6	94,950	12	6	12	275,600
Awi	3	3	4	80,700	9	6	9	231,500
Total	30	29	30	620,350	54	37	54	1,197,550

Ethiopia Lions Club

Presented by Dr. Tebebe Y. Berhan, Lions Club District 411A, Ethiopia



The Ethiopian Lions Club is a leading partner in blindness prevention in Ethiopia. With generous support from the Lions Clubs International Foundation, the Ethiopian Lions celebrated many significant accomplishments in 2008.

Capacity building is a cornerstone of the Lions' work. Under SightFirst Grant SF1176, the Lions have supported the second year of training for 19 ophthalmic nurses and supported the reconstruction of the Addet Secondary School in Amhara. The Lions are also a partner committed to providing basic eye care services such as trichiasis and cataract surgery. In 2008, the Lions supported 7,242 cataract operations and 11,618 trichiasis surgeries. The Ethiopian Lions are active in the Amhara and Tigray regions, where they facilitate a variety of interventions including surgery, antibiotic distribution, health worker training, latrine construction and water provision.

The Ethiopian Lions were instrumental in the preparation and implementation of the MALTRA week activities conducted through the Lions-Carter Center Sight First partnership. The Lions provided valuable assistance mobilizing the national and regional governments, health systems and local communities. The collaboration between The Carter Center Ethiopia and the Lions enabled the program to deliver an unprecedented level of service and health education to almost 5 million people in the Amhara Region.

Guided by their strategic plan, the Lions aim to eliminate blinding trachoma from the Amhara and Tigray regions, expand trachoma control to Oromia, SNNPR and Somali regions and to provide 70% of refractive error and eye screening services in schools by the year 2014. The Lions serve as an example to other partner organizations. The Lions are not simply a donor agency; their commitment and strategic vision enables them to provide leadership and advocacy to accomplish the goals of blindness prevention.



Ethiopian Lions at the MALTRA week launching ceremony.

APPENDIX I: The Disease

Trachoma is the world's leading cause of preventable blindness. The World Health Organization estimates that six million people are blind due to trachoma, most of whom are women, and another 540 million – almost 10 percent of the world's population – are at risk of blindness or severe visual impairment. Trachoma is caused by repeated infections of the conjunctiva (the lining of the eye and eyelid) by the bacterium *Chlamydia trachomatis*, and can be prevented through simple hygiene practices. Most cases occur in rural, arid areas of developing countries, such as the Sahelian region of Africa, where access to clean water is limited.

The early stage of the disease is called *inflammatory trachoma*, and is most common among children. Inflammatory trachoma can present as either the formation of whitish follicles on the conjunctiva under the upper lid or around the cornea, or as an intense uncomfortable inflammation with thickening of the conjunctiva and pain. Repeated cycles of infection and resolution lead to the formation of scar tissue on the conjunctiva. Women are repeatedly exposed to inflammatory trachoma in their role as primary caretakers of children. It is therefore not surprising to find that women develop chronic trachoma two to three times more often than men. Trachoma is transmitted through discharge from the eyes and nose of infected individuals, which may be passed to others on hands, towels and clothing, or by flies, which are attracted to ocular and nasal discharges. As a trachoma patient's eyelids are repeatedly infected with chlamydia, subsequent scarring of the conjunctiva deforms the eyelid margin, resulting in eyelashes turning inward and rubbing against the cornea. This condition, called *trichiasis*, causes disabling pain and physically abrades the cornea, scratching it and introducing other infections. Trichiasis is horrific in itself but also rapidly leads to blindness.

Recent developments have brought new hope that we can effectively control this disease. In 1987, eye care experts and the World Health Organization (WHO) developed a simplified trachoma grading scale, which facilitated and standardized the diagnosis and identification of all stages of trachoma. In 1996, WHO established the GET2020 Alliance, which brings international non-governmental development organizations, donors and researchers together to work collectively in controlling trachoma. In addition, with support from the Edna McConnell Clark Foundation (EMCF) and WHO, the *SAFE strategy* was created to control trachoma through community-based interventions.

Another important development was the finding that the oral antibiotic *azithromycin*, taken once or twice annually, is as effective in preventing chronic trachoma as six weeks of daily treatment with tetracycline eye ointment, the previously recommended therapy. To assist ministries of health in implementing the "A" component of the SAFE strategy, the International Trachoma Initiative (ITI), formed through the collaboration of EMCF and Pfizer Inc, is managing a significant donation of Zithromax[®] (azithromycin) for treatment of trachoma in selected endemic countries. Pfizer Inc's donation of azithromycin is the largest donation of patented pharmaceutical in history, and the existence of the donation program has served to invigorate trachoma programs.

“From Control to Elimination”
The Tenth Annual Trachoma Control Program Review
February 11-13, 2009

Wednesday, February 11

8:00	*Shuttle Pick-up at Hotel*	
8:30 – 9:00	<u>Breakfast</u>	
9:00 – 9:30	Welcome and Introductory Remarks Participant Introductions	Dr. Donald Hopkins
9:30 – 10:00	From Control to Elimination	Dr. Paul Emerson
10:00 – 10:30	<u>Coffee Break</u>	
10:30 – 11:30	Ghana	Dr. Oscar Debrah
11:30 – 12:30	Niger	Dr. Kadri Boubacar
12:30 – 1:45	<u>Lunch</u>	
1:45 – 2:00	Announcements	
2:00 – 2:30	Collateral Benefits of SAFE	Dr. Paul Emerson
2:30 – 3:00	WHO Update	TBD
3:00 – 3:30	ITI Presentation	Dr. Adam Zayan
3:30 – 4:00	<u>Coffee Break</u>	
4:00 – 4:30	Surveillance for Certification of Trachoma Elimination	Mr. Jonathan King
4:30 – 5:00	Overview of the Carter Center Malaria Program	Mr. Aryc Mosher
5:30	*Shuttle Departure for Hotel Indigo*	

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Thursday, February 12

8:00	*Shuttle Pick-up at Hotel*	
8:30 – 9:00	<u>Breakfast</u>	
9:00 – 10:00	Government of Southern Sudan	Dr. Lucia Kur
10:00 – 11:00	Government of Sudan	Dr. Awad Hassan
11:00 – 11:30	<u>Coffee Break</u>	
11:30 – 12:30	Ethiopia	Dr. Daddi Jima Mr. Tesfaye Teferi
12:30 – 1:45	<u>Lunch</u>	
1:45 – 2:00	Announcements	
2:00 – 2:30	Niger and Mali: From Control to Elimination	Ms. Lisa Rotondo
2:30 – 3:00	TANA Update	Ms. Nicole Stoller
3:00 – 3:30	Investigation of high prevalence of active trachoma in Sudanese adults	Mr. Jonathan King Dr. Bruce Gaynor
3:30 – 4:00	<u>Coffee Break</u>	
4:00 – 4:30	MALTRA Week	Mr. Teshome Gebre
4:30 – 5:00	Bednet Durability Study	Dr. Stephen Smith
5:30 – 7:00	*Shuttle Departure for Hotel Indigo and Reception at Bazaar*	

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Friday, February 13

8:00	*Shuttle Pick-up at Hotel*	
8:30 – 9:00	<u>Breakfast</u>	
9:00 – 10:00	Nigeria	Dr. U. Onyebuchi
10:00 – 11:00	Mali	Dr. Bamani Sanoussi
11:00 – 11:30	<u>Coffee Break & Group Photo</u>	
11:30 – 12:30	TTT Study	Dr. Saul Rajak
12:30 – 1:30	<u>Lunch</u>	
1:30 – 2:00	<u>Optional Museum Tour</u> Program Announcements	
2:00 – 2:30	Trichiasis and Gender	Mr. Jonathan King Dr. Paul Courtright
2:30 – 3:00	The Ethiopian Experience in Intensifying Community Health Education	Mr. Mulat Zerihun
3:00 – 3:30	Coverage Survey of Antibiotic Distribution	Ms. Elizabeth Cromwell
3:30 – 4:00	<u>Coffee Break</u>	
4:00 – 4:30	Women and Trachoma Manual	Dr. Paul Courtright
4:30 – 5:00	Conclusions and Recommendations	
5:30	*Shuttle Departure for Hotel Indigo*	

Appendix III: List of Participants

Ethiopia

Mr. Teshome Gebre (The Carter Center)
Dr. Daddi Jima
Dr. Zerihun Tadesse(The Carter Center)Mr.
Tesfaye Teferi (The Carter Center)
Mr. Mulat Zerihun (The Carter Center)

Ghana

Dr. Oscar Debrah
Mr. Jim Niquette (The Carter Center)

Government of Sudan

Ms. Zeinab Abdalla (The Carter Center)
Dr. Nabil Aziz Awad Alla (The Carter Center)
Dr. Awad Hassan

Government of South Sudan

Mr. Gideon Gatpan (The Carter Center)
Dr. Lucia Kur

Mali

Mr. Yaya Kamissoko (The Carter Center)
Dr. Bamani Sanoussi
Mr. Jim Ting (The Carter Center)

Niger

Mr. Ali Amadou (The Carter Center)
Dr. Kadri Boubacar
Mr. M. Salissou Kané (The Carter Center)

Nigeria

Dr. Abel Eigege (The Carter Center)
Dr. Nimzing Jip (The Carter Center)
Dr. Emmanuel Miri (The Carter Center)
Dr. Uwaezuoke Onyebuchi

Arthur M. Blank Foundation

Ms. Barbara Saunders

Bill & Melinda Gates Foundation

Ms. Erin Shutes

Cambridge University

Dr. Jeremiah Ngondi

The Centers for Disease Control and Prevention

Dr. Els Mathieu
Dr. Stephen Smith

Conrad N. Hilton Foundation

Mr. Ed Cain
Ms. Shaheen Kassim-Lakha
Ms. Jennifer Lieberstein

Francis I. Proctor Foundation

Dr. Bruce Gaynor
Ms. Nicole Stoller

Helen Keller International

Mr. Chad MacArthur

International Trachoma Initiative

Dr. Adam Zayan

Johns Hopkins University

Dr. Sheila West

Kilimanjaro Centre for Community Ophthalmology

Dr. Paul Courtright

Lions Clubs International Foundation

Mr. Philip Albano

Lions Clubs-Ethiopia

Dr. Tebebe Yemane Berhan

London School of Hygiene and Tropical Medicine

Dr. Saul Rajak

Operation Eyesight

Dr. Boateng Wiafe

Pfizer Inc

Ms. Kim Frawley

Research Triangle International

Dr. Dieudonné Sankara

Sight Savers International

Mr. Simon Bush

Taskforce for Global Health

Dr. Mark Rosenberg
Dr. Danny Haddad

Vestergaard Frandsen

Mr. Navneet Garg
Ms. Simone Nikolajsen

World Vision

Dr. Joseph de Graft Riverson

The Carter Center

Ms. Rebecca Brookshire
Ms. Kelly Callahan
Ms. Elizabeth Cromwell
Mr. Don Denard
Dr. Paul Emerson
Ms. Maureen Goodman
Dr. Patricia Graves
Dr. John Hardman
Ms. Madelle Hatch
Dr. Donald Hopkins
Ms. Nicole Kruse
Mr. Jonathan King
Mr. Aryc Mosher
Dr. Frank Richards
Ms. Lisa Rotondo
Mr. Randy Slaven
Mr. Craig Withers