

SUMMARY PROCEEDINGS
TWELFTH ANNUAL TRACHOMA CONTROL PROGRAM REVIEW

ACHIEVING ELIMINATION TARGETS

THE
CARTER CENTER



Waging Peace. Fighting Disease. Building Hope.

**Atlanta, Georgia
February 22-24, 2011**

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Conrad N. Hilton Foundation
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“Achieving Elimination Targets”

The Twelfth Annual Trachoma Control Program Review



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ACRONYMS

AMREF	African Medical and Research Foundation	OLS	Operation Lifeline Sudan
BTRP	Bilamellar Tarsal Rotation Procedure	ORDA	Organization for Rehabilitation and Development in Amhara
CBM	Christoffel Blindenmission	PBD	Prevention of Blindness and Deafness
CDC	U.S. Centers for Disease Control and Prevention	PBPS	Population-Based Prevalence Surveys
CDD	Community Drug Distribution or Distributor	PNLC(C)	Programme National de Lutte contre la Cecité
CLTS	Community Led Total Sanitation	PRET	Progress in the Rapid Elimination of Trachoma
CMA	Christian Medical Association	RTI	Research Triangle Institute International
CNHF	Conrad N. Hilton Foundation	SAFE	Surgery, Antibiotics, Facial Cleanliness & Environmental Improvement
CPA	Comprehensive Peace Agreement	Sanplat	Modified Mozambique Sanitation Platforms
DANIDA	Danish International Development Agency	TANA	Trachoma Amelioration in Northern Amhara
FINIDA	Finnish International Development Agency	TCC	The Carter Center
FMOH	Federal Ministry of Health	TEO	Tetracycline Eye Ointment
GET2020	Alliance for the Global Elimination of Blinding Trachoma by 2020	TF	Trachomatous Inflammation-Follicular
GOS	Government of Sudan	TI	Trachomatous Inflammation-Intense
GOSS	Government of Southern Sudan	TIRET	Tripartite International Research for the Elimination of Trachoma
GW	Guinea Worm	TRA	Trachoma Rapid Assessment
HEW	Health Extension Worker	TT	Trachomatous Trichiasis
HKI	Helen Keller International	TTT	Trichiasis Trachomatous Trials
IDP	Internally Displaced Persons	UIG/UTG	Ultimate Intervention/Treatment Goal
IG	Integrated	UNICEF	United Nations Children's Education Fund
ITI	International Trachoma Initiative	USAID	United States Agency for International Development
KAP	Knowledge, Attitudes, and Practices	VBHW	Village Based Health Worker
KCCO	Kilimanjaro Centre for Community Ophthalmology	WHO	World Health Organization
LCIF	Lions Clubs International Foundation		
LGA	Local Government Area (specific to Nigeria, analogous to a district)		
LLIN	Long-Lasting Insecticidal Nets		
MALTRA	Malaria and Trachoma Program		
MDA	Mass Drug Administration		
MDG	Millennium Development Goal		
MOH	Ministry of Health		
NECP	National Eye Care Program		
NEI/NIH	National Eye Institute/National Institutes of Health		
NGO	Non-Governmental Organization		
NP	Nasopharyngeal		
NPPB	National Program for the Prevention of Blindness		
NTD	Neglected Tropical Disease		

EXECUTIVE SUMMARY

Achieving Elimination Targets

The Twelfth Annual Program Review of trachoma control programs was held at The Carter Center, February 22-24, 2011. In addition to the six Carter Center-assisted programs (Ethiopia, Mali, Sudan, South Sudan, Niger, and Nigeria), we were joined by our donors, partners and special guests from the World Health Organization (WHO), U.S. Centers for Disease Control and Prevention (CDC), Emory University, Pfizer Inc, International Trachoma Initiative (ITI), Helen Keller International (HKI), London School of Hygiene and Tropical Medicine (LSHTM), Kilimanjaro Centre for Community Ophthalmology (KCCO), the Francis I. Proctor Foundation at the University of California San Francisco, the Task Force for Global Health, Sightsavers, Ghana Health Service, McKinsey & Company, Research Triangle Institute International, Tanzania Ministry of Health, Lions Clubs International Foundation, Lions Clubs of Ethiopia, Conrad N. Hilton Foundation and the Bill & Melinda Gates Foundation.

As in previous years, the objective of the Program Review was to provide inspiration, instruction and motivation to all those involved in delivering the SAFE strategy for trachoma control. This was accomplished by reviewing the status of the national trachoma control programs; identifying challenges in planning and implementation; discussing solutions and shared experience; and promoting the sharing and standardizing of information.

After over a decade of implementing trachoma control programs, country programs are distributed across the spectrum of strategic stages, from those still struggling with mapping to those that have reached the elimination targets and are maintaining surveillance before applying for certification. All country programs can learn from the experience of their peers as they aim to achieve the elimination targets. At the review, and summarized in this document, were presentations on expanding activities in Nigeria to include mass drug administration for the first time; conducting impact assessments in Ethiopia, Mali, and Niger; and managing the end game of eliminating active trachoma in The Gambia and Ghana. There also were several special sessions on surgical provision and managing trichiasis aimed at increasing the number of successfully operated and satisfied patients.

2010 was an important year for Carter Center-assisted countries and the global program. Featured speakers from the WHO, ITI and McKinsey & Company gave updates on several major new international initiatives. The WHO presented the report of the third Global Scientific Meeting on Trachoma, held in July 2010, which has clarified the guidelines for starting and stopping interventions. ITI unveiled the new online Global Trachoma Atlas, and McKinsey & Company discussed progress on their Global Strategic Action Plan which will outline all that needs to be achieved to reach the goal of eliminating blinding trachoma by the year 2020. The Carter Center's Dr. Donald Hopkins gave an overview of the findings of the International Task Force for Disease Eradication that convened in October 2010 to review progress on trachoma elimination.

With only 10 years before the global elimination target date, one Carter Center-assisted country, Ghana, reached the elimination targets for active trachoma prevalence, and has now also reached the target for surgery provision. Mali, Sudan, Niger and the Amhara region of Ethiopia appear to be on track to achieve elimination by their target date of 2015 while the rest of Ethiopia, Nigeria and South Sudan need additional assistance if they are to reach elimination targets by 2020. Carter Center-assisted program output across all countries was very strong with over 41,000 surgeries conducted, over 16.2 million doses of antibiotic distributed, almost 10,000 villages receiving routine health education and 612,000 household latrines reported for 2010. In all, the programs touched the lives of nearly 40 million people suffering from or at risk of trachoma.

Ethiopia Trachoma Control Program-National Perspective

Presented by Dr. Tizita Hailu, Director, Pastoralist, Health Promotion and Disease Prevention Directorate and Chairperson of the National Committee for the Prevention of Blindness and National Taskforce for Trachoma Control, Federal Ministry of Health

Background

In 2006, the Federal Ministry of Health (FMOH) of Ethiopia conducted a national blindness and low vision survey supported by The Carter Center, the International Trachoma Initiative (ITI), CBM, and other partners. The findings of this survey showed that the prevalence of blindness in Ethiopia, estimated at 1.6%, is among the highest in the world. Blindness from trachoma was attributed to 12% of all blindness nationally, second only to cataract. The national prevalence of trachoma (clinical grade TF) among children ages 1-9 years was estimated at 26.2% and trichiasis among adults 15 years and older was 3.1%. The second most populous country in Africa, Ethiopia is the most severely affected trachoma-endemic country worldwide. Although the prevalence of TF and TT vary by region, there are approximately 67 million people at risk for trachoma among a national population of approximately 75 million, and nearly 1.2 million people blind as a result of trichiatic corneal opacity. Table 1 shows the distribution of TF and TT by region.

Table 1. 2006 Prevalence Data, by Region

Region	TF Children % (1-9 years)	TT Adults % (15 years and older)
Afar	1.9	1.0
Addis Ababa	0.5	0.9
Amhara	39.1	5.2
B-Gumz	0.9	0.1
Dire Dawa	0.5	0.7
Gambella	14.6	2.5
Harari	2.6	1.2
Oromiya	24.5	2.8
Somali	16.7	4.2
SNNP	26.4	2.0
Tigray	20.8	2.3

The Amhara National Regional State of Ethiopia is the most trachoma-endemic among all ten regional states. Home to almost 18 million people, the 2006 survey showed the regional prevalence of TF in children was 39.1% and TT in adults was 5.2%.

In 2005, the first national strategic plan for trachoma control was developed for the period 2006-2010. In the five-year plan, the FMOH set 2020 as the target date for the elimination of blinding trachoma as a public health problem.

Regional Activities

With support from partners, the regional health bureaus implement trachoma control activities and coordinate SAFE strategy interventions, through a process decentralized from the Federal Ministry of Health.

Table 2. List of Regions and Supporting Partners

Region	Partner
Afar	AMREF
Amhara	The Carter Center, CBM, Lions Clubs of Ethiopia, Light for the World
Benshangul-Gumuz	CBM
Oromiya	Light for the World , CBM, GTM, World Vision
SNNP	ORBIS International, GTM, Light for the World, World Vision
Gambella	CBM
Harari	CBM
Somali	Light for the World
Tigray	CBM, Lions Clubs of Ethiopia

Program Achievements in 2010

The national program made considerable progress towards its SAFE strategy Ultimate Intervention Goals (UIG) in 2010. A summary of the annual targets and achievements is presented in Table 3. Although the program did not meet all its targets, the output achieved ranks Ethiopia's as the most productive trachoma control program in the world.

Table 3. Program Achievements in 2010

Indicator	National Program Targets	National Program Output
Persons operated on for trichiasis	85,000	59,058
Trichiasis surgeons trained	187	136
Doses of azithromycin distributed	21,600,000	18,404,655
Doses of tetracycline distributed	480,000	545,330
Villages reached through health education	*	*
Household latrines constructed	*	*

*Not presented

Table 4. Program Achievements in Surgery and Mass Drug Administration by Region, 2010

Region	Number of doses of antibiotic distributed ¹	Number of persons operated ²
Amhara	15,141,608	33,021
SNNPR	2,481,438	13,764
Oromia	1,179,711	1,581 ³
Tigray	77,657 ⁴	10,692
Addis Ababa	N/A	4,914
Total	18,880,414⁵	63,972

¹Azithromycin and tetracycline eye ointment (TEO)

²As reported by FMOH

³Surgeries supported by GTM in Oromia and SNNPR; data disaggregated by region are not available

⁴TEO doses not reported

⁵Total disaggregated by region does not include antibiotic distribution in urban areas

Trichiasis Surgery (S)

In Ethiopia, trichiasis surgery is offered free of charge through routine health service provision and surgical outreach campaigns. Partners working with the regional health bureaus provide support for the provision of surgical sets, consumables and other supplies. Trichiasis surgeons are trained to perform the Trabut procedure and are certified using World Health Organization (WHO) guidelines. Upon successful completion of training, surgeons are provided surgical sets to use during their routine health service tasks, as well as during participation in campaigns. Some surgeons seek patients through individual visits to communities where they operate in the *kebele*, others work through large-scale campaigns that attract hundreds of patients via radio and other forms of mobilization.

Since 2001, the national program has achieved a total of 442,868 trichiasis surgeries throughout the country. The national program estimates that there remains a backlog of approximately one million un-operated TT cases.

Antibiotic Distribution (A)

In Ethiopia, antibiotic distribution takes place using the existing health infrastructure, including the *woreda* supervisors and the *kebele* Health Extension Workers (HEWs). The *woreda* level supervisor has overall responsibility and oversees all field supervisors. Field supervisors are staff from health centers who each supervise three to four teams. Antibiotic distribution is directly observed and recorded in both *kebele* log books and tally sheets. A distribution campaign may last for ten days and is initially conducted at pre-specified convenient points within the *kebele* before teams move to trace missed families house-to-house.

The national program indicates that the program has achieved 87.4% coverage of the 21.6 million persons targeted for treatment. The majority of the 18.3 million doses (~81%) were distributed in the Amhara region where antibiotic treatment is delivered through an integrated approach via MalTra Weeks.

Facial Cleanliness and Health Education (F)

Health education is an ongoing activity through the HEW program. HEWs use their health promotion schedule to encourage households to build latrines, practice good hygiene and keep their children's faces clean. During surgery and antibiotic campaigns, HEWs play a key role in social mobilization to advocate for the benefits of treatment with those at risk of trachoma infection or blindness from trichiasis.

Environmental Improvement (E)

The Ethiopian Federal Ministry of Health has identified household sanitation as a priority intervention through the HEW program and, in 2009, adopted a form of Community-Led Total Sanitation (CLTS). The Amhara Regional Health Bureau also has adopted the CLTS approach, with a target to exceed Millennium Development Goal 7 by reducing the proportion of households without access to sanitation by 100% (MDG 7 calls for a 50% reduction). The national program estimates that they are close to achieving this goal. Of the 17.2 million latrines estimated to be the national need, a total of 12.7 million have been constructed, leaving a total of 4.5 million latrines to go to achieve 100% coverage or 2.2 million to achieve the MDG 7 goal.

Safe water provision is actively promoted by the Water Ministry and other NGO partners, including UNICEF, the World Bank, Plan International, World Vision, Millennium Water

Alliance, and Save the Children. However, there is no comprehensive list of partners supporting water provision in trachoma-endemic areas at the national level.

Targets for 2011

Surgery (S)

- Operate on 140,059 persons for TT;
- Train 225 TT surgeons;

Antibiotics (A)

- Distribute azithromycin to 23,500,000 persons;
- Distribute tetracycline eye ointment to 480,000 persons;

Health Education and Facial Cleanliness (F)

- Conduct health education in all villages/kebeles;

Environmental Improvement (E)

- Facilitate the construction of 2.1 million household latrines.



Health workers are trained in the WHO simplified trachoma grading system in preparation for impact surveys in South Wollo zone, Amhara region, Ethiopia.

Ethiopia Trachoma Control Program-Amhara National Regional State Perspective

*Presented by Dr. Asrat Genet Amnie, Head, Amhara Regional Health Bureau,
Ethiopia*

Background

From the results of the 2006 national blindness and low vision survey conducted by the Federal Ministry of Health of Ethiopia with support from The Carter Center, the International Trachoma Initiative, CBM, and other partners, Amhara stood out as the region most impacted by trachoma. For both the prevalence of trachoma (clinical grade TF) among children ages 1-9 years and trichiasis among adults 15 years and older, the Amarah regional results were higher than the national average (39.1% vs 26.2% for TF and 5.2% vs 3.1% for TT). Of the 67 million persons estimated to be at risk from trachoma, 18 million (27%) reside in Amhara Region.

Timeline of Events

In October 2000, the Amhara Regional Health Bureau selected four *woredas* (districts) in South Gondar zone to launch trachoma control activities with support and funding from the Lions-Carter Center SightFirst Initiative: Dera, Ebinate, Estie, and Simada. The activities in these districts reached 155 *kebeles* (communities), with a total population exceeding one million persons. After trachoma control activities began, 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* in December 2000. Survey results were consistent with anecdotal evidence of extremely high prevalence of both active and blinding trachoma (TF in children aged 1-9 years 49-90%; TT in adults 3.2-5.4%). 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 from the KAP survey were used to create health education materials including posters, flipcharts, pamphlets, a primary school health education curriculum, and a community health worker training manual.

The effort to eliminate trachoma is strengthened by the highly active participation of local Lions Clubs. Their leadership in advocacy has made Amhara's trachoma control program the most productive in the world, consuming almost 40% of the global azithromycin donation and performing almost 25% of the global surgeries.

Regional Activities

With support from partners, the Amhara Regional Health Bureau implements trachoma control activities and coordinates SAFE strategy interventions, through a process decentralized from the Federal Ministry of Health.

Table 1. List of supporting partners in the Amhara region

2010 Estimated Population	Partners in 2010
17,232,709	The Carter Center, CBM, Lions Clubs of Ethiopia, Light for the World

Trachoma Control in Amhara Regional State

In partnership with the Lions Clubs of Ethiopia and The Carter Center, the Amhara Regional Health Bureau has expanded trachoma control efforts from the original four *woredas* to reach all 151 *woredas* with the SAFE strategy. In 2007, trachoma control activities were integrated into malaria control, resulting in the “MalTra” project (“Mal” for malaria, “Tra” for trachoma). At the start of the MalTra project, a baseline survey was conducted to determine the zonal-level prevalence of trachoma (see Table 3). Under MalTra, trachoma and malaria control activities are integrated through routine health education and semi-annual MalTra weeks, where antibiotics are offered to the whole population and there is active malaria case detection and treatment.

The national program continues its promotion and support of the MalTra week campaigns held in Amhara. The first historic MalTra week was held in November 2008 and facilitated the distribution of more than five million doses of antibiotics in one week.

Table 2. Prevalence of TF and TT by zone in Amhara Region (Data from MalTra baseline survey, 2006-2007)

Domain	TF	TT	TT
	(ages 1-9 years)	(ages 0-14 years)	(ages 15 and above)
	Prevalence (%)	Prevalence (%)	Prevalence (%)
Amhara Region	32.7	0.3	6.2
Zones			
North Gondar	34.7	0.0	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
Awi	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

Table 3. Doses of antibiotic distributed by MalTra week

MalTra Week	Doses of azithromycin distributed	Doses of TEO distributed	Total Number of Doses Distributed
I	4,700,875	115,460	4,816,335
II	4,379,909	93,279	4,473,188
III	8,417,795	180,813	8,598,608
IV	5,450,056	123,187	5,573,243
V	9,199,942	215,379	9,415,321
Total	32,148,577	728,118	32,876,695

Program Achievements in 2010

The Amhara regional program made considerable progress towards its SAFE strategy Ultimate Intervention Goals (UIG). A summary of the targets and achievements is presented in Table 4.

Table 4. Program achievements in 2010

Indicator	Carter Center Targets (Amhara)	Carter Center Output (Amhara)
Persons operated on for trichiasis	79,284	33,021
Trichiasis surgeons trained	141	96
Doses of azithromycin distributed	15,690,499	14,773,344
Doses of tetracycline distributed	467,070	368,264
Villages reached through health education	3,428	3,428
Household latrines constructed	805,812	590,119

Trichiasis Surgery (S)

The Amhara Regional State follows the Ethiopian national plan of providing free trichiasis surgery through routine health service provision and surgical outreach campaigns. The Carter Center and the Ethiopian Lions Clubs have taken lead roles in supporting the Amhara Regional Health Bureau through the provision of surgical sets, consumables and other supplies. In 2010, the national program provided 59,058 persons with trichiasis surgery, of which nearly 56% (33,021) were performed in Amhara region during 369 trichiasis surgery campaigns. An additional 2,218 patients received surgery during routine health service provision in Amhara. The program estimates that 67% of those operated on in Amhara in 2010 were women.

With support from Lions-Carter Center SightFirst Initiative in Amhara, 96 new TT surgeons were trained in 2010 which represents 71% of 136 surgeons trained nationally. The program reported that all 396 active TT surgeons have successfully passed the WHO certification process.

The current UIG for surgery in the Amhara region is estimated at 440,507 people. It is important to note that nearly half of those patients identified with TT are presenting with no entropion and may not make suitable candidates for surgery.

Antibiotic Distribution (A)

As elsewhere in Ethiopia, antibiotic distribution in Amhara takes place using the existing health infrastructure, including the *woreda* supervisors and the *kebele* Health Extension Workers (HEWs).

In the Amhara region, antibiotic treatment is delivered through an integrated approach via MalTra Weeks. In 2010, a total of 149 *woredas* (out of 151) were reached with antibiotics in Amhara, with a reported coverage rate of 98.7% of the population at risk. The regional health bureaus assist in micro-planning, allocate staff to the campaigns, pay salaries during the campaign period, and provide transportation where possible. Since the Amhara trachoma control program began administering antibiotic, a cumulative total of 51 million doses have been distributed.

Facial Cleanliness and Health Education (F)

In Amhara, 3,428 *kebeles* received ongoing health education from Health Extension Workers in 2010 with Carter Center support. HEWs promote trachoma messages including 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. Additionally, HEWs have integrated health education information regarding the use and care of long lasting mosquito nets and promoting the early detection of malaria infection through consultation with local health providers. The UIG for Amhara is to reach all endemic *kebeles* with health education and to reach the entire population with regional radio. This is being achieved on an on-going basis

Environmental Improvement (E)

The Amhara Regional Health Bureau has vigorously adopted the Community-Led Total Sanitation (CLTS) approach in its effort to join the national plan of making household sanitation a priority intervention. In the Amhara region, traditional pit latrines are promoted. These latrines require only locally available materials for the pit and superstructure. HEWs serve as trainers for their communities, enlisting other community members to assist as volunteers. The program empowers heads of households to build individual household pit latrines in all project areas, with no specific training of masons or artisans.

The Amhara trachoma control program indicates that latrine coverage has reached 83% for the region. The program also estimates its regional UIG for latrine construction to be 727,880 household latrines. Support for sanitation promotion is provided through training of HEWs and community members to construct household latrines. The Amhara Regional Health Bureau works with The Carter Center, DANIDA, FINIDA, and the African Development Bank to support latrine construction.

In Amhara, access to safe water among rural households is estimated at 56%. In 2006, a total of 119 small-scale water schemes in Lions-Carter Center supported trachoma-endemic areas were built through a partnership with the Lions Clubs of Ethiopia, CBM, ORDA, and The Carter Center. A total of 10,613 households in 57 *kebeles*, with a population of 38,098, benefited from this project.

Targets for 2011

Surgery (S)

- Operate on 70,441 persons for TT with Lions-Carter Center support;
- Train 132 TT surgeons with Lions-Carter Center support;

Antibiotics (A)

- Distribute azithromycin to 16,696,381 persons with Lions-Carter Center support;
- Distribute tetracycline eye ointment to 390,742 persons with Lions-Carter Center support;

Health Education and Facial Cleanliness (F)

- Conduct health education in 3,428 trachoma-endemic villages with Lions-Carter Center support;

Environmental Improvement (E)

- Facilitate the construction of 727,880 household latrines with Lions-Carter Center support.



Transporting boxes of azithromycin to west Amhara in preparation for the MalTra V campaign.

Table 5. Lions-Carter Center SightFirst Assisted Achievements from 2001 – 2010 in the Amhara Region, Ethiopia

Indicator	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Persons operated on for trichiasis	815	4,019	6,840	23,676	22,097	7,283	28,425	31,561	35,681	33,021	193,418
Trichiasis surgeons trained	8	11	19	67	75	27	193	185	82	93	760
Doses of azithromycin distributed	0	0	100,256	625,422	1,680,394	2,925,569	5,195,937	12,631,132	13,395,792	14,773,344	51,327,846
Doses of tetracycline distributed	1,042	7,964	35,106	125,208	256,048	261,733	343,963	352,152	324,881	368,264	2,076,361
Villages reached through health education	N/A	138	155	654	654	654	1,447	2,898	3,432	3,428	N/A
Household latrines constructed	N/A	1,333	2,151	89,096	144,750	75,621	41,228	373,677	544,205	590,119	1,862,180

Mali Trachoma Control Program

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

The first national trachoma prevalence survey was conducted in Mali from 1996-1997. This survey found that trachoma was endemic throughout the country and that blinding trachoma affected over 80,000 people. 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%. 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 former Lions Clubs International President, Jim Ervin.

The current population of Mali exceeds 15 million people in a total of 53 health districts (not including the capital city, Bamako). As of 2010, 20 districts had already demonstrated a TF prevalence of less than 5% among children ages 1-9 years. Of the 33 districts where TF exceeded 5%, 23 districts benefited from mass drug administration in 2010. S, F and E interventions were implemented throughout the country. Impact evaluations conducted in early 2011 demonstrated that an additional 12 districts achieved a prevalence of TF less than 5% among children, suggesting that active trachoma has been successfully controlled in those areas. There are currently a total of 10 districts where TF exceeds 10% where full intervention with the SAFE strategy is warranted. There are now 11 districts where TF prevalence is between 5% and 9% and 32 districts where TF is less than 5%. An estimated 4,365,716 people reside in districts where TF is greater than 5%.

Knowledge, attitudes, and practice (KAP) surveys were conducted in the Koulikoro region in 1996 and 2000 to gather baseline sociological data for the development of health education strategies to encourage hygiene and sanitation. A survey found that in 2001, 23% of households nationally did not have a latrine (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. In 2006, the National Blindness Prevention Program (PNLC) began to receive support from the USAID Integrated Neglected Tropical Disease (NTD) Initiative to cover the cost of distributing azithromycin in endemic areas through Helen Keller International (HKI). The Carter Center historically has assisted the national program by supporting F&E interventions in Ségou and Mopti regions. In late 2008, Carter Center involvement in trachoma control was expanded to include support of the full SAFE strategy in Mali with renewed support from the Conrad N. Hilton Foundation (CNHF) and in partnership with HKI.

In 2009, the Mali Trachoma Control Program implemented district-level trachoma prevalence surveys in Kayes, Kidal and Koulikoro regions. Mapping of Ségou and Sikasso regions was conducted in early 2010, with prevalence surveys in Mopti and Tombouctou completed in early 2011. The data from these surveys have shown dramatic reductions in the prevalence of TF among children ages 1-9 years to below 5% in 32 districts, enabling the PNLC to begin investigating options for post-endemic surveillance.

Timeline of Events

- 1994: National Blindness Prevention Program launched
- 1996-1997: National baseline prevalence survey
- 1999: Mali Trachoma Control Program launched
- 2000: Distribution of Pfizer Inc-donated Zithromax® begins
- 2006: Launching of the Neglected Tropical Disease Program
- 2008: The Carter Center and Helen Keller International expand support to implement the full SAFE strategy
- 2015: Target date for elimination of blinding trachoma in Mali

Program Achievements in 2010

Table 1. Program Achievements in 2010

Indicator	National Program Targets	National Program Output	Carter Center Targets	Carter Center Output
Persons operated on for trichiasis	12,910	9,321	6,240	5,623
Trichiasis surgeons trained	0	0	0	0
Doses of azithromycin distributed	3,542,332	3,082,808	N/A	N/A
Doses of tetracycline distributed*	70,847	63,018	N/A	N/A
Villages reached through health education	12,000	6,500	2,122	2,095
Household latrines constructed	25,000	17,695	12,000	11,907

*The Carter Center purchases tetracycline eye ointment (TEO) for the national program but does not cover the cost of distribution.

Surgery (S)

Trichiasis surgery is available from the routine health service throughout Mali. However, since trichiasis surgery output from health facilities is low, the national program also supports outreach campaigns to increase the accessibility of trichiasis surgery among the target population. These campaigns are organized either by a single trichiasis surgeon traveling from community to community by motorcycle over a 10-day period or through large-scale, week-long campaigns with teams of surgeons traveling in vehicles. The current backlog of TT cases is estimated at 64,000 persons needing surgical intervention. In 2010, a total of 9,321 surgeries were conducted, of which 565 were conducted through the routine health service. A total of 7,036 surgeries were conducted during motorcycle campaigns and another 1,720 were conducted via the large-scale, vehicle-based campaign approach. The PNLC has also pilot-tested the use of health educators, known as *relais* (community health agents), to identify trichiasis cases in their communities as a mechanism to maximize surgeons' time in the community.

The PNLC estimates that there are currently 60 trichiasis surgeons active in Mali. On average, each surgeon operates on approximately 155 people per year, with the most productive surgeon reporting 544 surgeries in 2010. The program estimates there are a total of 352 complete TT sets in-country and available for use, donated to the program in 2010 by AmeriCares. Rates of surgeon attrition and trichiasis recurrence are unknown.

Antibiotic Distribution (A)

Antibiotic distribution is community directed and takes place both door-to-door and in public gathering places. Mass distribution of antibiotics is supported by the NTD Initiative funded by USAID, with HKI serving as the implementing partner. The Carter Center provides tetracycline eye ointment to meet the needs of the national program. In 2010, a total of 3,082,808 doses of azithromycin and 63,018 doses of tetracycline eye ointment were distributed in the Kidal, Gao, Tombouctou and Mopti regions, in addition to a few districts in Ségou, Koulikoro and Kayes. The program estimates reaching 77.2% of the total population of the intervention areas in 2010 (excluding urban populations). Supervision of mass distribution is conducted by local health post directors, district-level staff and representatives from the national and regional health services.

Facial Cleanliness and Health Education (F)

Health education activities are conducted through a multi-channel approach. The national program currently reaches approximately 6,500 villages with some form of health education (of which The Carter Center supports 2,095 villages). Training of community *relais* is supported by The Carter Center in Mopti, Ségou and Sikasso regions, and a few districts in Kayes and Koulikoro. The program also supports the training of women's groups to encourage radio listening activities, and soap making to encourage hand and face washing and as a small-scale income generating activity. The Ministry of Education is currently working with the Ministry of Health to include trachoma control in the primary school health education curriculum.

Rural radio is used to promote all aspects of SAFE and generate community support for surgical campaigns and mass distribution campaigns. With HKI, The Carter Center supports 100 radio stations throughout Mali to broadcast trachoma messages. The PNLC estimates that over 11 million people live in areas covered by the rural radio program. In late 2010, HKI supported a structured "spot check" of local radio stations to confirm that community radio stations hired to broadcast messages were indeed operational.

Environmental Improvement (E)

Latrine coverage in Mali is estimated to be greater than 95%, with the majority of latrines being traditional latrines. The national program promotes the construction of household latrines with Modified Mozambique Sanitation Platforms (Sanplat slabs). Masons are trained in Sanplat slab construction over two days and receive approximately \$1 per household for their work. The cost of each latrine is estimated at \$50 including cement, iron bar and a contribution from the household for labor, sand and superstructure costs. Once a mason is trained, he recruits households in the community for latrine construction and then submits a request for cement to the PNLC. The mason is responsible for working with the community to identify households where latrines are needed and serves as a liaison to the district sanitation officer. In 2010, the Ministry of Health began pilot-testing the Community-Led Total Sanitation (CLTS) approach in the Kayes Region, with support from UNICEF.

Water provision is supported by partners such as World Vision, Water Aid, UNICEF, and the Malian government.

National Program and Carter Center Targets for 2011

Surgery (S)

- Operate on 7,900 persons with trichiasis (6,000 with Carter Center support);
- Certify active trichiasis surgeons according to the WHO guidelines;

Antibiotics (A)

- Distribute 2,033,326 doses of azithromycin;
- Distribute 40,667 doses of tetracycline;

Facial Cleanliness and Health Education (F)

- Reach 5,000 villages with health education (2,595 with Carter Center support);

Environmental Improvement (E)

- Build 15,000 household latrines (12,000 with Carter Center support).



Masons learn how to construct Sanplat slabs for household latrine construction in rural Mali.

Table 2. National SAFE Productivity in Mali as Presented at The Carter Center Program Reviews, 1999-2010

Indicator	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Persons operated for trichiasis	1,500	2,500	2,500	4,150	4,500	2,758	5,872	5,272	2,890	4,180	11,196	9,321	56,639
Trichiasis surgeons trained	N/A	22	N/A	N/A	N/A	20	N/A	N/A	0	35	0	0	77
Doses of azithromycin distributed	N/A	200,000	300,000	750,000	1,150,000	2,688,061	3,575,000	3,935,247	1,767,877	5,445,392	6,290,754	3,082,808	26,102,331
Doses of tetracycline distributed	N/A	25,000	300,000	30,000	N/A	N/A	75,000	0	0	98,232	125,883	63,018	717,133
Villages reached through health education	N/A	N/A	N/A	383	581	277	548	809	4,371	8,487	10,491	6,500	N/A
Household latrines constructed	N/A	N/A	N/A	0	1,577	3,327	12,199	14,557	11,891	13,410	23,701	17,695	98,357

Niger Trachoma Control Program

Presented by Dr. Kadri Boubacar, National Prevention of Blindness Program, Niger

Background

Niger's National Prevention of Blindness Program (PNLCC) was established in 1987. The Ministries of Health, Education, and Water and Social Development formed a National Trachoma Task Force in 1999. Implementation of the full SAFE strategy began in the Zinder region in 2002 and the first national strategic plan for trachoma control was adopted in 2004. Partner health organizations including The Carter Center, local Lions Clubs, Helen Keller International (HKI), CBM, the Niger Association for the Blind, the African Muslim Agency, and the World Health Organization are Task Force members.

A national trachoma prevalence survey was conducted in 1997-1999, with financial assistance from the European Union and The Carter Center. The results showed that 44% of children ages 1-9 years had active trachoma (TF or TI) and 1.7% of women over 15 years old had trichiasis. That baseline assessment showed 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 1-9 years was 52%. The national survey was used to plan country-level interventions, with the eastern regions of Diffa, Maradi and Zinder given priority due to high rates of active trachoma. Subsequent district-level prevalence surveys have provided the national program an opportunity to refine its ultimate intervention goals (UIGs) with more robust estimates of trachoma prevalence. In 2006, the Niger program became a recipient of the USAID Integrated Neglected Tropical Disease (NTD) grant.

Traditionally focused on F and E promotion, Carter Center support was expanded to include the full SAFE strategy in select areas of Niger through renewed funding from the Conrad N. Hilton Foundation in 2008. The Carter Center works with HKI and other partners to support the national program to deliver SAFE throughout the country.

In 2009, the national program began implementing trachoma prevalence surveys to update district-level data. Eight districts were surveyed with support from The Carter Center: Gaya, Loga, Maine Soroa, N'guigmi, Matameye, Magaria, Tessaoua, and Maradi Commune. In 2010, the national program carried out additional surveys in Tahoua, Tillaberi and Dosso regions.

Timeline of Events

- 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: Neglected Tropical Disease Program launched
- 2008: The Carter Center and Helen Keller International expanded support to implement the full SAFE strategy
- 2009: ITI closed its Niamey office
- 2015: Target date for elimination of blinding trachoma in Niger

Program Achievements in 2010

Table 1. Program achievements in 2010

Indicator	National Program Targets	National Program Output	Carter Center Targets	Carter Center Output
Persons operated on for trichiasis	13,900	7,683	6,000	5,267
Trichiasis surgeons trained	50	40	30	20
Doses of azithromycin distributed	3,845,445	3,456,380	1,466,468	1,128,844
Doses of tetracycline distributed	86,685	82,670	29,928	32,888
Villages reached through health education	571	634	571	634
Household latrines constructed	15,000	15,199	15,000	10,650

Surgery (S)

The Niger Trachoma Control Program supports trichiasis surgery through both health center-based care and outreach strategies. In 2010, 65 surgery campaigns were conducted with 7,683 people receiving surgery. Data on routine service provision are unavailable. A total of 40 new trichiasis surgeons were trained. Challenges to the delivery of surgical activities include the demands of cost-recovery for health clinic activities, competing non-trachoma related activities, as well as the irregular supervision of the trichiasis surgeons. Currently active TT surgeons have not yet been certified using the WHO certification methodology, as the manual is not yet available in French. While awaiting an official translation, the national program will begin to certify surgeons in 2011 using an interim non-official translated copy of the WHO certification document. The current Ultimate Intervention Goal (UIG) for surgery suggests that a total of 35,763 persons are required to be operated to reach a prevalence of trichiasis less than one per 1,000 people.

Antibiotics (A)

Distribution of azithromycin in Niger is community-based and is carried out door-to-door in the villages by community distributors. In 2010, 10 districts were supported for the distribution of azithromycin and tetracycline eye ointment by the USAID-supported NTD Initiative and The Carter Center. A total of 3,456,380 doses of azithromycin were reported as distributed, along with 82,670 doses of tetracycline.

Facial Cleanliness and Health Education (F)

A total of 634 villages in three target regions (Zinder, Maradi and Diffa) received regular health education sessions for trachoma prevention in 2010 with Carter Center support. Community health agents are trained with support from The Carter Center to conduct health education sessions; women are trained in the production of soap using locally available materials; local community leaders and religious leaders are trained to promote participation in trachoma program activities; and teachers are trained to conduct health education in schools.

The program uses mass media to broadcast messages on all four components of the SAFE strategy for trachoma control. To broaden the reach of the program's educational campaign throughout Niger, health education messages are produced and broadcast in local languages on community radio stations. 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 eye-seeking *Musca sorbens* flies in trachoma-endemic villages and to improve general hygiene. The national program promotes Sanplat latrines. In 2010, partners assisted the program to build 15,199 household latrines. The Carter Center supported the construction of 10,650 latrines in the Diffa, Zinder and Maradi regions. To reach Millennium Development Goal 7, which calls for halving the proportion of households without access to sanitation by 2015, the program will need to build over 854,660 latrines. This goal is unachievable at current rates of construction. Community masons are trained to construct latrines, with 115 trained in 2010.

UNICEF and the Ministry of Water support the construction and rehabilitation of water points in Niger. The national program reported that 78 improved water points were constructed in 2010.

National Program and Carter Center Targets for 2011

Surgery (S)

- Operate on 11,244 persons with trichiasis (7,000 planned with Carter Center support);
- Certify 50 TT surgeons (20 with Carter Center support);

Antibiotics (A)

- Distribute 5,561,942 doses of azithromycin (2,442,208 with Carter Center support);
- Distribute 113,510 doses of tetracycline eye ointment (49,841 with Carter Center support);

Facial Cleanliness and Health Education (F)

- Reach 654 villages with health education (654 with Carter Center support);

Environmental Improvement (E)

- Build 15,000 household latrines (15,000 with Carter Center support).



Community mobilization and health education is accomplished through radio broadcasted messages from community based stations, such as the one above, in the village of Mirriah in Zinder region, Niger.

Table 2. National SAFE Productivity in Niger as Presented at The Carter Center Program Reviews, 1999-2010

Indicator	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Persons operated on for trichiasis	704	4,172	5,739	4,592	4,858	5,286	6,500	4,500	2,804	2,500	6,743	7,683	56,081
Trichiasis surgeons trained	40	117	110	N/A	44	10	10	44	6	0	42	40	463
Doses of azithromycin distributed	N/A	N/A	N/A	95,000	710,230	1,915,456	2,429,500	2,532,047	5,958,174	5,750,612	7,341,878	3,456,380	30,189,277
Doses of tetracycline distributed	N/A	N/A	N/A	N/A	68,606	48,886	60,781	61,504	120,000	146,843	184,198	82,670	773,488
Villages reached through health education	95	226	276	276	1,122	4,438	4,512	4,512	4,512	4,500	571	634	N/A
Household latrines constructed	N/A	N/A	N/A	1,282	1,303	5,355	7,940	6,777	10,725	11,636	18,979	15,199	79,196

Nigeria Trachoma Control Program

Presented by Dr. Benjamin Nwobi, Nigeria National Prevention of Blindness Program

Background

Nigeria is the most populous country in Africa, with a population of approximately 140 million people, according to the 2006 census. Trachoma control in Nigeria is led by the National Program for the Prevention of Blindness at the Federal Ministry of Health. In 1991, the national program for the prevention of blindness was formed and a national taskforce for trachoma control was formed in 2001.

The 11 northern states, home to approximately 28 million people, bordering the Republic of Niger, are suspected to be endemic for trachoma, although prevalence mapping of these areas is not yet complete. Trachoma prevalence surveys and rapid assessments have been conducted since 2000 across nine states. Surveys have been supported by The Carter Center, Sightsavers and Helen Keller International (HKI). The unit of intervention is the Local Government Area (LGA), which is equivalent to a district.

Prevalence surveys conducted in Yobe, Borno and Sokoto states indicate the prevalence of trachoma among children ages 1-9 years exceeds the 10% TF threshold for intervention. Surveys carried out in Plateau and Nasarawa states in 2007 found the LGA prevalence of TF among children ages 1-9 years varied from 2-15% in those LGAs.

Trachoma rapid assessments have been conducted in 58 LGAs across Sokoto, Zamfara and Kebbie states of which 26 are suspected to be trachoma endemic. An additional 148 LGAs in the northern part of Nigeria are suspected to be at risk of trachoma, but prevalence surveys still need to be implemented. In 2011, the program plans to complete mapping of Zamfara and Taraba states and conduct a sentinel site methodology research project in Sokoto State with support from the CDC Foundation, Bill & Melinda Gates Foundation and Sightsavers.

Timeline of Events

- 1991: National Program for Prevention of Blindness launched
- 2001: National Trachoma Control Program began and Trachoma Task Force formed
- 2005: National blindness survey conducted
- 2007-2008: Prevalence surveys in Plateau and Nasarawa states
- 2007: Nigeria approved to receive the Zithromax[®] donation from Pfizer Inc
- 2010: Mass drug administration for trachoma control with Pfizer Inc-donated Zithromax[®] was officially launched
- 2015: Target date for the elimination of blinding trachoma in Nigeria

Table 1. Program Achievements in 2010

Indicator	National Program Targets	National Program Output	Carter Center Targets	Carter Center Output
Persons operated on for trichiasis	10,000	12,000	N/A	N/A
Trichiasis surgeons trained	20	13	N/A	N/A
Doses of azithromycin distributed	1,435,800	1,247,332	763,294	715,507
Doses of tetracycline distributed	40,000	24,000	15,600	15,456
Villages reached with health education	13,240	2,624	853	853
Household latrines constructed	10,500	0	N/A	N/A

Surgery (S)

In Nigeria, trichiasis surgery is available through the routine health service and community outreach campaigns. In 2010, five outreach campaigns were organized to provide trichiasis surgery. The national program reported operating on 12,000 people through these campaigns. Partners supporting surgery by the Government of Nigeria in 2010 include: Sightsavers, CBM, and the Federal Ministry of Health. Data are not available to estimate the prevalence of recurrent trichiasis, nor are data available to calculate the proportion of women operated in 2010.

In Nigeria, surgeons are trained on both theoretical and practical aspects of surgery, supervised by consultant ophthalmologists from state ministries of health. Over the life of the program, 50 surgeons have been trained and certified with support from CBM, HKI, Sightsavers and the Federal Ministry of Health.

Antibiotics (A)

From 2004-2006, Sightsavers purchased azithromycin for distribution in two communities of Sabon Birni LGA in Sokoto state. Although Nigeria was approved to receive Pfizer Inc-donated Zithromax[®] in 2007, the first mass drug distribution (MDA) did not occur until October 2010. MDA for trachoma control was implemented in a total of 10 LGAs in Plateau, Nasarawa, Sokoto, Zamfara and Kebbi states with support from The Carter Center and Sightsavers. This historic event was officially launched in conjunction with World Sight Day in October 2010.

MDA in Nigeria is conducted using Community Drug Distributors (CDDs). Training of CDDs is conducted through a cascade training of trainers approach, beginning with the State Ministry of Health, to LGA authorities and then the CDDs. Mobilization and treatment are the responsibility of the CDDs, who register households and organize treatment. Most CDDs conduct MDA using a house-to-house approach, and the communities provide cash or gift-in-kind incentives to compensate the CDDs for the time they spend distributing the drug.

Facial Cleanliness and Health Education (F)

Health education activities are conducted through school-based programs, and mobilization for trachoma control is performed in communities, market places, churches and mosques. The national program uses television and radio as its mass media outlets. In Plateau and Nasarawa states, health education is conducted by trained community-based health workers supported by The Carter Center including: State

Integrated Health Team members, LGA Integrated Health Team members, village volunteers, and Community Drug Distributors.

Environmental Improvement (E)

Nigeria promotes Sanplat latrines using a modified slab design to reduce the amount of cement required. This lower-cost option has been promoted in Plateau and Nasarawa states. The program currently trains community masons in latrine construction and partner NGOs provide and transport cement to communities. Water projects are implemented through partnerships among ministries and with other stakeholders. In particular, the Tulsi Chanrai Foundation has rehabilitated 690 boreholes and new water points have been installed in 30 villages. Additionally, in Sokoto state, 200 villages received new water points, which were donated by the Sokoto state government.

National Program and Carter Center Targets for 2011

Trichiasis Surgery (S)

- Operate on 4,500 people for trichiasis;
- Train 6 new trichiasis surgeons;

Antibiotic (A)

- Distribute 3,175,392 doses of azithromycin (778,872 in Carter Center intervention zones in Plateau and Nasarawa states);
- Distribute tetracycline eye ointment to 120,000 people (15,600 in Carter Center supported areas);

Facial Cleanliness and Health Education (F)

- Target 13,240 accessible villages for health education to promote personal hygiene and latrine construction (853 with Carter Center support);

Environmental Improvement (E)

- Promote construction of latrines in endemic communities (no target presented).



With assistance from a Community Drug Distributer, this child receives the first dose of Pfizer Inc-donated Zithromax® ever distributed in Nigeria.

Table 2. National SAFE Productivity in Nigeria as Presented at The Carter Center Program Reviews, 2003-2010

Indicator	2003	2004	2005	2006	2007	2008	2009	2010	Total
Persons operated on for trichiasis	75	3,830	6,096	5,572	19,610	9,672	13,500	12,000	70,355
Trichiasis surgeons trained	N/A	30	34	4	8	0	50	13	139
Doses of azithromycin distributed*	N/A	1,247,332	1,247,332*						
Doses of tetracycline distributed	5,971	45,582	25,102	25,102	5,201	10,782	15,000	24,000	156,740
Villages reached with health education	108	172	8,449	446	1,117	6,425	9,200	2,624	N/A
Household latrines constructed	420	1,871	5,958	4,986	6,458	6,121	7,500	0	33,314

*Nigeria's first shipment and distribution of Pfizer Inc-donated azithromycin took place in 2010.

Sudan Trachoma Control Program: Government of Sudan

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

Background

Under the terms of the Comprehensive Peace Agreement signed in 2005, Sudan has been one country under two government administrative systems: the Government of Sudan (GOS) for the 15 northern states and the Government of South Sudan (GOSS) for the 10 southern states. In an historic referendum in January 2011, the southern Sudanese voted overwhelmingly for secession and Sudan will formally become two countries, Sudan and South Sudan, in July 2011. GOS areas have an estimated population of more than 20 million, including four million internally displaced persons (IDP).

The Prevention of Blindness Administration was established under the auspices of the Federal Ministry of Health (FMOH) in 1962. Control efforts were scaled back in the late 1970s as trachoma was no longer considered a public health problem. However, anecdotal evidence suggested a resurgence of trachoma, but little data were available until May 1999. At that time, the Sudanese FMOH completed the first population-based trachoma prevalence surveys with Carter Center assistance. A survey conducted in Wadi Halfa confirmed that trachoma was a cause of severe disability and significant blindness.

Pfizer Inc began to donate Zithromax[®] to Sudan through the International Trachoma Initiative in August 2000. In March 2005, the Federal Minister of Health signed a decree stating that the Trachoma Control Program had officially joined the National Program for Prevention of Blindness (NPPB). Carter Center-supported activities in GOS areas continue to be coordinated and monitored from Khartoum. In 2005, the program started to decentralize the 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.

In 2006, Sudan's Trachoma Control Program began implementing prevalence surveys to map trachoma at the locality (district) level with Carter Center assistance. All localities of all states were mapped by 2010 with the exception of the three Darfur states, which are inaccessible due to insecurity.

The completion of the trachoma prevalence mapping in GOS areas has enabled the national program to set evidence-based targets to reach the elimination of blinding trachoma by 2015. Three districts, El Galabat East, Gaissan and Al Kurmuk, have TF greater than 10% in children ages 1-9 years and seven districts with TF between 5 and 9%. There are 15 districts that have a prevalence of TT greater than 1% among adults ages 15 years and older.

Timeline of Events

- 2000: Zithromax® donation began
- 2005: National trachoma program moved to the FMOH
- April 2005: Baseline prevalence surveys started
- 2006: Community participation protocol developed
- 2006: TT surgery manual locally adapted for training in Arabic; primary eye care manual modified to include the WHO simplified grading system for trachoma; survey protocol developed
- 2010: Prevalence survey mapping completed (except three Darfur states)
- 2010: Government pledged U.S. \$1 million to support River Blindness and Trachoma programs
- 2015: Target for elimination of blinding trachoma in Government of Sudan

Table 1. Program achievements in 2010

Indicator	National Program Targets	National Program Output	Carter Center Targets	Carter Center Output
Persons operated on for TT	3,000	1,718	2,000	438
Trichiasis surgeons trained	20	31	20	21
Doses of azithromycin distributed	0	718	0	683
Doses of tetracycline distributed	6,000	438	6,000	438
Villages reached with health education	477	20	239	20

Surgery (S)

In GOS program areas, routine trichiasis surgery is performed by ophthalmologists and trained ophthalmic medical assistants at central and state hospitals. Trichiasis surgical outreach campaigns also often are integrated with cataract surgery outreach and other comprehensive eye care interventions. Payment is levied on a sliding scale for TT surgery in the hospitals but is provided free in eye camps.

A total of 432 persons were reported to have benefited from trichiasis surgery during the 12 surgical campaigns that were conducted in 2010, although significant under-reporting by partners is suspected. Through routine health service provision, a total of 1,286 people were reported to have been operated on in 2010. The national program receives support from many organizations to conduct trichiasis surgeries, including The Carter Center, Al Basr Foundation, The National Health Insurance and Help Age International, the Sudanese Islamic Medical Association, UNICEF, and Zakat Chamber.

The surgical output per operator and the recurrence of trichiasis are unknown. There are currently 120 active surgeons trained to perform TT surgery according to WHO certification guidelines, although attrition of trained surgeons was not reported.

The current surgical backlog for GOS is estimated at 31,072 patients. The program indicated that anecdotal evidence supports that many of these remaining cases are elderly women who may not wish to access surgical service.

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.

Findings from impact surveys conducted in 2010 in Dongola locality (Northern state) and in Baw locality (Blue Nile state) indicate that the percent of TF in children aged 1-9 was less than 5%. As a result, planned MDA activities in these localities were not warranted. The small amount of azithromycin and tetracycline reported distributed in 2010 was related to doses provided to those persons reporting for TT surgery.

Facial Cleanliness and Health Education (F)

The trachoma control program supported ongoing health education activities in Dongola and Baw localities. In 2010, 20 villages benefited from support for health education from The Carter Center, reaching approximately 380,930 people. In these areas, health education is conducted in primary schools, via community radio programs and through health education sessions at the community level. In 2010, a total of 35 teachers were trained for health education. Primary eye care modules were incorporated into the basic school curriculum and trachoma modules will be included in the new Health Extension Worker (HEW) program.

During mass antibiotic distribution, radio messages were broadcast and leaflets, calendars, school bags and caps were distributed.

Environmental Improvement (E)

The GOS trachoma control program does not promote household latrines in its intervention areas as a separate activity. The program has been represented in the UNICEF Water and Environmental Sanitation task force since 2005, which has prioritized trachoma-endemic areas for water and sanitation promotion. The national program continues will work with UNICEF for water provision in Baw and Gaissan localities (Blue Nile state) and East Al Galabat locality (Al Gedarif state).

Targets for 2011

Surgery (S)

- Operate on 5,000 people for trichiasis (5,000 with Carter Center support);
- Train 20 surgeons to conduct trichiasis surgery (20 with Carter Center support);

Antibiotic Therapy (A)

- Distribute 442,931 doses of azithromycin in Gaissan, El Galabat East and Al Kurmuk localities (442,931 with Carter Center support);
- Distribute 14,039 doses of tetracycline eye ointment in Gaissan, El Galabat East and Al Kurmuk (14,039 with Carter Center support);

Facial Cleanliness (F)

- Develop a national communication and behavior change strategy to promote the elimination of blinding trachoma;
- Conduct health education in 260 communities (260 with Carter Center support);

Environmental Change (E)

- Continue to work with local partners and the Ministry of Water and Environmental Sanitation to promote household latrine construction and use.

Table 2. National SAFE Productivity in Government of Sudan as Presented at The Carter Center Program Reviews, 1999-2010

Indicator	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Persons operated for trichiasis	N/A	115	122	729	338	276	1,949	1,183	2,059	1,380	1,974	1,718	11,843
Trichiasis surgeons trained	N/A	N/A	N/A	43	0	83	43	12	8	10	12	31	242
Doses of azithromycin distributed	N/A	12,671	85,674	157,502	186,246	266,630	132,755	29,962	179,698	248,559	284,783	718	1,585,198
Doses of tetracycline distributed	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4,056	4,072	5,510	438	14,076
Villages reached through health education	N/A	N/A	73	N/A	664	N/A	N/A	27	120	239	239	20	N/A
Household latrines constructed	N/A	N/A	N/A	617	1,933	70	1156	N/A	N/A	N/A	N/A	N/A	3,776

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.

Sudan Trachoma Control Program: Government of Southern Sudan

Presented by Dr. Lucia Kur, Trachoma Control Program of Southern Sudan

Background

Between 1989 and 2005, trachoma control program activities in Southern Sudan were delivered via Operation Lifeline Sudan (OLS), a consortium of United Nations agencies and more than 40 non-governmental organizations with the objective of providing coordinated humanitarian aid during a time of conflict. In 2000, The Carter Center began collaborating with non-governmental organizations to implement the SAFE strategy in some OLS-supported areas, and the International Trachoma Initiative included Sudan as a beneficiary of the Zithromax[®] donation from Pfizer Inc. Activities were coordinated by The Carter Center from Nairobi with assistance from partner NGOs and humanitarian agencies in Southern Sudan.

Trachoma prevalence surveys were conducted in four *payams* (sub-districts) in 2001 and an additional three *payams* in 2002. On January 9th, 2005, a Comprehensive Peace Agreement (CPA) ended the 21-year civil war and under its terms, Sudan became one country under two government administrative systems: the Government of Sudan (GOS) for the 15 northern states; the Government of Southern Sudan (GOSS) for the 10 southern states. The Carter Center office relocated from Nairobi, Kenya, to Juba, Sudan, in 2005 after the signing of the CPA. In January 2011, Southern Sudanese voted to secede from Sudan, which will lead to formal separation in July 2011.

The Carter Center in Southern Sudan supports the full SAFE strategy in Eastern Equatoria and Jonglei states with funding from the Lions Clubs International Foundation (LCIF), the Conrad N. Hilton Foundation and Dr. and Mrs. John and Terri Hussman.

Timeline of Events

- 2001: Trachoma control activities began
- January 2005: Comprehensive Peace Agreement 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 established
- 2009: Second Annual Trachoma Control Program Review held
- 2011: Referendum on self-determination
- 2020: Target date for the elimination of blinding trachoma in Government of Southern Sudan

Epidemiology of Trachoma in Southern Sudan

Using the 2008 census data, the national program now estimates more than three million individuals are at-risk 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 children under five years old. It is sometimes difficult for the program to gain access to those most at risk because of insecurity and seasonally impassable roads. This situation is complicated by a poor health infrastructure, minimal physical infrastructure, and strong cultural beliefs and practices that inhibit behavior

change. In addition, there are many 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 ages 1-9 years ranges from 33.2-80.1%. The prevalence of TT among children ages less than 15 years ranges from 0.1-5.2% and among persons ages 15 years and older ranges from 1.3-17.0%.

In 2009, the Malaria Consortium supported trachoma rapid assessments (TRAs) in Unity and Northern Bahr El Ghazal states. The data suggest that trachoma is of public health importance in Unity state but that there is evidence that trachoma prevalence does not exceed 5% in children 1-9 years (grade TF) in Northern Bahr El Ghazal. The Malaria Consortium supported a regional-level survey in Unity State in 2010, showing the prevalence of TF at 64.7% in children 1-9 years and a trichiasis prevalence of 11.2% among adults ages 15 years and older.

Program Achievements in 2010

Table 1. Program achievements in 2010

Indicator	National Program Targets	National Program Output	Carter Center Target	Carter Center Output
Persons operated on for trichiasis	6,500	2,227	3,000	810
Trichiasis surgeons trained	28	7	6	1
Doses of azithromycin distributed	895,000	435,558	645,000	302,471
Doses of tetracycline distributed	17,000	45,474	13,000	19,622
Villages reached through health education	4,674	3,226	4,662	3,226
Household latrines constructed	411	330	382	0

Surgery (S)

Mapping of trachoma in Southern Sudan has not yet been completed. In the areas where prevalence data are available (Western, Eastern, and Central Equatoria, Unity, Upper Nile, and Jonglei states), a surgical UIG of 98,591 persons has been calculated. Once additional surveys are conducted, the total surgical backlog is likely to increase. Unlike many trachoma-endemic settings, where trichiasis is seen only among the elderly, children often present with the condition. In Ayod county of Jonglei state, the prevalence of pediatric trichiasis exceeds 5%.

In Southern Sudan, trichiasis surgery is conducted through routine health service in large cities and towns. Surgery is also available through surgical outreach campaigns at the community level. Partners supporting surgery with the Government of Southern Sudan in 2010 include: The Carter Center, CBM, and Christian Medical Association (CMA). A total of three surgery camps were conducted in 2010 with support from CBM (139 people were operated during these camps); 2,088 persons were operated on through the routine health service, and all patients were treated with azithromycin post surgery. The national program estimates that 74% of the patients operated were women. In 2010, there were a total of 45 complete trichiasis surgical kits in the country.

To date, 33 out of the 45 trained and certified surgeons in GOSS are active. In Carter Center-supported areas, the average number of people operated per surgeon is 98, with a maximum of 173 surgeries.

Antibiotics (A)

Mass drug administration (MDA) of antibiotics takes place at selected locations within the community. The distribution stations are chosen by trachoma control program field officers, community leadership, and local governments, with consideration for population movements towards animal grazing grounds and water points. Mobilization takes place at least five days in advance of the distribution and the distribution teams are composed of four to five trained community health workers, in addition to Carter Center field officers. The program will be unable to calculate an accurate ultimate intervention goal for antibiotic distribution until surveying is complete. In 2010, 16 counties benefited from MDA for trachoma control. A total of 481,032 doses of antibiotics (azithromycin and tetracycline) were distributed over a target of 912,000 treatments. The national program began MDA in one county of Unity State—Mayom—in 2010.

Facial Cleanliness and Health Education (F)

Routine health education is conducted by trained community-based health workers, such as trachoma and Guinea worm field officers and village volunteers, primary school teachers, and hygiene promoters from NGO partners working in water and sanitation. During outreach activities such as surgery campaigns and MDA, field officers and technical advisors work with volunteers to screen videos in local language on trachoma and Guinea worm.

The program estimates reaching 3,226 villages with ongoing health education in 2010 in Jonglei and Eastern Equatoria states. The UIG for health education is to reach all of the 5,201 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)

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.

National Program and Carter Center Targets for 2011

Trichiasis Surgery (S)

- Operate on 6,500 people with trichiasis (3,000 with Carter Center support);
- Train 26 new trichiasis surgeons (6 with Carter Center support);

Antibiotic (A)

- Distribute azithromycin to 858,800 people (618,000 in Carter Center intervention zones in Eastern Equatoria and Jonglei states);
- Distribute tetracycline eye ointment to 75,500 people (13,000 with Carter Center support);

Facial Cleanliness and Health Education (F)

- Provide 5,201 accessible villages with health education on personal hygiene and latrine construction (3,226 with Carter Center support);

Environmental Improvement (E)

- Promote construction of 330 household latrines in endemic villages.



Health education for trachoma control taking place in Larou, Eastern Equatoria state.

Table 2. National SAFE Productivity in Government of Southern Sudan as Presented at The Carter Center Program Reviews, 1999- 2010

Indicator	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Persons operated on for trichiasis	N/A	153	966	1481	1,072	1,481	604	563	1,475	3,704	1,558	2,227	15,284
Trichiasis surgeons trained	N/A	N/A	N/A	N/A	14	N/A	9	46	10	10	11	7	107
Doses of azithromycin distributed	N/A	40,000	30,161	31,731	117,317	180,317	84,096	109,405	275,382	464,974	370,431	435,558	2,139,372
Doses of tetracycline distributed	N/A	N/A	N/A	N/A	40,197	43,105	22,435	115,324	48,398	13,668	15,799	45,474	344,400
Villages reached through health education	N/A	N/A	406	405	424	1,346	429	901	1,371	4,662	3,441	3,226	N/A
Household latrines constructed	N/A	N/A	197	220	252	980	269	175	N/A	N/A	128	330	2,551

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.

Trachoma Control in Tanzania

Presented by Dr. Bernadetha Shilio, Tanzania National Trachoma Control Program

The Tanzania National Eye Care Program was launched in 1986, followed by the founding of the national trachoma control program in 2004. From 2004 through 2006, a series of district-level prevalence surveys were implemented to establish baseline trachoma prevalence data. Tanzania is home to a population of over 44 million, with approximately 14.4 million people currently known to be at risk for trachoma. TF exceeds 5% among children ages 1-9 years in 49 out of the total 55 districts surveyed of mainland Tanzania.

The most recent national trachoma control strategic plan expired in 2008, but national planning for trachoma control has since been incorporated into the 2009-2011 national strategy for neglected tropical diseases. In Tanzania, the national trachoma control program provides overall stewardship to the intervention of SAFE. However, unlike many other countries where implementation planning occurs at the central level, program plans are set by the district health administrations. Reporting of SAFE activities in 2010 has not been completed. The Tanzania national program has set 2020 as the target date for the elimination of blinding trachoma. Partners in trachoma control include the Kilimanjaro Centre for Community Ophthalmology, Helen Keller International, Kongwa Trachoma Project, and the African Programme for Onchocerciasis Control.

Program Accomplishments in 2010

Surgery

Trichiasis surgery is performed using the Bilamellar Tarsal Rotation Procedure (BTRP). Eye workers or trained medical personnel (such as clinical officers and nurses) are eligible to become trichiasis surgeons. The current backlog of unoperated trichiasis cases is estimated to be 167,000 persons. The program reported operating on 26,442 persons since 1999.

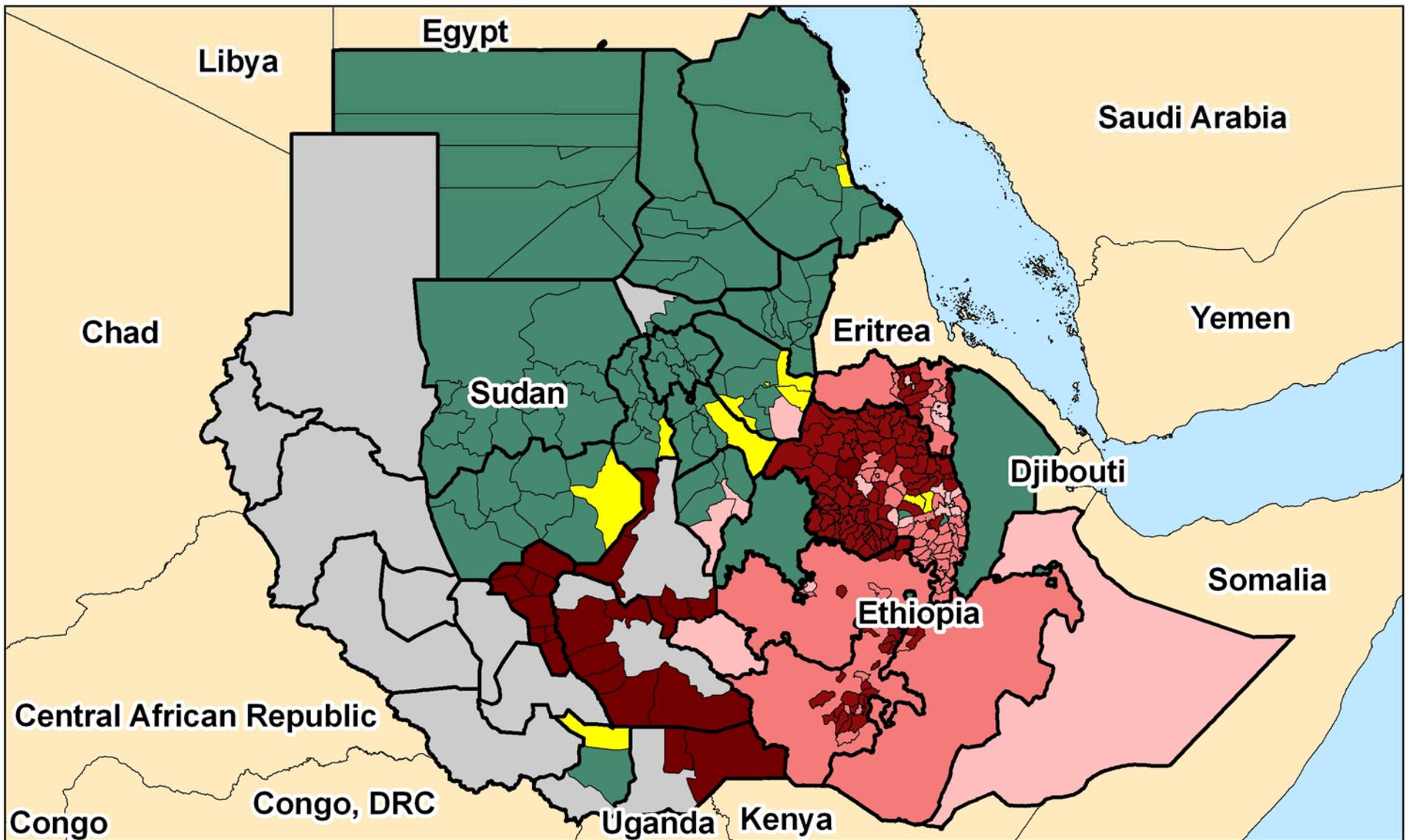
Antibiotic Therapy

Mass drug administration with antibiotics for trachoma control is conducted through both house-to-house and a fixed site approaches, depending on the local context. Community Drug Distributors (CDDs) are selected by community members to manage the distribution at the village level. CDDs are trained through a cascade approach, and are supervised by front line health facility workers. Although the national program reported MDA for trachoma occurred in 2010, data are not yet available.

Facial Cleanliness and Environmental Change

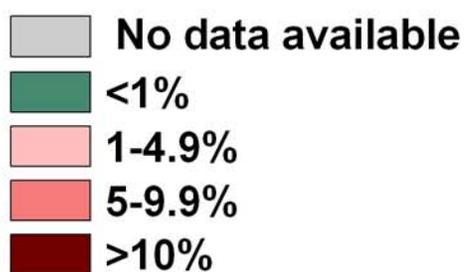
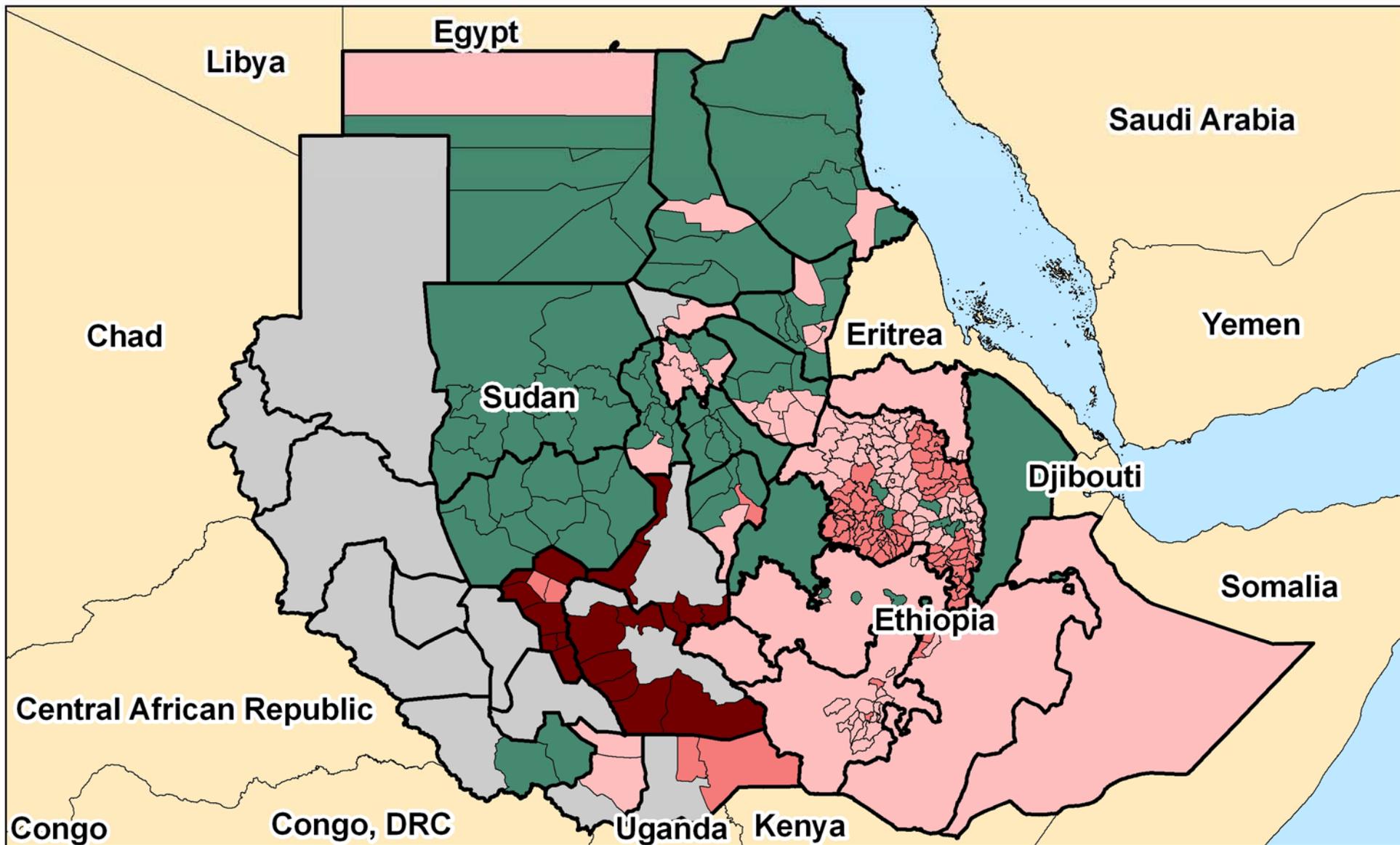
Health education activities are coordinated by the districts through Information, Education and Communication Officers. Promotion of VIP and SanPlat latrines is ongoing in Tanzania, with support from the Water and Sanitation Program and the district health services. The national program also advocates the use of Community-Led Total Sanitation (CLTS) to generate demand for latrines. From 2004-2009, the program constructed over 158,000 household latrines. The cost of latrines in Tanzania varies based on the type built, but the program reported an average cost of \$405 for a VIP latrine.

Water provision is coordinated by the Ministry of Water through the Rural Water and Sanitation Program. Partners supporting water activities include UNICEF, AMREF and the World Bank.

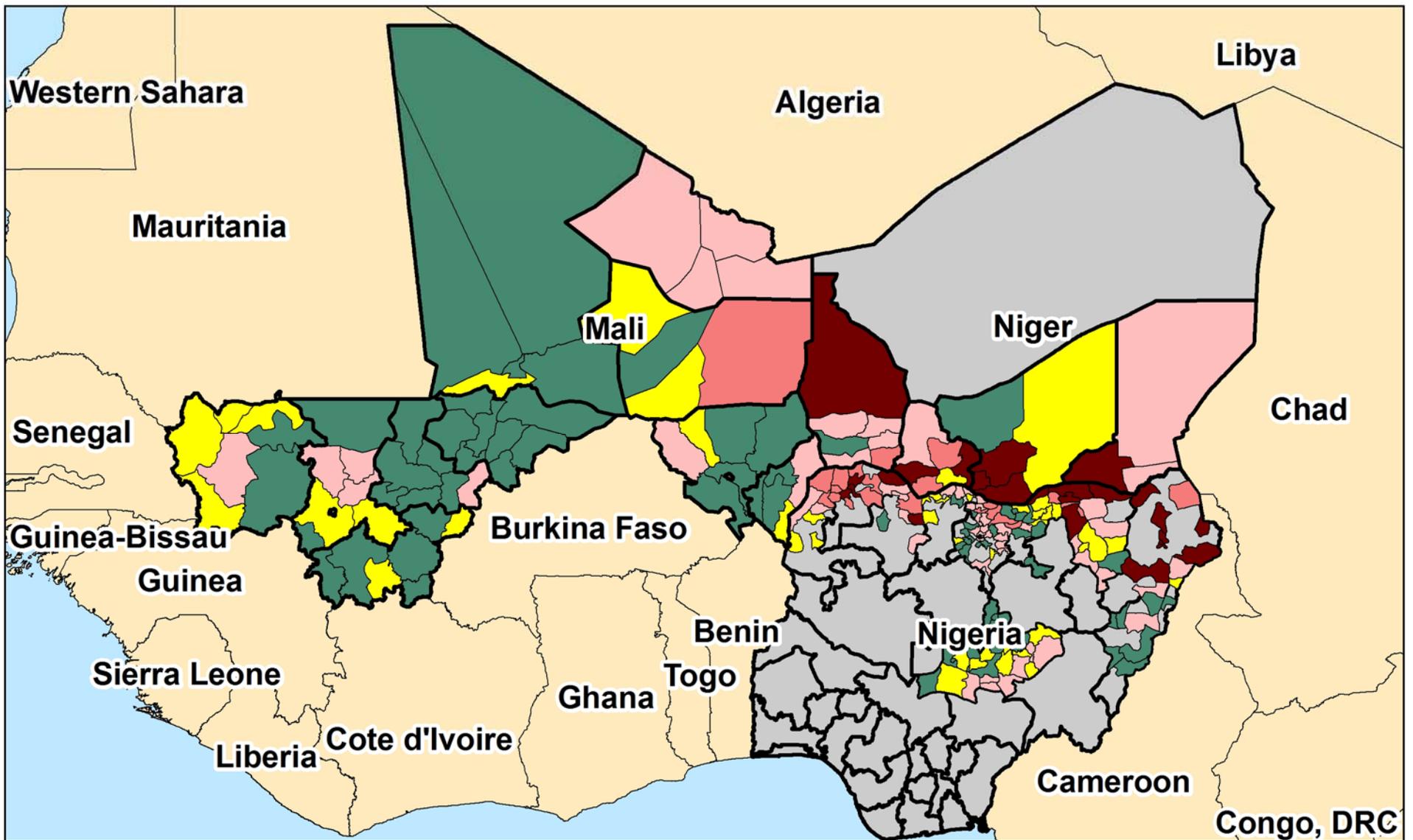


**Prevalence of TF in Children ages 1-9 years
Sudan, Southern Sudan & Ethiopia**

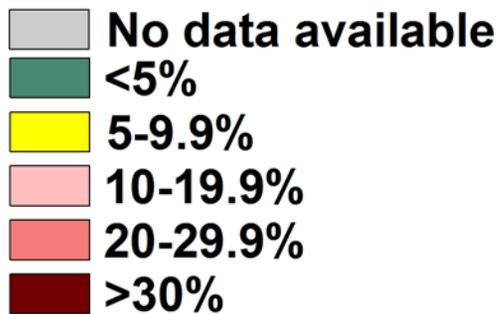
- No data available
- <5%
- 5-9.9%
- 10-19.9%
- 20-29.9%
- >30%

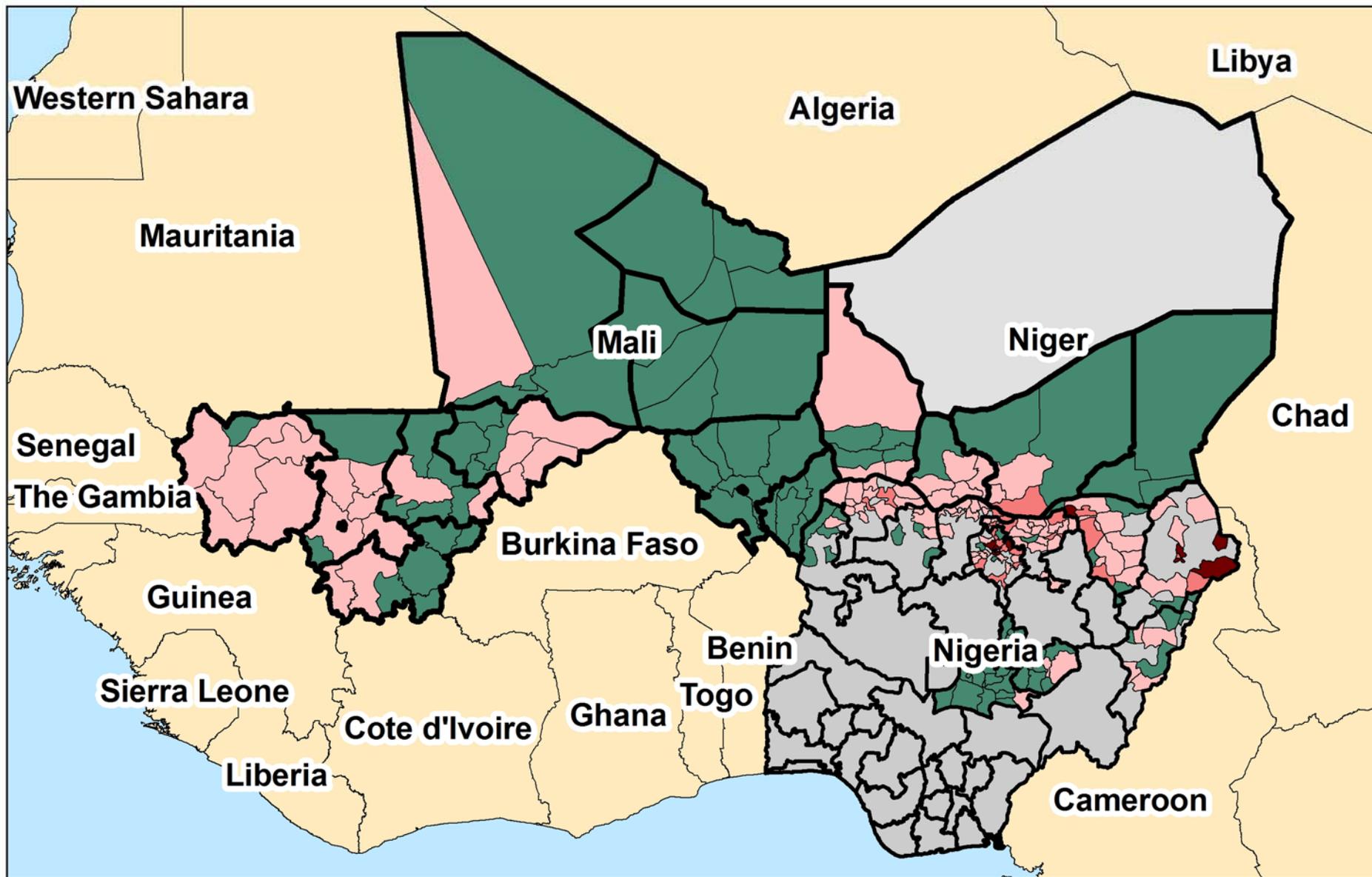


**Prevalence of TT in Adults 15 years and older
Sudan, Southern Sudan & Ethiopia**



Prevalence of TF in Children ages 1-9 years
Mali, Niger & Nigeria





**Prevalence of TT in Adults 15 years and older
Mali, Niger & Nigeria**

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

National Data as Reported for 2010 at the Twelfth Annual Program Review, Atlanta, Georgia, February 22-24, 2011

	Mali	Niger	Sudan		Ethiopia	Nigeria	Total
			GOS**	GOSS***			
Surgery (S)							
Surgeries	9,321	7,683	1,718	2,227	59,058	12,000	92,007
2010 Target	12,910	13,900	3,000	6,500	85,000	10,000	131,310
Percent Coverage	72.2%	55.3%	57.3%	34.3%	69.5%	120.0%	70.1%
Antibiotics (A)							
<i>Azithromycin</i>							
Doses	3,082,808	3,456,380	718	435,558	18,404,655	1,247,332	26,627,451
2010 Target	3,542,332	3,845,445	0	895,000	21,600,000	1,435,800	31,318,577
Percent Coverage	87.0%	89.9%	N/A	48.7%	85.2%	86.9%	85.0%
<i>Tetracycline</i>							
Doses	63,018	82,670	438	45,474	545,330	24,000	760,930
2010 Target	70,847	86,685	0	17,000	480,000	40,000	694,532
Percent Coverage	88.9%	95.4%	N/A	267.5%	113.6%	60.0%	109.6%
Facial Cleanliness and Health Education (F)							
Villages with Health Education	6,500	634	20	3,226	*	2,624	13,004
2010 Target	12,000	571	477	4,674	*	13,240	30,962
Percent Coverage	54.2%	111.0%	4.2%	69.0%	N/A	19.8%	42.0%
Environmental Improvements (E)							
Latrines	17,695	15,199	N/A	330	*	0	33,224
2010 Target	25,000	15,000	N/A	411	17,152,252	10,500	17,203,163
Percent Coverage	70.8%	101.3%	N/A	80.3%	N/A	0.0%	0.2%

*National target not presented.

**GOS: Government of Sudan.

***GOSS: Government of Southern Sudan.

N.B. These are national level data from interventions supported by all partners, not exclusively supported by The Carter Center.

Table 2. National Trachoma Control Program Annual Targets 2011 (Carter Center-Assisted Countries)

Targets as Presented at the Twelfth Annual Program Review, Atlanta, Georgia, February 22-24, 2011[§]

	Mali	Niger	Sudan		Ethiopia	Nigeria	Total
			GOS**	GOSS***			
Surgery							
Persons to operate for trichiasis	7,900	11,244	5,000	6,500	140,059	4,500	175,203
Antibiotic							
Doses of azithromycin to distribute†	2,033,326	5,561,942	442,931	858,800	24,000,000	3,175,392	36,072,391
Doses of tetracycline ointment to distribute	40,667	113,510	14,039	75,500	480,000	120,000	843,716
Facial cleanliness							
Villages to reach through health education	5,000	654	260	5,201	*	13,240	24,355
Environmental change							
Household latrines to construct	15,000	15,000	*	330	2,100,000	*	2,130,330

[§]All targets are subject to change

*Target not presented.

**GOS: Government of Sudan.

***GOSS: Government of Southern Sudan.

†Antibiotic targets to not reflect ITI-approved allocations of Zithromax

Table 3 Carter Center-Assisted Implementation of SAFE*Summary of Interventions per Country, January - December 2010*

	Indicators	Mali	Niger	Sudan		Ethiopia	Nigeria	Total
				GOS*	GOSS*			
S	Persons operated for trichiasis	5,623	5,267	438	810	33,021	N/A	45,159
	Target persons	6,240	6,000	2,000	3,000	79,284	N/A	96,524
	Percentage	90.1%	87.8%	21.9%	27.0%	41.7%	N/A	46.8%
	Trichiasis surgeons trained	0	20	21	1	93	N/A	135
A	Doses of azithromycin distributed	N/A	1,128,844	683	302,471	14,773,344	715,507	16,920,849
	Target population	N/A	1,466,468	0	645,000	15,690,499	763,294	18,565,261
	Percentage	N/A	77.0%	N/A	46.9%	94.2%	93.7%	91.1%
	Doses of tetracycline ointment distributed	N/A	32,888	438	19,622	368,264	15,456	436,668
F	Villages with ongoing health education	2,095	634	20	3,226	3,428	853	10,256
	Schools with ongoing health education	N/A	452	20	59	6,935	N/A	7,466
	Persons trained for health education	1,033	503	79	197	19,478	550	21,840
E	Household latrines constructed	11,907	10,650	N/A	0	590,119	0	612,676
	Target for latrines	12,000	15,000	N/A	382	805,812	0	833,194
	Percentage	99.2%	71.0%	N/A	0.0%	73.2%	0.0%	73.5%
	Masons trained	742	115	N/A	N/A	N/A	0	857

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

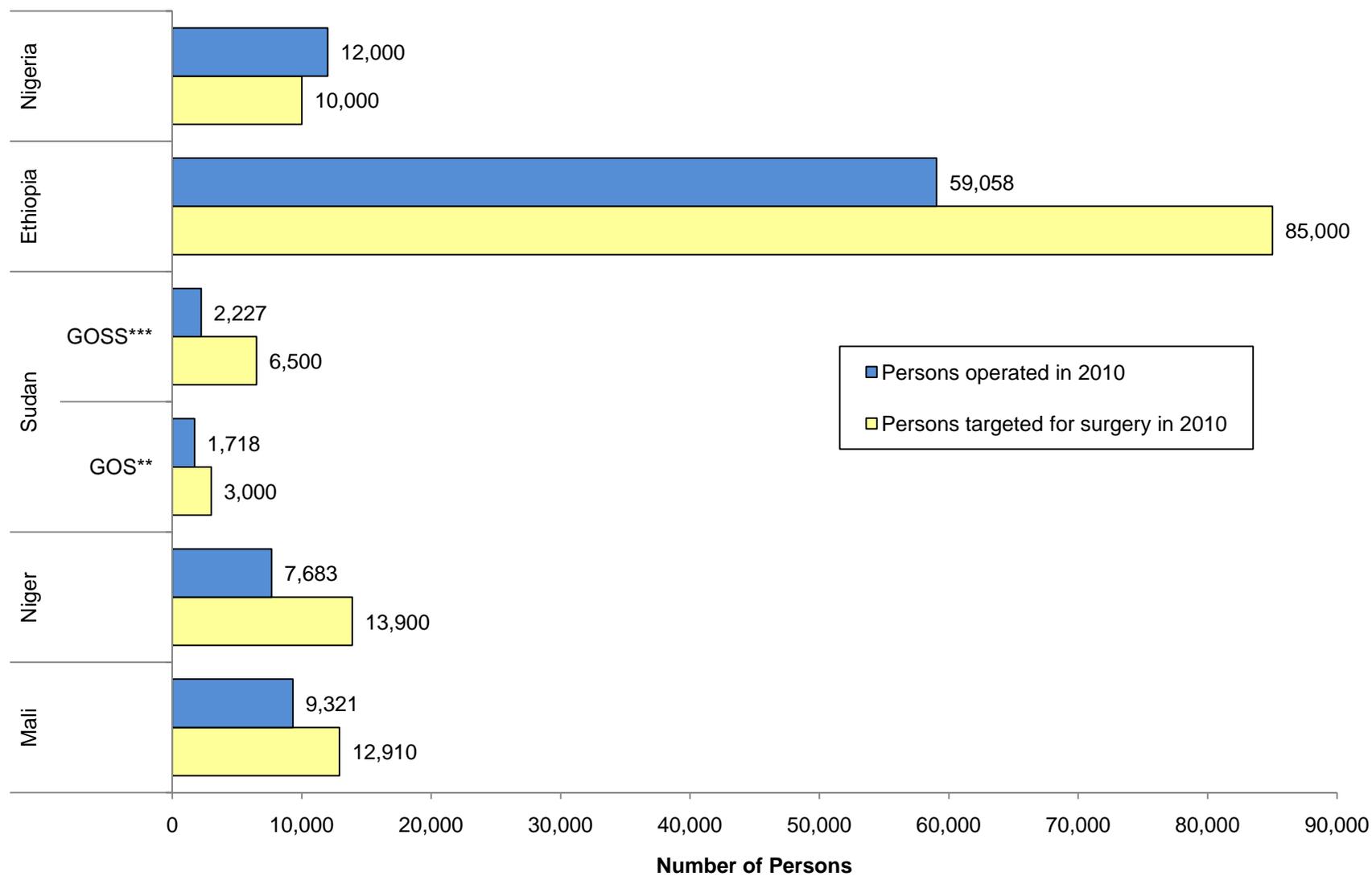
Table 4 Carter Center-Assisted Implementation of SAFE

<i>Cumulative Interventions per Country, 1999-2010</i>								
Indicators	Mali	Niger	Sudan		Ethiopia	Nigeria	Total	
			GOS*	GOSS*				
S	Persons operated for trichiasis	12,285	8,447	5,105	5,859	193,262	26	224,984
	Trichiasis surgeons trained	25	30	99	77	760	N/A	991
A	Doses of azithromycin distributed	N/A	1,724,232	1,585,163	1,955,317	50,921,686	715,507	56,901,905
	Doses of tetracycline ointment distributed	N/A	50,465	14,076	245,848	2,076,361	15,456	2,402,206
F	Villages with ongoing health education**	2,095	634	20	3,226	3,428	853	10,256
	Schools with ongoing health education**	N/A	452	20	59	6,935	0	7,466
	Persons trained for health education	17,611	5,701	2,215	20,705	116,968	4,648	167,848
E	Household latrines constructed	72,746	54,178	N/A	567	1,862,180	31,979	2,021,650
	Masons trained	4,378	1,418	N/A	N/A	N/A	1,910	7,706

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

**2010 Data Only.

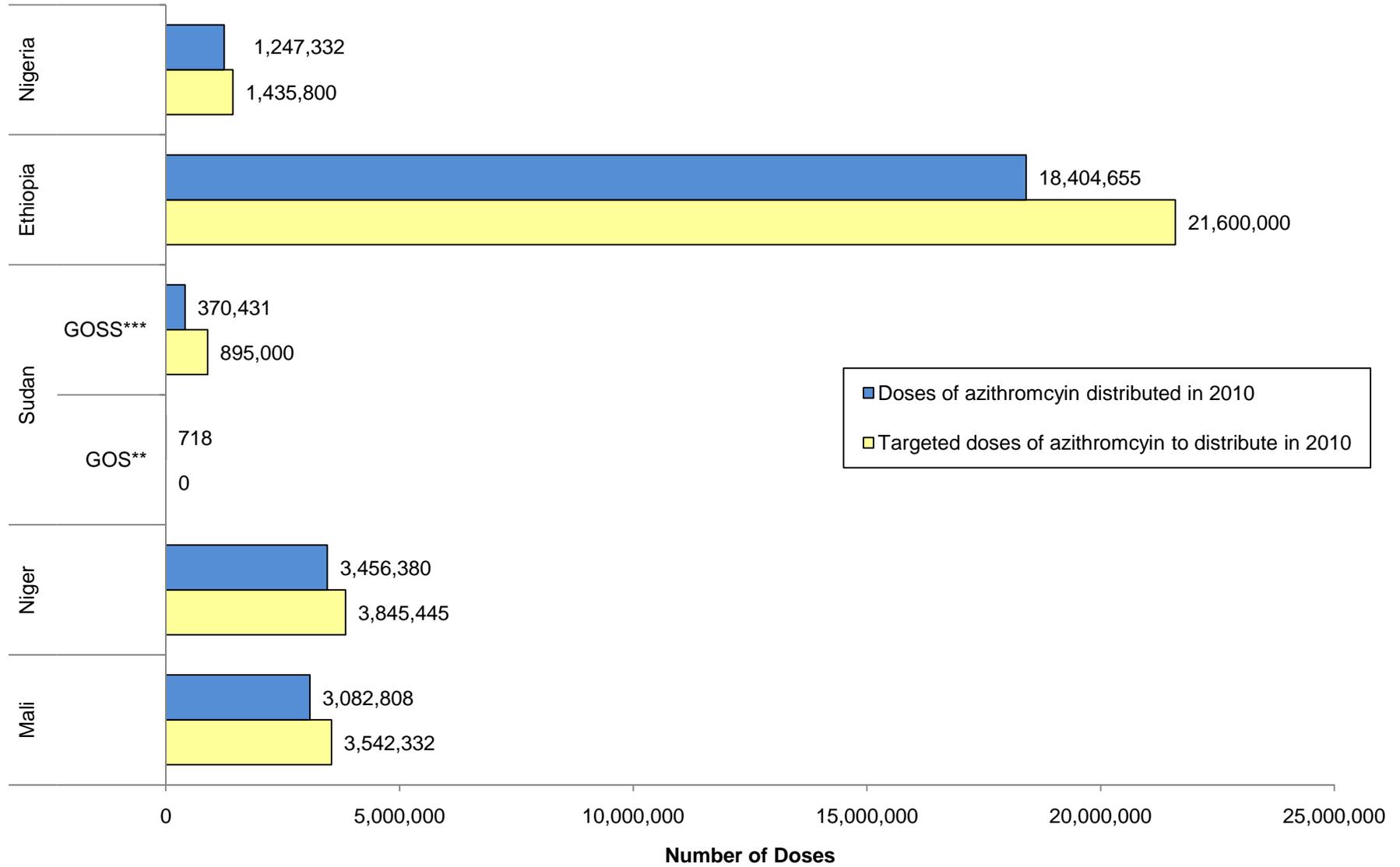
Figure 1 Persons Operated for Trichiasis, Carter Center-Assisted Countries
National program data as presented for January - December 2010



**GOS: Government of Sudan.

***GOSS: Government of Southern Sudan.

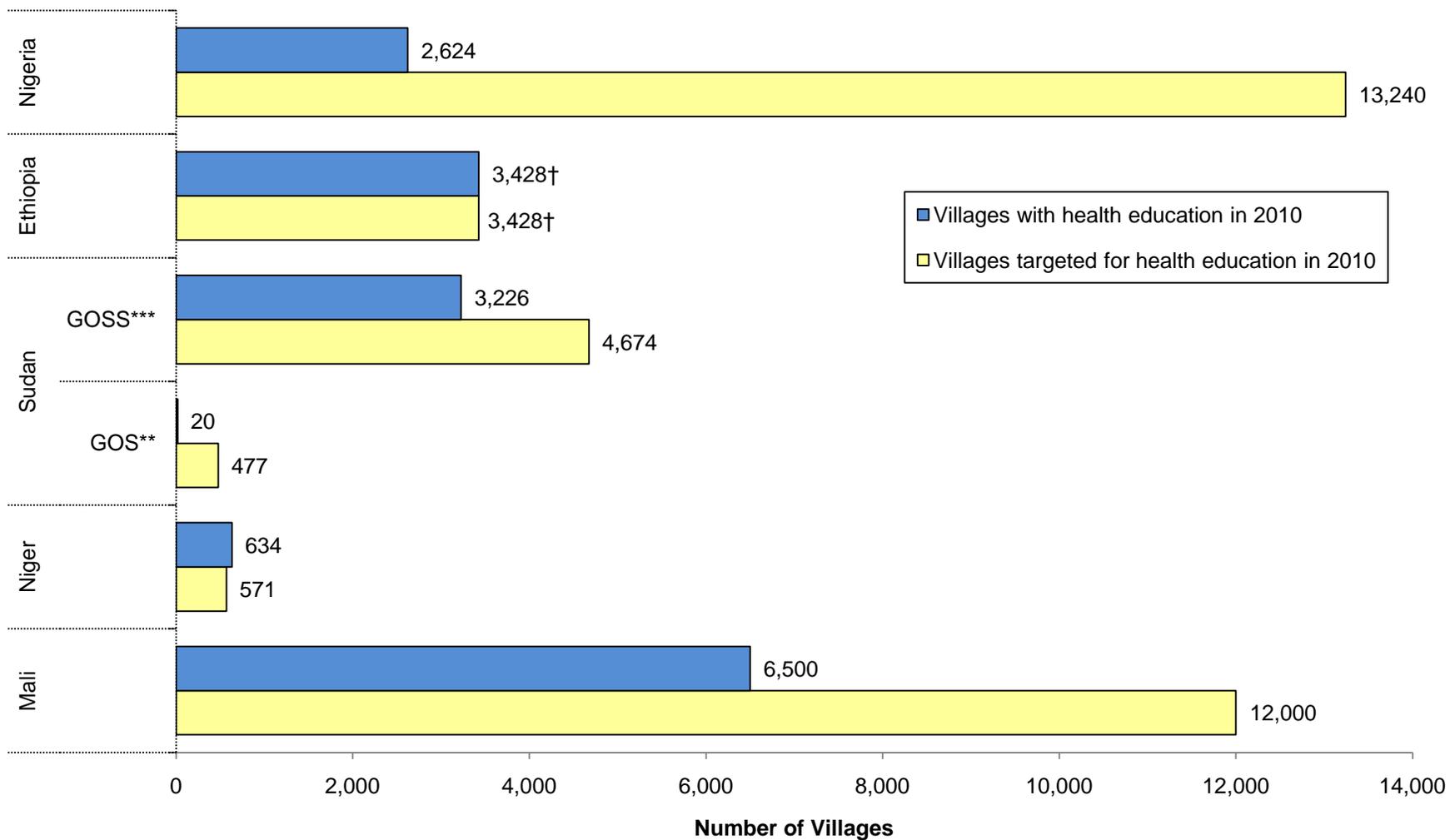
Figure 2 Azithromycin Distribution, Carter Center-Assisted Countries
National program data as presented for January - December 2010



**GOS: Government of Sudan.

***GOSS: Government of Southern Sudan.

Figure 3 Villages with Health Education, Carter Center-Assisted Countries
National program data as presented for January - December 2010



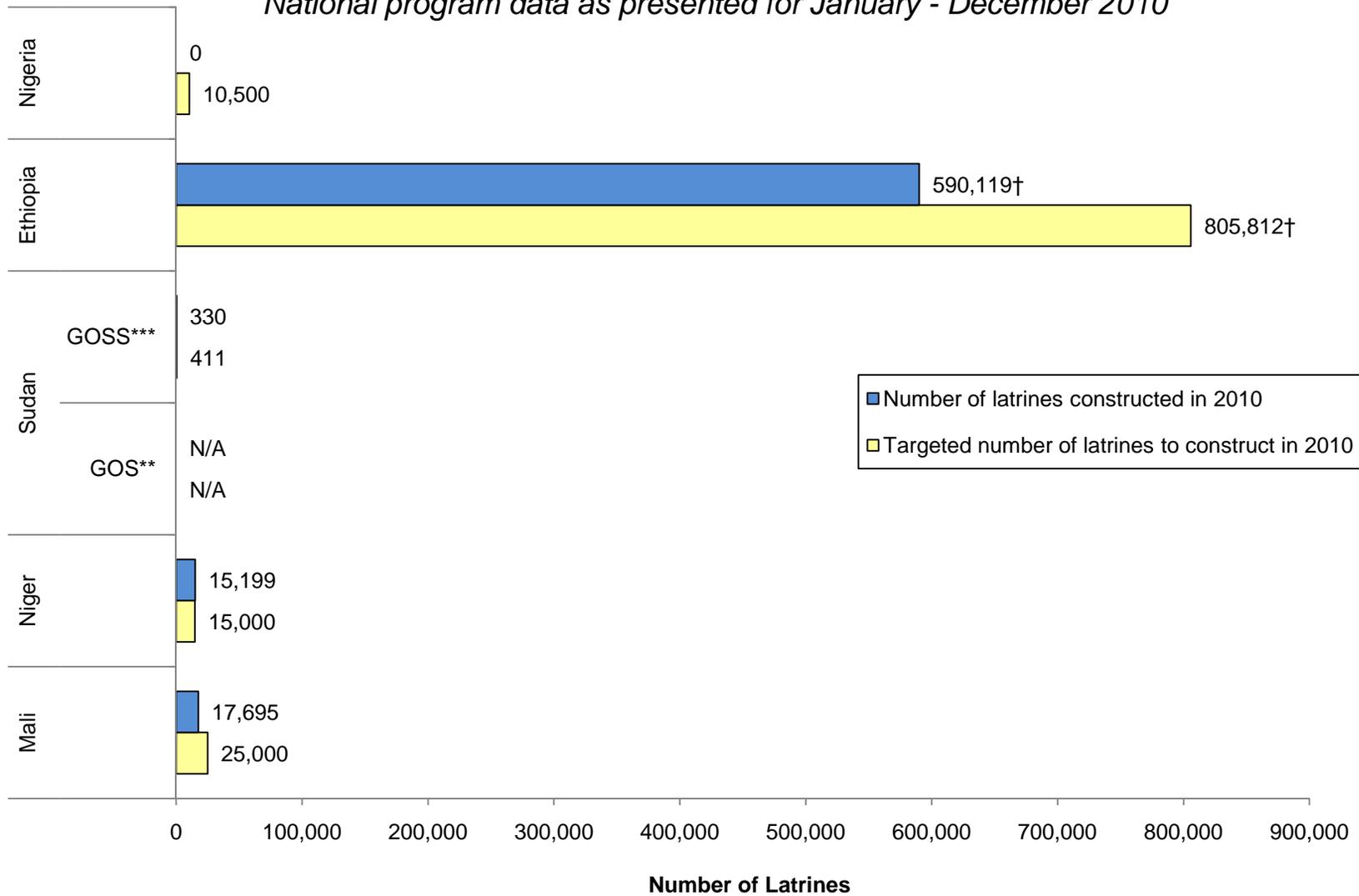
†Data presented for Amhara Region only.

*Data not presented.

**GOS: Government of Sudan

***GOSS: Government of Southern Sudan

Figure 4 Household Latrines Constructed, Carter Center-Assisted Countries
National program data as presented for January - December 2010



†Data presented for Amhara Region only.

**GOS: Government of Sudan.

***GOSS: Government of Southern Sudan.

South Wollo Impact Evaluation

Presented by Mr. Tesfaye Teferi, The Carter Center Ethiopia

In the national blindness, low vision and trachoma survey of 2005-2006, the Amhara National Regional State had a prevalence of trachoma (TF in children ages 1-9 years) of 39.1%. On the basis of the national survey, it was anticipated that the whole state was hyper-endemic for trachoma; therefore, baseline surveys were conducted at the zonal level (population around 2 million) at the end of 2006 prior to intervention. In South Wollo zone, baseline prevalence of trachoma (TF in children ages 1-9 years) was estimated at 12.6%. As of December 2010, 13 out of 21 districts in South Wollo had received at least three years of SAFE intervention, including three rounds of mass drug administration (MDA), the most recent of which took place six months prior, warranting an impact evaluation.

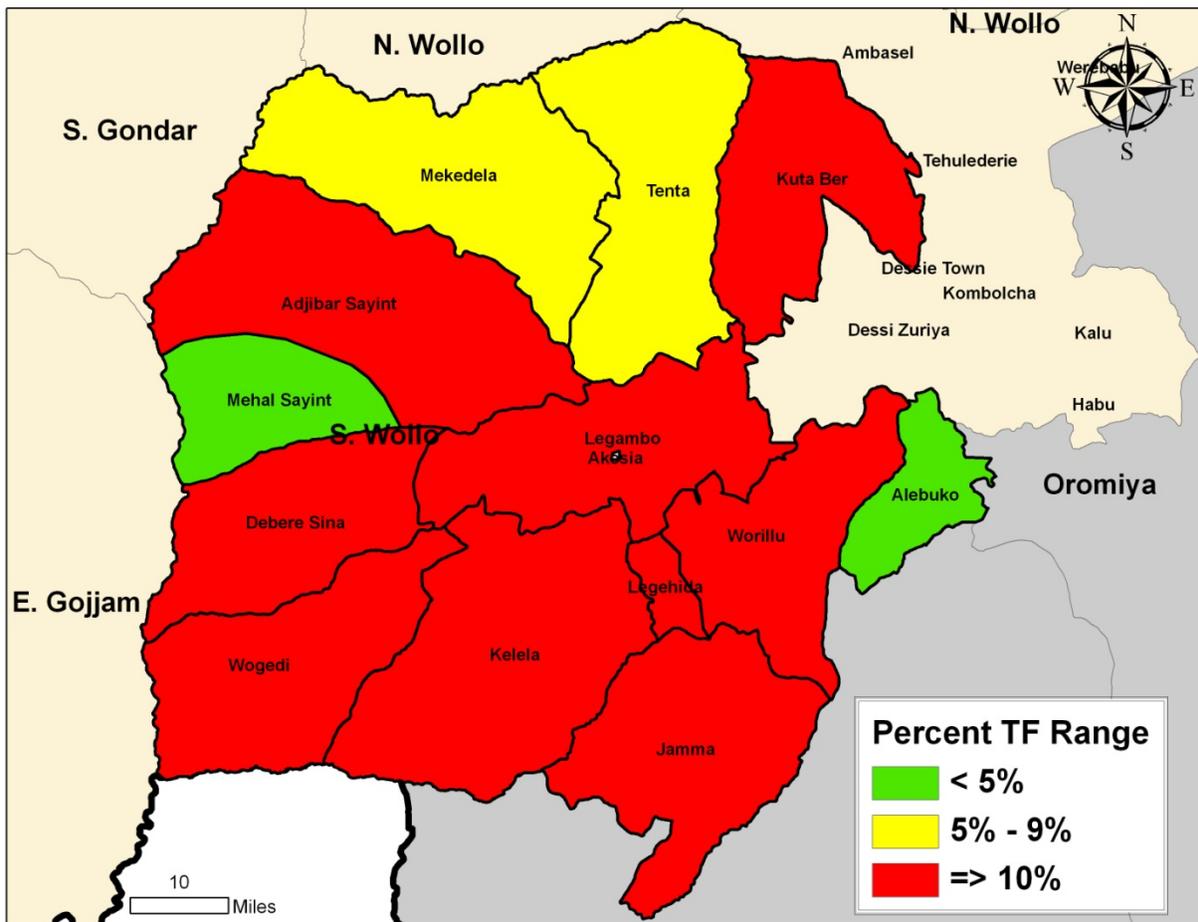
Impact surveys were designed to give a prevalence estimate of TF for each of 36 sub-districts which together comprise the 13 districts. The sample size was based on a true prevalence of TF of 3% with a precision of +/-2% with 10 clusters per sub-district and two to four sub-districts per district. The overall sample was 33,800 people of all ages screened for trachoma in 9,263 households from 360 clusters in 13 woredas.

Strict adherence to World Health Organization guidelines would indicate that MDA can be stopped in two woredas (Albuko and Mehal Saynt) since they are below 5% and that another two fall into the 5-9% category of targeted treatment (Tenta and Mekedela). All other woredas are greater than 10% and warrant continued treatment. Interpretation of the impact evaluation results was discussed and the consensus opinion was that stopping MDA uses less drug and is less expensive than continuing; however, this is only true if there is no resurgence of trachoma and MDA does not have to be re-started in the future. In the case of these woredas, they are still surrounded by endemic districts, some of which are hyper-endemic and we are concerned that the gains made in the last three years may be lost to re-infection from neighboring districts (Figure 1). Therefore, continuing MDA is recommended for all 13 evaluated woredas in South Wollo zone from 2011-2013.

Table 1. Results of trachoma impact assessment surveys in South Wollo zone, Amhara National Regional State, Ethiopia in December 2010

Woreda	Children 1-9 Examined	%TF (95%CI) 1-9 years	Adults Examined	%TT (95%CI) Adults >15	%TT (95%CI) All Ages
Adjibar Sayint	778	30.8 (17.8-43.7)	1,375	3.71 (2.2-5.2)	2.14 (1.3-3.0)
Alebuko	460	0.9 (0.0-1.9)	894	-	-
Debere Sina (Borena)	1,041	14.4 (11.2-17.5)	1,829	2.20 (1.4-3.1)	1.2 (0.7-1.7)
Jamma	977	21.6 (10.8-32.4)	2,152	2.85 (1.3-4.4)	1.69 (0.8-2.6)
Kelela	757	27.9 (20.0-35.8)	1,342	3.98 (2.8-5.1)	2.27 (1.7-2.8)
Kuta Ber	475	20.7 (13.4-28.1)	1,036	1.42 (0.3-2.5)	1.07 (0.0-2.2)
Legambo Akasia	988	20.2 (14.0-26.4)	1,832	0.52 (0.1-0.9)	0.33 (0.1-0.6)
Legehida	512	64.4 (52.9-75.9)	962	2.27(1.1-3.5)	1.56 (0.6-2.5)
Mehal Sayint	632	2.1 (0.4-3.9)	1,021	1.95(0.6-3.3)	1.11 (0.3-1.9)
Mekedela	1,078	9.3 (4.3-14.2)	2,285	0.73 (0.1-1.4)	0.46 (0.1-0.9)
Tenta	670	8.3 (4.6-12.0)	1,368	1.82 (0.7-2.9)	1.05 (0.4-1.7)
Wogedi	909	29.7 (22.0-37.5)	1,472	5.60 (4.2-7.0)	3.13 (2.4-3.9)
Worillu	848	45.5 (38.6-52.5)	1,640	1.68 (0.7-2.6)	0.94 (0.4-1.5)

Figure 1. Woreda level prevalence of TF among children 1-9 years of age in 13 woredas of South Wollo zone



March 15, 2011/awm

Post-Endemic Trachoma Surveillance in Mali

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

Mali aims to eliminate blinding trachoma by 2015. The SAFE strategy has been implemented in all regions. Recent trachoma impact assessments conducted from 2009 to 2011 have estimated the prevalence of TF among children to be below the 5% elimination target in several districts. To ensure that the achievements made in reducing active trachoma are maintained, surveillance activities must be put into place to monitor and respond to any recrudescence of active disease and ensure that existing and incident TT cases receive corrective surgery. The methodology implemented in Mali was based on collaborative feedback from the Ministry of Health, WHO and supporting partner organizations.

For active trachoma, Assistant Medical Officers (AMO) and Ophthalmic Technicians (OPT) were trained in the WHO Simplified Trachoma Grading System and qualified by reliability assessments utilizing both digital photographs and patients in the field. Currently, each AMO/OPT performs surgical outreach approximately 10 days per month visiting villages and operating on eligible TT patients via motorcycle campaign. In each eligible district where TF among children is less than 5% and mass distribution of antibiotic has ceased, two sentinel villages will be selected randomly where the district population is less than 200,000 persons. An additional two sentinel villages will be selected for districts larger than 200,000 total population. Once per year (Dec/Jan), during the existing surgery motorcycle campaigns, AMO/OPT will visit the randomly selected villages and examine at minimum 50 children for signs of active trachoma. If less than 5% of the children have TF (i.e. one or two children from the sample), then the AMO/OPT will ensure that children with active trachoma and their families and playmates will receive antibiotic treatment. In villages where 5-10% of the children have TF (i.e. three to five children from the sample), antibiotics will be mass distributed in the village and surrounding villages will be surveyed and distributed antibiotics where TF >5% among children is found. The F and E components of SAFE will be evaluated and strengthened in these villages. If TF in sentinel villages is greater than 10% (i.e. six or more children from the sample), mass distribution of antibiotics will commence in the entire sub-district for three years, F and E components will be enhanced and villages in surrounding sub-districts will be surveyed for trachoma. This method of active surveillance will occur annually for at least three years and new sentinel villages will be selected each year. A pilot of the proposed methodology of active surveillance for TF, will be implemented in April 2011, revised and then implemented in all eligible districts.

For surveillance of TT, all health centers in all districts will be provided with forms to register operated and recurrent cases of TT and to document TT cases that refuse surgery. Case detection and surgery through campaigns will continue. Adults in all sentinel villages with reported or presenting eye problems will be examined to detect TT and offer surgery. Any refusals will be examined, counseled and encouraged to receive surgery.

All results of campaigns, TF surveillance and clinic registers will be submitted to the national program. A national surveillance committee will review reports and make appropriate program decisions and provide feedback to the districts. The surveillance of trachoma will be integrated into the national surveillance system for long-term sustainability.

It should be noted that Mali is one of just a few countries (others are Morocco and Ghana) in which post-endemic surveillance is being piloted. Treatment decision based around prevalence thresholds of 5% and 10% are very susceptible to bias introduced by the examiners. Falsely

classifying just two or three children as presenting TF will have a great impact in terms of intervention. Thorough record-keeping concerning trichiasis patients will be required in order to demonstrate that all cases have been approached by the program and offered surgery or other management if they decline to undergo surgery.

TTT Study Update

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

Untreated trachomatous trichiasis can cause corneal damage and visual impairment. The WHO recommends surgery for all cases. However, in many regions surgical provision is inadequate and many patients decline surgery. The Trichiasis Trachomatous Trials (TTT) included two randomized controlled trials to investigate the management of trichiasis. The first trial compared two treatment options for those with minor trichiasis: epilation and surgery. Epilation is commonly practiced by patients for minor trichiasis (<6 lashes touching the eye) and has been associated with comparable outcomes to surgery in non-randomised studies. A non-inferiority trial of immediate surgery versus ongoing epilation for the management of minor trichiasis was conducted to compare the two practices.

The second trial evaluated the use of absorbable sutures versus traditional black silk sutures. Since trichiasis can recur after corrective surgery, the study tested the hypothesis that using absorbable sutures instead of silk sutures might reduce the risk of recurrent disease among patients with major trichiasis.

Epilation versus Surgery: Methods and Findings

1300 individuals with minor trichiasis from rural villages in the Amhara region of Ethiopia were recruited and assigned (1:1) by a computer-generated randomisation sequence to receive trichiasis surgery or epilation. Participants in the epilation group were given new forceps and epilation training for themselves and a helper. Study participants were examined every six months for two years by clinicians masked to allocation. The primary outcome measure was ≥ 5 lashes touching the eye at any time or receiving trichiasis surgery. The non-inferiority margin (Δ) was set at 10%.

The estimated risk difference in reaching the primary outcome was 11.0% (95% CI 7.1 – 13.9%). The result is inconclusive as the lower boundary (7.1%) is below Δ and the upper boundary (13.9%) above. There was no difference between the trial arms in visual acuity or corneal opacity change.

For minor trichiasis, epilation is associated with visual acuity and corneal outcomes that are comparable to surgery, over a two-year period. Epilation should be for the treatment of patients who do not have access to or refuse surgery. Surgery should be performed when it is available and patients are willing to accept it.

Absorbable versus Silk Sutures: Methods and Findings

1300 individuals with major trichiasis from rural villages in the Amhara region of Ethiopia were recruited and assigned (1:1) by computer-generated randomisation sequence to receive trichiasis surgery using either an absorbable suture (polyglactan-910) or silk sutures (removed at 7-10 days) using an otherwise identical surgical technique. Participants were examined every six months for two years by clinicians masked to allocation. The primary outcome measure was recurrent trichiasis (≥ 1 lash touching the eye) at one year.

There was no difference in the prevalence of recurrent trichiasis at one year (114 [18.2%] in the absorbable suture group against 120 [19.7%] in the silk suture group; odds ratio=0.90, 95%CI 0.68-1.20). The two groups also did not differ in terms of corneal opacification, visual acuity, conjunctival inflammation and surgical complications.

There was no evidence that use of absorbable polyglactan-910 sutures was associated with a lower prevalence of trichiasis recurrence at one year post-surgery than silk sutures. However, from a programmatic perspective, polyglactan-910 offers the major advantage that patients do not have to be seen soon after surgery for suture removal. The post-operative review can be delayed for three to six months, which may allow us to better determine who needs additional surgery.

Integrated Antibiotic and Mosquito Net Coverage Survey in Plateau State, Nigeria 2011

Presented by Dr. Nimzing Jip, The Carter Center, Jos, Nigeria

In 2010, the Federal Ministry of Health received its first shipment of Pfizer Inc-donated azithromycin for the elimination of blinding trachoma. Residents in seven trachoma endemic local government areas (LGAs) in Plateau and Nasarawa states were the first recipients of the drug during an inaugural mass distribution. Volunteer community drug distributors (CDDs) were utilized to register households and distribute the drugs, as is done in both states for other ongoing mass drug administration (MDA) programs. Simultaneously, long-lasting insecticidal nets (LLINs) were distributed to registered households through central distribution points in Plateau State as part of a national malaria control initiative. Both activities were supported by The Carter Center Nigeria.

Just over a month after both distributions, a cluster randomized survey was implemented to estimate the true coverage of antibiotics and household net ownership to monitor the distribution strategies. All census enumeration areas from three LGAs where the distributions overlapped were listed geographically and 24 were selected by random, systematic sampling. Within each selected enumeration area, households were divided into segments of approximately 16 households and the village leader selected one segment randomly via lottery. All households within a selected segment were visited by a survey team and present residents reported taking or not taking antibiotics for trachoma and sleeping or not sleeping under a bednet the previous night. Antibiotic participation was verified using the drug distribution registers where available. Household interviews and observations were conducted to determine presence of a household latrine; knowledge of trachoma and the antibiotic distribution; and net ownership.

An adult household resident was present to give consent for the survey in 365 of 392 visited households. From the surveyed households, responses were recorded for 1,858 out of 2,185 registered persons. A used latrine was observed in 25.6% of surveyed households. 72.9% of households reported receiving antibiotics from a CDD and the same percentage of households reported receiving advanced notification of the distribution. 81.9% of household interview respondents knew what trachoma was and 55.1% were aware that the antibiotics distributed were for treating trachoma. Reported individual antibiotic coverage was 59.9% (95%CI 48.0-71.8%). Individual antibiotic coverage among households reporting to have received the drugs from a CDD was 76.9% (69.4-84.4%). Of persons not taking antibiotics, 62.2% reported that the antibiotics were not distributed by the time of the survey and 34.1% reported not being present and missing the distribution. Survey teams were able to verify responses for 95.7% of persons listed in treatment registers; however, only 44.2% of household residents could be identified in treatment registers. Figure 1 shows antibiotic coverage by age and registration status. Reported individual antibiotic coverage was 79.6% (67.4-91.7%) for persons listed in the treatment register and 42.3% (25.5-59.0%) among persons not registered.

The average number of nets owned per household was 2.15 (95%CI 1.84-2.46). 82.2% of households owned at least one net and 79.7% owned two or more. Reported nets were observed in 88.6% of households. Among households with nets, 98.3% reported that their newest net was received from a mass distribution campaign. The newest net was being used in

52.0% (39.5-64.5%) of households with nets. Individual net use assessed by reporting sleeping under a net the previous night was 41.0% (28.2-53.9%) among households with at least one net.

This coverage survey highlights the importance of monitoring mass drug distributions through household surveys. Administrative reports of antibiotic coverage of 75.8% corresponded with coverage among persons recorded in treatment registers. However, the household coverage survey identified households and communities that were not registered and did not receive antibiotics. Where CDDs registered households and distributed antibiotics, coverage reached 80%. Coverage in future rounds of MDA can be enhanced by updating treatment registers and identifying additional CDDs to cover new communities and all households to ensure that no households are missed.

Figure 1. Reported antibiotic coverage by age group and registration status



Evaluation of Latrine Promotion in North Shewa Zone, Amhara Regional State, Ethiopia

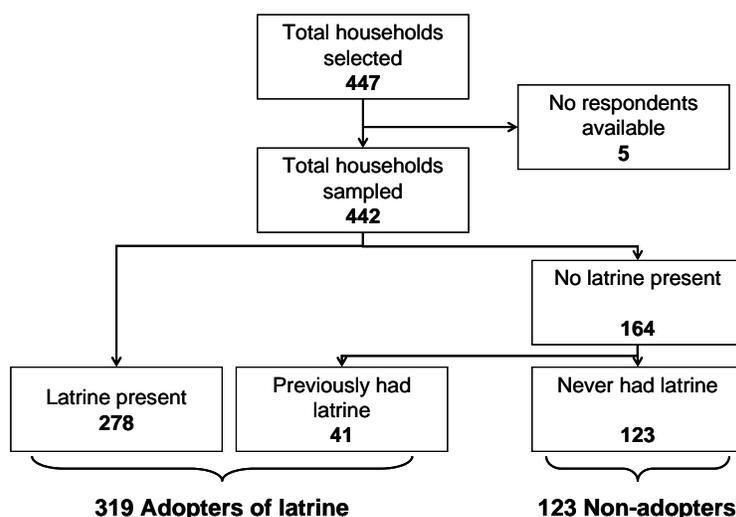
Presented by Ms. Rachael K. Ross, Rollins School of Public Health, Emory University

In 2006, 8.9% of households had a pit latrine in the North Shewa Zone. In 2007, the full SAFE strategy was implemented in the zone. The Kewot woreda health office reported that latrine coverage in rural areas of woreda was 97% in 2009.

This study had three objectives:

1. Estimate household latrine coverage in Kewot woreda
2. Investigate previous latrine ownership and frequency of rebuilding latrines
3. Explore characteristics of adopters and non-adopters

Interviews were conducted in 442 households selected at random in a multi-stage, cluster survey. The head of household was interviewed. Latrines were visually inspected by survey teams.



Estimated household latrine coverage was 56.2% (95% CI 37.5 – 74.8) and, in rural areas (where reported coverage was 97%), was 67.7% (95% CI 59.6 – 75.7). Previous latrine ownership was reported by 12.7% (95% CI 8.9 – 16.5) of households of which 32.0% (95% CI 15.9 – 48.2) had built a replacement. On average, the previous latrines reportedly lasted 2.3 years (95% CI 1.9 – 2.7). The majority of previous latrines (70.9%) were no longer used because of a structural problem.

Four characteristics were significantly associated with latrine adoption:

Characteristic	OR	95% CI
Male head of household	2.5	1.6 – 3.7
Primary occupation: agriculture	12.7	8.1 – 20.0
>5 residents in household	5.0	1.6 – 15.6
Rural setting	8.3	2.9 – 23.6

Head of household's education, travel experience, religion, ethnicity, children's education and roof material were not associated with latrine ownership.

Heads of household who were advised by a health extension worker or development agent were more likely to have built a latrine. Heads of households who reported reduction of flies or convenience as advantages of latrines were significantly more likely to be adopters.

If the zonal estimate from 2007 (8.9%) can be used as a proxy for baseline in the woreda, there appears to have been a substantial increase in latrine coverage since the implementation of the SAFE strategy. Reported coverage and estimated coverage from the woreda health office are not in agreement. Current reporting methods may not distinguish if the latrine was the first at a household or if the latrine replaced a previous latrine. Without this distinction, reported coverage estimates would be inflated. Additionally, estimates may not be updated for latrines which are no longer used which would also lead to inflated coverage. The latrine promotion program should ensure that routine reporting accurately distinguishes between new and replacement latrines and include a mechanism to capture no longer used latrines. It may be beneficial for the program to audit reporting records to better understand where inaccuracies originate in order to develop more refined tools for regular data collection.

Pit latrines using local materials are expected to require regular maintenance. The short reported life-span of the latrines and the large proportion which were not used until full suggest that owners may not be conducting maintenance. The latrine promotion program should include an emphasis on maintenance of already existing latrines. Additionally, because the latrine use of all local materials, the life span of these latrines, even with maintenance, may be significantly less than that of an improved pit latrine. Simple pit latrines are a short-term solution for sanitation and the program should explore alternative longer lasting construction options. The promotion program should include emphasis on rebuilding latrines targeted at current latrine owners. Future studies should continue to investigate rebuilding behaviors and try to determine why heads of household do not rebuild.

Female heads of households, heads with a non-agriculture occupation and heads of smaller households were significantly less likely to have a latrine. These heads may not be able to supply the labor required for latrine construction. For heads of household that may not be able to supply labor, promotion should include information about additional sources of assistance such as community volunteers.

Trachoma Elimination in The Gambia

Presented by Dr. Robin Bailey, London School of Hygiene and Tropical Medicine

The Gambia National Eye Care Programme (NECP) has been at the forefront of operational research on trachoma control and elimination. Following the 1986 national blindness prevalence survey, the NECP was established to address the leading causes of blindness: cataract (47%), trachoma (17%), and other causes of corneal opacity (11%), which include childhood measles and traditional eye practices. From early work on trachoma vaccine development and demonstrating the association between flies and trachoma transmission to establishing the evidence base for mass treatment with azithromycin, The Gambia has been actively engaged in the control of trachoma.

Since 1986, the NECP has trained community ophthalmic nurses to conduct screening and surgery for trichiasis, and has trained village health workers and community volunteers to promote trachoma control. In 1996, the national prevalence of active trachoma fell from 10.4% to 4.9% among children less than 15 years of age. The prevalence of trachoma (TF and/or TI) among children 0-9 years was 5.9%, with regional estimates ranging from 11.5% to 1.2%. In 2006, a survey was conducted in the Lower River and North Bank regions (areas with the highest prevalence) to re-quantify the burden of disease. From 1996 to 2006, the prevalence of clinical signs TF and/or TI in children 0-9 years did not change. However, tests for Chlamydia DNA showed that only 0.3% of children in the 2006 study had evidence of ocular *C. trachomatis* infection. Based on the 2006 findings, there was evidence to suggest that although clinical signs of trachoma may persist, infection may not have been present. However, since clinical signs of the disease exceeded 10% in the study areas, mass treatment with antibiotics was still indicated, despite the presence of little to no infection. In order to examine the long-term impact of one round of antibiotics in this setting, 14 villages were selected for mass treatment and latrine construction at baseline and then followed-up over the course of five years to measure the trend of infection. In these villages, infection was reduced and the low level prevalence was sustained five years later.

The NECP authored a national plan in 2007, in which 11 districts were targeted to receive mass drug administration with antibiotics. As part of the national plan, The Gambian NECP incorporated the Progress in the Rapid Elimination of Trachoma (PRET) study to test the effect of standard versus enhanced coverage with antibiotics. In this study, a comparison of clinical signs of disease and infection were poorly correlated. It is possible that signs of TF that were observed in the PRET study are caused by other pathogens, and that as trachoma endemicity decreases, the sensitivity of the clinical grading system is reduced.

Helen Keller International: Integrated Trachoma Control

Presented by Ms. Emily Toubali, Helen Keller International

Helen Keller International (HKI) is an active partner in the effort to eliminate blinding trachoma by the year 2020. Currently, HKI operates trachoma control programs in Mali, Niger, Tanzania and Cameroon.

Projects in Mali are funded by the Conrad N. Hilton Foundation (CNHF), USAID through Research Triangle Institute International (RTI), the Bill & Melinda Gates Foundation through the International Trachoma Initiative (ITI), the European Union and Pfizer Inc/ITI. The surgery, antibiotic distribution and face washing components of the SAFE strategy are implemented by HKI in Mali. Trichiasis surgeries are focused in the Kayes region. Antibiotics, including azithromycin and tetracycline, are distributed in 15 districts in the regions of Kayes, Koulikoro, Segou, Tombouctou, Gao and Kidal. To support the face washing component of the SAFE strategy, HKI supports women's listening groups, a trachoma primary school health curriculum and a radio broadcast program, which also promotes trichiasis surgeries. In addition, the Integrated Behavior Change for Trachoma and Soil Transmitted Helminthes study is working to create behavior change and communication messages to improve hygiene and sanitation practices through the safe disposal of feces.

Projects in Niger are funded by CNHF and the Bouamatou Foundation through ITI. These funds cover the surgery and face washing components of the SAFE strategy. HKI supports surgeries in Tahoua, Dosso and Zinder, and trains and certifies new trichiasis surgeons. Additional funds are applied towards rehabilitating radio stations which then promote face washing; conducting a radio impact study in Zinder, Diffa, Tahoua and Dosso; distributing IEC posters; and piloting a trachoma primary school health curriculum in Dosso and Tahoua.

Projects in Tanzania are funded by CNHF, the Heart to Heart Foundation and the Sabin Vaccine Institute. The complete SAFE strategy is covered by these funds and programs, which are focused in four regions: Mtwara, Lindi, Pwani and Ruvuma. Surgical activities include surgical camps, refresher training for current surgeons, new surgeon training and employment of village health workers for social mobilization. These funds have also supported the development of a trachoma planning and budgeting tool. Several activities are aimed towards promoting face washing and environmental change: a trachoma school health curriculum, poster distribution, development of radio broadcasts on the importance of facial hygiene, and a mapping activity to identify key water and sanitation partners in the regions of Mtwara and Lindi.

An antibiotic mapping project in Cameroon was funded by USAID through RTI and Pfizer/ITI. This project conducted baseline mapping of 26 health districts in the Far North. Findings revealed that 13 districts had a TF prevalence of over 10%. Eight of these districts will receive Zithromax[®] during an upcoming round of MDA. Baseline mapping in the North region will begin later this year.

Programmatic successes in Mali, Niger, Tanzania and Cameroon have largely stemmed from collaboration between HKI, other NGO partners such as The Carter Center, and national governments. In this way, all components of the SAFE strategy are integrated into national health plans. Challenges include obtaining all drugs in time to conduct integrated MDA in Mali, competing public health priorities in Cameroon during mapping, and ensuring the inclusion of the "F" and "E" components in the national programs of Niger and Tanzania. These challenges will be addressed through increased collaboration between program partners and governments.

New Global Atlas of Trachoma Prevalence Created from Data in Countries with Active Trachoma and Trichiasis

Presented by Dr. Danny Haddad, International Trachoma Initiative

The *Trachoma Atlas* shows the distribution and prevalence of trachoma, the world's leading cause of infectious blindness. The *Trachoma Atlas*, at <http://www.trachomaatlas.org> shows 49 country maps with population-based data on trachoma. The open-access, global resource is intended for public health professionals and managers of trachoma-control programs as well as the general public interested in learning about this infectious eye disease and the possible global elimination of blinding trachoma by 2020.

Mapping and assessing the magnitude of blinding trachoma is critical to defining which areas are priority for implementation of control efforts, monitoring changes in trachoma prevalence, and advocating for prevention and treatment.

The *Trachoma Atlas* was created by several partners, including the [London School of Hygiene & Tropical Medicine](#), the [International Trachoma Initiative](#) at The Task Force for Global Health, and [The Carter Center](#), with funding from the Bill & Melinda Gates Foundation. Data came from Ministries of Health and academic research in various countries.

The data at www.trachomaatlas.org include:

- Prevalence estimates of active trachoma and trichiasis from population-based prevalence surveys (PBPS)
- Maps of district level data from PBPS and trachoma rapid assessment (TRA).

The country maps are expected to be used as:

- An information resource for all partners to highlight where additional surveys are needed and the current distribution of trachoma
- An advocacy tool to prompt political will and further support for implementation efforts
- A source of data for use in operational research.

Quality Assurance Trichiasis Assessment

Presented by Dr. Paul Courtright, Kilimanjaro Center for Community Ophthalmology

Background

The ultimate goal of national programs implementing TT surgery is to provide a quality surgical effort that mobilizes sufficient resources to allow all those suffering with trichiasis a satisfactory outcome. As of 2010, there remains only 10 years for countries burdened with trachomatous trichiasis to reach their GET 2020 targets. Even after several years of trichiasis surgical efforts, annual surgical delivery achievements for Ethiopia, Niger, Mali and Tanzania are not adequate to enable these countries to achieve their 2020 surgical targets. Additionally, recent research suggests:

- 1) the provision of surgical training and a dependable consumable supply chain are insufficient to ensure service delivery;
- 2) the quality of surgical outcomes are not as good as anticipated;
- 3) the clinical definitions of "good outcome" from TT surgery may not always equate to patient satisfaction;
- 4) changes to service delivery models are needed.

In 2010, the Kilimanjaro Center for Community Ophthalmology partnered with The Carter Center and Helen Keller International to assess the quality of surgical service delivery within these four countries and to design and implement pilot interventions for program improvement and expansion.

Assessment

The quality assurance surgical assessment is a two year project in each of the participating countries (Ethiopia, Mali, Niger and Tanzania) which began January 2011.

Year One will include quantitative interviews and a situational analysis of surgical delivery systems. The following persons will be identified for participation in the quantitative interviews:

- 1) 192 previously operated patients from randomly selected villages in each participating country via a population based selection process;
- 2) All un-operated persons suffering from trichiasis living within selected villages;
- 3) All surgeons who have performed at least one TT surgery in 2010.

A situational analysis will be uniquely developed within each participating country that will seek to capture the successes and challenges that exist in the current surgical service delivery systems. Additionally, the situational analysis will be used as an opportunity to attempt to qualitatively explain queries raised through the analysis of information gathered during the quantitative interview process.

Year Two will allow participating country programs an opportunity to develop and implement one-year pilot projects that will attempt to address challenges to the availability and quality of TT surgical service delivery as well as to increase the satisfaction level of participating patients.

WHO/PBD-GET2020 Third Global Scientific Meeting on Trachoma Elimination

Presented by Dr. Silvio Mariotti, WHO GET 2020 Secretariat

This summary was prepared by Dr. Paul Emerson, GSM participant. When finalized, the full meeting report will be available via the WHO GET 2020, ITI and Carter Center websites and should be referred to before making material programmatic decisions.

The third Global Scientific Meeting on trachoma elimination was convened in Baltimore the 19-21st July 2010 with the purpose of reviewing the most recent data from research and elimination programs to identify if new evidence may lead to refinement of previous global scientific meeting conclusions, to review current recommendations and treatment directives for trachoma control programs, and to clarify previous recommendations on certification of elimination of blinding trachoma.

Consensus recommendations were made by the group with the purpose of clarifying the process of reaching elimination. For these recommendations the following operational terms were used:

1. District: The administrative unit for health care management (i.e. the basic implementation unit) that has a population of around 100,000-250,000 persons.
2. Sub-district: A geographic or other grouping of at least three villages that divides a district into sub-units. The sub-district may have a population of around 50,000.
3. Village: a population unit of 8,000-10,000 persons.
4. Community: A defined group of households, a village, or a group of neighboring villages, for which mass trachoma control activities can be implemented. A community may be as large as a sub-district or may be smaller than a village.

In order to start a trachoma control program, population-based data on disease prevalence are necessary for programmatic planning. District level data are the gold standard for all programs, but other levels can be used. Where focal disease is suspected, village or community level data can be used to start village or community level programs. Where there is evidence of hyper-endemic active trachoma, a geographic area larger than the district can be used as the survey domain. This would allow access to interventions for the affected people faster than if the hyper-endemic area is surveyed district by district. However, if TF is found to be less than 10% in 1-9 year olds in the larger area, district level surveys should be conducted before intervention.

Outcome or impact assessment surveys should be conducted in order to determine when antibiotic distribution can be stopped and if the Ultimate Intervention Goal for active trachoma has been reached. Such surveys must be conducted at the district level (not at larger aggregates) and the findings can be used to support claims of reaching the Ultimate Intervention Goal for TF if the sample size is powered to calculate estimates at the sub-district level. The timing of these surveys should be guided by the baseline level of TF in children ages 1 to 9 years. If the baseline prevalence of TF is 10-30% then it is not necessary to conduct impact assessment before at least three years of A, F and E. If TF is >30% at baseline then it is not necessary to conduct impact assessment before 5 years of A, F and E implementation. Programs can conduct impact assessments sooner if they wish to and have the resources available.

The Ultimate Intervention Goal for active trachoma is to achieve and maintain a prevalence of TF <5% in children aged 1-9 years. At impact assessment, a district with >10% TF should continue with at least three years of A, F and E implementation. A district with prevalence <5% TF should continue F and E, but A can be stopped (if the survey was powered at the sub-district level). Districts with TF between 5 and 9% should be divided into meaningful sub-districts and the sub-districts assessed. Sub-districts with TF >10% warrant at least three years of A, F and E. Those with TF <5% should continue with F and E until elimination is achieved. If a sub-district is found with prevalence between 5 and 9% then F and E should continue and A can be targeted to known endemic communities, or where trachoma transmission is still suspected.

For the control of trachomatous trichiasis, the Ultimate Intervention Goal at the district level is to achieve fewer than 1 UNKNOWN case of TT per 1,000 total population. It is important to understand that unknown cases do not include people with TT as a result of: recurrence after surgery; patients who decline to accept service after counseling; and patients who have agreed to accept service, but who are awaiting their appointment. In order to document the status of these patients and achieve the Ultimate Intervention Goal for surgery, programs will have to have a highly functioning surgical information system in place. Furthermore, there must be evidence that the health system is able to identify and to manage incident trichiasis cases and have evidence of appropriate financial resources to implement them. In the strategy for achieving this goal, country programs must report a recurrence rate as part of the health information system, with a target of achieving 10% or less recurrence at one year after surgery.

Evaluation of Trichiasis Surgery Quality in Niger

Presented by Dr. Kadri Boubacar, Niger National Program for the Prevention of Blindness

In 2010, the National Program for the Prevention of Blindness in Niger (PNLCC) implemented a survey to evaluate the outcome of trichiasis surgery one year after operation. The objectives of the evaluation were to calculate the proportion of patients with surgical failure; identify the risk factors that may increase the probability of surgical failure; and identify other factors that contribute to a patient's decision to accept or refuse trichiasis surgery.

The evaluation was implemented in Dosso, Maradi and Tahoua regions, with assistance from The Carter Center and Helen Keller International and financial support from the Conrad N. Hilton Foundation. Study subjects were randomly selected from a list of patients operated at least 12 months since the time of the evaluation. The program used the surgical registers to create a list of patients, and those selected for the study were followed-up in their communities. Once a subject was found, s/he was asked to provide informed consent to participate in a structured interview. The structured interview tool collected basic demographic background information, history of treatment of trichiasis and overall assessment of satisfaction with the service provided. An examination of the eye and the eyelid was performed on enrolled subjects to measure visual acuity, recurrence and other surgical outcomes. Patients with recurrent trichiasis or other eye conditions were referred to the appropriate health service clinic for treatment.

The sample size calculation estimated that 310 patients were necessary to estimate a rate of recurrence as low as 10%. After reviewing the surgical registers, the study team was able to follow-up 287 patients eligible for inclusion in the study. Among the patients followed-up in the registers, only 163 were enrolled. The other 124 were either unavailable (80%), absent due to travel (14%), deceased (4%) or declined to be interviewed and examined (2%). Among those recruited into the study, the majority (55%) was over the age of 40 years and 76% of the subjects enrolled were women.

The results of the clinical examination showed that of the 163 patients enrolled, 33% had recurrent trichiasis, 7% had corneal opacity, and 3% had granuloma. Over 80% of the subjects reported that their trichiasis was corrected after surgery and that their level of pain was reduced. 16% of the participants claimed that their vision improved. Since visual acuity and corneal opacity were not recorded at the time of surgery, it was not possible to measure change in the patient's condition.

The findings from this evaluation will be used by the national program in Niger to adjust surgical delivery targets and address training needs in the areas covered by the survey. The recurrent cases in Niger may require a second surgery or additional follow-up. In addition to these results, implementation of the survey identified challenges with conducting long-term follow-up of trichiasis patients. The high rate of non-response suggests that patients may provide incorrect tracing data at the time of surgery, especially if they reside beyond the boundaries of the health district implementing a campaign. It is also possible that surgeons do not complete registers accurately, which suggests that another sampling method may be more appropriate when implementing this type of evaluation in the future.

Ghana: The End Game: Guinea Worm Disease and Trachoma

Presented by Ms. Kelly Callahan, The Carter Center Atlanta

The Ghana Ministry of Health in conjunction with The Carter Center (TCC), Sightsavers and other partners met the elimination targets for blinding trachoma in 2008 and the eradication targets for ending transmission of Guinea worm disease in 2010. The End Game Goal for trachoma is to clear the entire TT backlog by 2011/2012 and for Guinea worm is to report zero cases in 2010/2011.

In 2009, the Ghana Ministry of Health identified 29 districts with a trachomatous trichiasis (TT) backlog. These districts required TT case searches and surgery to eliminate the TT backlog in the country. Of the 29 districts, fourteen are in the Northern Region of the country with six of these previously endemic for Guinea worm disease (see map inset). In an effort to ensure these six Districts were free of Guinea worm disease and to assist in the elimination of the TT backlog, The Carter Center agreed to implement integrated case searches to identify and treat all TT patients and investigate all rumors and treat all suspect cases of Guinea worm disease.

In February 2010, four districts (Savelugu, Tolon-Kumbungu, Gushegu, and Karaga) carried out integrated case searches and TT surgical campaigns from a centralized level using mostly male Guinea worm Village Based Health Workers (VBHWs) from certain geographical locations. The total number of persons involved in the integrated case search in all four districts was 959. VBHWs were trained at the central level on TT identification methods, house to house searching and reporting and “refreshed” on Guinea worm identification and reporting. The training took place on the first day of the district-wide case search. All Guinea worm rumors and suspects were immediately transported to a case containment center for verification. All TT patients were referred to a surgical team to arrive at a later date. The patients were told to report for surgery or were told they would be transported for surgery at a date in the following weeks.

The four districts (Savelugu, Tolon-Kumbungu, Gushegu, and Karaga) were not searched in their entirety which created missed opportunities to identify TT patients, find rumored and suspected GW cases and increase awareness on Guinea worm disease. There are several reasons the case search coverage was low: the four districts were not mapped prior to the case searches; they utilized mostly male Guinea worm VBHWs searching only in Guinea worm specific villages and not all villages of the district; and the case searches in the four districts were centralized. Although Gushegu and Karaga both reported high TT surgery acceptance rates, the number of suspected TT cases examined was probably low due to the lack of population coverage during the case searches. This means there may still be TT cases in these districts (as well as Savelugu and Tolon-Kumbungu) and they should be identified through another more comprehensive case search.

In November 2010, two districts (Central Gonja and West Gonja) carried out integrated case searches and surgical campaigns from a de-centralized level using Guinea worm VBHWs, Red Cross Women’s Volunteers, TCC and district staff. The total number of persons involved in the integrated case searches in these two districts was 1,833. The entire district was mapped and a plan formulated for successive training, then case search, then surgery – in cycles through the entire district. The persons were trained at a localized level the day before the case searches were conducted. The trainings took place each day prior to the localized case search ensuring preparedness, high participation and information recall. The persons were formed into teams ensuring at least two Red Cross Women’s Volunteers on each team. The teams then conducted the case searches in their “home” villages. The surgical referrals occurred the same

day as the case searches at a localized level. The surgical teams were mobile and moved from village to village treating patients and performing TT surgery, mostly in the home, on the same day the patients were identified.

The two districts (Central Gonja and West Gonja) were searched in their entirety and produced 100% TT surgery acceptance rates with extremely high population coverage. The two district case searches were distinctly different than the four district case searches. The differences were intentional and aimed to improve the integrated case search coverage based upon the results of the four district case searches. The differences included: thoroughly mapping the districts and planning searches across the district; changing the methods of the training, search and surgery to consist of cyclical decentralized training: this consisted of a geographically limited training day immediately followed the next day by the case search with concurrent examination and surgery in the village (training/search/exam/surgery); and changing the case search participants: utilizing more women, increasing the number of participants in the case searches, and insisting case search participants search each and every village.

The different integrated case search methods found the following conclusions and recommendations:

- Mapping the area and planning according to geographic constraints is essential to increasing population coverage and reducing costs of case search;
- Costs are reduced when TT search is combined with other disease case searches and training, examination, and surgery is all conducted at a local level;
- Decentralized training and successive search methods (training/search/exam/surgery) provided increased coverage and was clearly the preference of the district managers;
- Women prefer women asking personal hygiene questions and face touching;
- TT surgery acceptance rate was high (74.7% overall) – with 100% in Central Gonja and West Gonja Districts;
- TT examination rate in some districts was low and there may still be TT cases unknown to the health service;
- TT estimates were higher than found in the districts; and
- Surgical teams know surgical conditions and should be allowed to make decisions on locations based upon that knowledge.

Table 1. TCC-assisted integrated case search results in Ghana

District	Suspected GW Cases	Suspected TT Cases
Savelugu	2	250
Tolon-Kumbungu	16	300
Gushegu	11	223
Karaga	1	62
West Gonja	10	55
Central Gonja	196	427
Total cases suspected	236	1,317
Total cases confirmed	0 (all dismissed)	428
Total cases accepted intervention	N/A	320 (74.7%)
Total Case Search Cost	= \$21,176	

TANA Study Update

Presented by Dr. Bruce Gaynor and Ms. Nicole Stoller, F. I. Proctor Foundation, University of California, San Francisco

TANA: Trachoma Amelioration in Northern Amhara

The purpose of the TANA study is to investigate the role of antibiotics and latrine construction in trachoma control for hyperendemic areas: specifically 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 Proctor Foundation at UCSF.

Study Design. The TANA study had 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 Proctor Foundation has shown that biannual distribution of azithromycin might be more effective in eliminating ocular infection at the local level. We compared 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 attempted to see if treating only children had a protective effect on the entire population. In Arm C, only children were treated every three months for one year. Arm D received delayed treatment at one year and was compared to Arm C.

3. To study the effect of latrines on vector control.

We compared how intensive promotion of latrine construction and use affected the rate at which ocular infection returned to a community after mass antibiotic distribution. Communities in Arm F received baseline treatment with no further interventions. Communities in Arm G received baseline treatment with intensive latrine construction and promotion on latrine use.

Study Progress and Results

The TANA study team has successfully completed eight research visits to date, completing the 42-month follow up visit in November 2009. A total of approximately 30,000 participants were enrolled.

Annual versus Twice-Yearly Treatment

The analysis of Arms A and B showed no difference between annual and twice-yearly treatment, implying that annual treatment may be sufficient in hyperendemic areas of trachoma. In the twice-yearly treated communities, the prevalence of infection was reduced from a mean of 38.3% (95% CI 29.0 to 47.6) at baseline to 3.2% (95% CI 0.02 to 6.5) at 42 months. The prevalence of ocular chlamydia infection in 0 to 9 year-old children in annually-treated communities was not different from that of the twice-yearly treated communities at 18, 30 and 42 months (pooled regression, $P > 0.99$). The mean elimination time in the twice-yearly treatment group was 7.5 months earlier (95% CI -2.3 months to 17.3 months) than that of the annual group ($P = 0.10$, Cox proportional hazards model).

Latrine Efficacy

In study year 1, our 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 2 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. The study was not able to compare the data of re-infection after treatment since no return of infection was seen in either group.

Herd Effect

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 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.

This was published in 2009:

House J, Ayele B, Porco TC, Zhou Z, Hong K, Gebre T, Ray KJ, Keenan J, Stoller N, Whitcher J, Gaynor B, Emerson P, Lietman T. Assessment of herd protection against trachoma due to repeated mass antibiotic distributions: a cluster-randomised trial. *Lancet*. 2009;373:1111-8.

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 that arm at baseline and again at 12 months. NP swabs were also collected from the delayed treatment arm at 12 months.

Macrolide (azithromycin, 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. We found no change in the resistance to penicillin. Penicillins are much more commonly used than macrolides in this particular region of Ethiopia, so we were pleased to find that our treatment program was not having an impact on penicillins.

This was published in 2010:

Skalet A, Cevallos V, Ayele B, Gebre T, Zhou Z, Jorgensen J, Zerihun M., Habte D, Assefa Y, Emerson P, Gaynor B, Porco T, Lietman T, Keenan J. Antibiotic selection pressure and macrolide resistance in nasopharyngeal *Streptococcus pneumoniae*: a cluster-randomized clinical trial. *PLoS Med* 2010 Dec 14;7(12):e1000377

TIRET: Tripartite International Research for the Elimination of Trachoma

The TIRET Study is a continuation of TANA, funded by NEI/NIH. It is designed to follow study villages from TANA Arms A (Annual treatment for everyone) and B (biannual treatment for children only) for an additional 36 months. TIRET also has three main research aims:

Specific Aim 1: Can we stop antibiotics after four years?

We hypothesize that infection will return, even from low levels. Twenty-four communities which received repeated mass treatments for four years will be monitored for an additional three years to determine if chlamydial infection returns.

Specific Aim 2: Can infection be completely eliminated if mass treatments continue for seven years?

We hypothesize that infection will be completely eliminated in all communities. We will monitor the prevalence of infection in 12 communities which continue to receive annual mass treatments, and 12 which continue to receive biannual mass treatments.

Specific Aim 3: Can treatment targeted to pre-school aged children, or to households in which a pre-school aged child has clinically active trachoma, prevent infection from returning into the community?

We hypothesize that identifying and treating clinically active cases will delay or even prevent reemergence at a far lower cost than mass treatment of all individuals. We will monitor 12 communities where treatment is targeted to clinically active cases and their households, and another 12 communities where treatment is targeted to pre-school children.

Communities in the TIRET study will be monitored annually throughout the study for: ocular chlamydia, nasopharyngeal pneumococcal resistance, and child mortality.

Trachoma Road Map

Presented by Dr. Lieven Van der Veken, McKinsey & Company

At the 2010 meeting of the Alliance for the Global Elimination of Blinding Trachoma, the participants agreed that a review of current data at the global and national levels was critical to identify gaps that need to be addressed in order to reach the goal of elimination by 2020. The International Trachoma Initiative invited McKinsey & Company to develop a country program template to develop a global trachoma “road map” to reach the elimination targets. National data will then be aggregated into a global strategic plan for the elimination of blinding trachoma. At the global level, there is a need to develop a global strategic plan to ensure that trachoma control efforts are focused and progress is assessed to keep the program on track to reach elimination by 2020.

Through this project, the International Trachoma Initiative and McKinsey & Company identified challenges at the global and national levels. The project team interviewed country program managers and partners to understand the current challenges with planning for elimination. These discussions led to the development of a Global Strategic Plan template that would lay out the path to elimination by 2020, review milestones and aggregate existing data on prevalence, program activities and cost of interventions. This plan will address the milestones required at the global level to reach elimination by 2020 and also address countries for which interventions have not yet begun. The Global Strategic Plan will become a powerful advocacy document for both country programs and international partners.

The Global Strategic Plan will have five sections. The first will present the current situation, with an overview of the progress made thus far in the implementation of the SAFE strategy. The second section outlines the goal of elimination by 2020 and an overview of the interventions needed. The following section will describe a strategy that will lead to success by 2020, with key strategic principles to prioritize interventions. From there, the document will go on to identify milestones to track progress and finally, the plan will outline the resource and funding gap and country planning needs to reach elimination by 2020.

Each country program will be provided a country-level strategic planning template to outline the path the 2020 and develop messages necessary to drive advocacy and identify and coordinate stakeholders. The template and the Global Strategic Plan documents will be presented at the Alliance meeting at the World Health Organization in April 2011.

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 painful or uncomfortable inflammation with thickening of the conjunctiva. 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 twice as often as men. Trachoma is transmitted through discharge from the eyes and nose of infected individuals, which may be passed to others by contact with hands, towels and clothing, or by flies, which are attracted to ocular and nasal discharges. As trachoma patients' 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 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. In 2009, Pfizer Inc, manufacturer of Zithromax[®], recommitted to supporting the WHO GET2020 goal of elimination of blinding trachoma by the year 2020. Since the beginning of the donation in 1998, approximately 225 million doses of Zithromax[®] have been donated by Pfizer Inc and managed by the International Trachoma Initiative. The donation has reached 19 countries with plans to expand to an additional five to seven countries from 2011 to 2012. The existence of the donation program has served to invigorate national trachoma programs and global support for the elimination of blinding trachoma.

APPENDIX II: Papers published by the trachoma group in 2010

Papers listed are those published during calendar year 2010 in peer-reviewed journals with at least one author from the trachoma group. The list does not include abstracts for conferences, posters, or papers submitted or in press. Papers are listed in reverse chronological order.

1. Skalet AH, Cevallos V, Ayele B, Gebre T, Zhou Z, Jorgensen JH, Zerihun M, Habte D, Assefa Y, Emerson PM, Gaynor BD, Porco TC, Lietman TM, & Keenan JD. (2010) Antibiotic selection pressure and macrolide resistance in nasopharyngeal streptococcus pneumoniae: a cluster-randomized clinical trial. *PLoS Medicine* **14**:7:e1000377
2. King JD, Ngondi J, Kasten J, Diallo MO, Zhu H, Cromwell E, & Emerson PM. (early online publication, 2010) Randomized trial of face-washing to develop a standard definition of a clean face for monitoring trachoma control programs. *Transactions of the Royal Society of Tropical Medicine and Hygiene* **105**: 7-16. doi:10.1016/j.trstmh.2010.09.008
3. Ngondi J, Teferi T, Gebre T, Shargie EB, Zerihun M, Ayele B, Adamu L, King JD, Cromwell EA, & Emerson PM. (2010) Effect of community intervention with pit latrines in Five Districts of Amhara region, Ethiopia. *Tropical Medicine and International Health* **15**:592-599. doi: 10.1111/j1365-3156.2010.02500.x
4. Clements ACA, Kur LW, Gatpan G, Ngondi JM, Emerson PM, Lado M, Sabasio A, & Kolaczinski JH. (2010) Targeting trachoma control through risk mapping: The example of Southern Sudan. *PLoS Neglected Tropical Diseases* **10**.1371/journal.pntd.0000799
5. Bamani S, King JD, Dambele M, Coulibaly F, Sankara D, Kamissoko Y, Ting J, Rotondo L, & Emerson PM. (2010) Where do we go from here? Prevalence of trachoma three years after stopping mass distribution of antibiotics in the Regions of Kayes and Koulikoro, Mali. *PLoS Neglected Tropical Diseases* **4**: e734. doi:10.1371/journal.pntd.0000734
6. King JD, Jip N, Jugu S, Othman A, Rodgers AF, Miri E, & Emerson PM. (2010) Mapping trachoma in Nasarawa and Plateau States, central Nigeria. *British Journal of Ophthalmology* **94**:14-19. doi:10.1136/bjo.2009.165282
7. Bamani S, Dambele M, Sankara D, Coulibaly F, Kamissoko Y, Ting J, Emerson PM, & King JD. (2010) Evaluation of the prevalence of trachoma 12 years after baseline surveys in Kidal Region, Mali. *Tropical Medicine and International Health* **15**: 306-311
8. Baker MC, Mathieu E, Fleming FM, Deming M, King JD, Garba A, Koroma JB, Bockarie M, Kabore A, Sankara DP, & Molyneux DH. (2010) Mapping, monitoring, and surveillance of neglected tropical diseases: towards a policy framework. *The Lancet* **375**: 321-238.

APPENDIX III: Progress towards Uitimate Intervention Goals (UIGs) 2010

Definitions Used

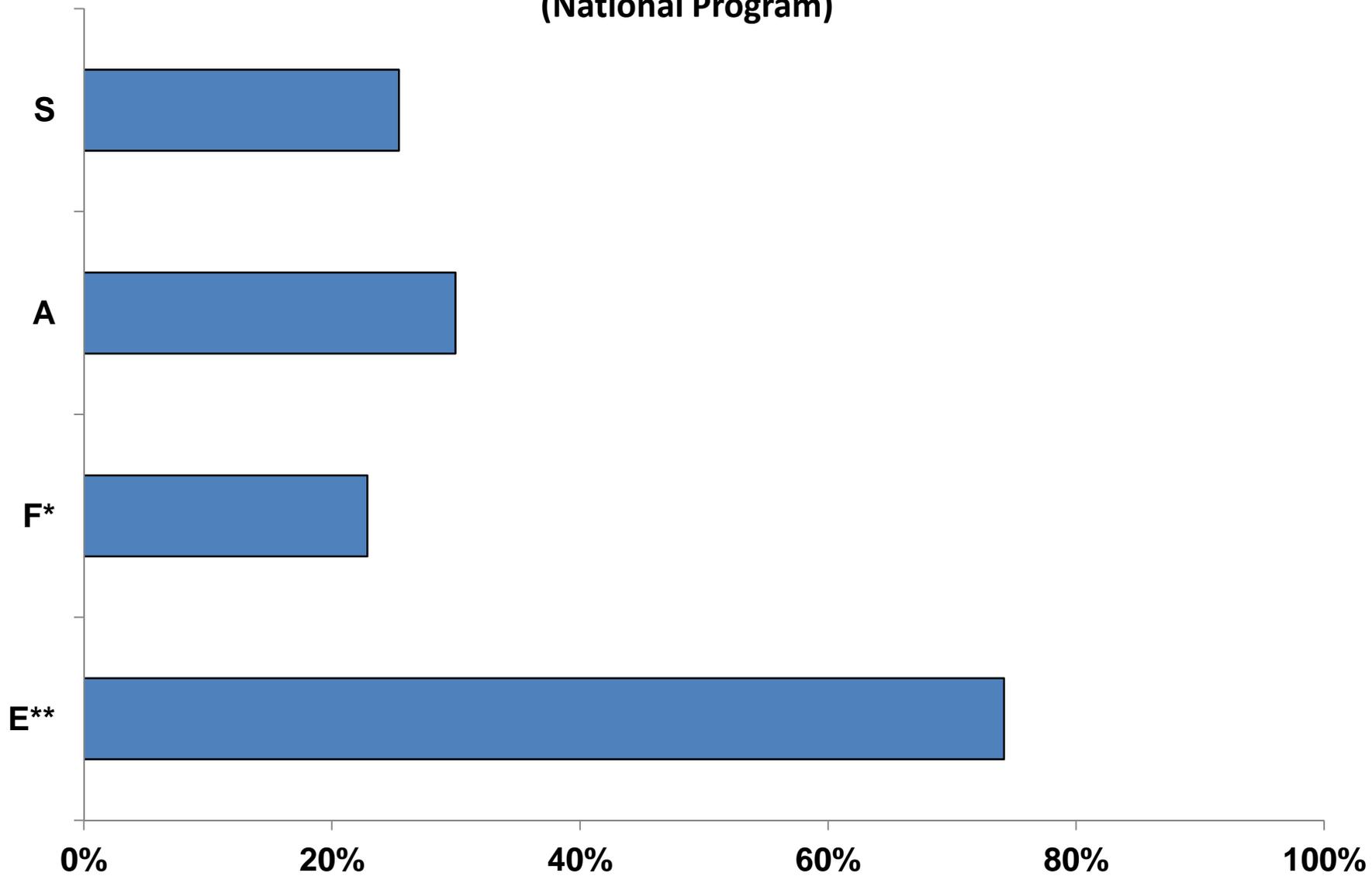
Surgery	$\frac{\text{Sum of annual surgical output to date}}{\text{Sum of surgeries to date + most recently calculated backlog}}$
Antibiotics*	$\frac{\text{Annual sum of azithromycin and TEO distributed}}{\text{Total population where TF in children ages 1-9 > 10\%}}$
Facial Cleanliness	$\frac{\text{Number of villages in which there is routine health education}}{\text{Total number of villages in districts where TF in children ages 1-9 > 10\% + any villages where TF in children ages 1-9 > 10\% in non-endemic districts}}$
Environmental Improvement**	$\frac{\text{Sum of annual latrine construction output to date}}{(\text{Sum of annual latrine construction output to date + total backlog}) / 2}$

NB: Progress against UIGs was calculated for both Carter Center-assisted output and for national program output.

*The goal for antibiotic distribution is not strictly a UIG; it is the proportion of the Annual Treatment objective obtained.

**The Millenium Development Goal 7c (MDG7c) calls to halve the proportion of the population without access to a latrine by 2015.

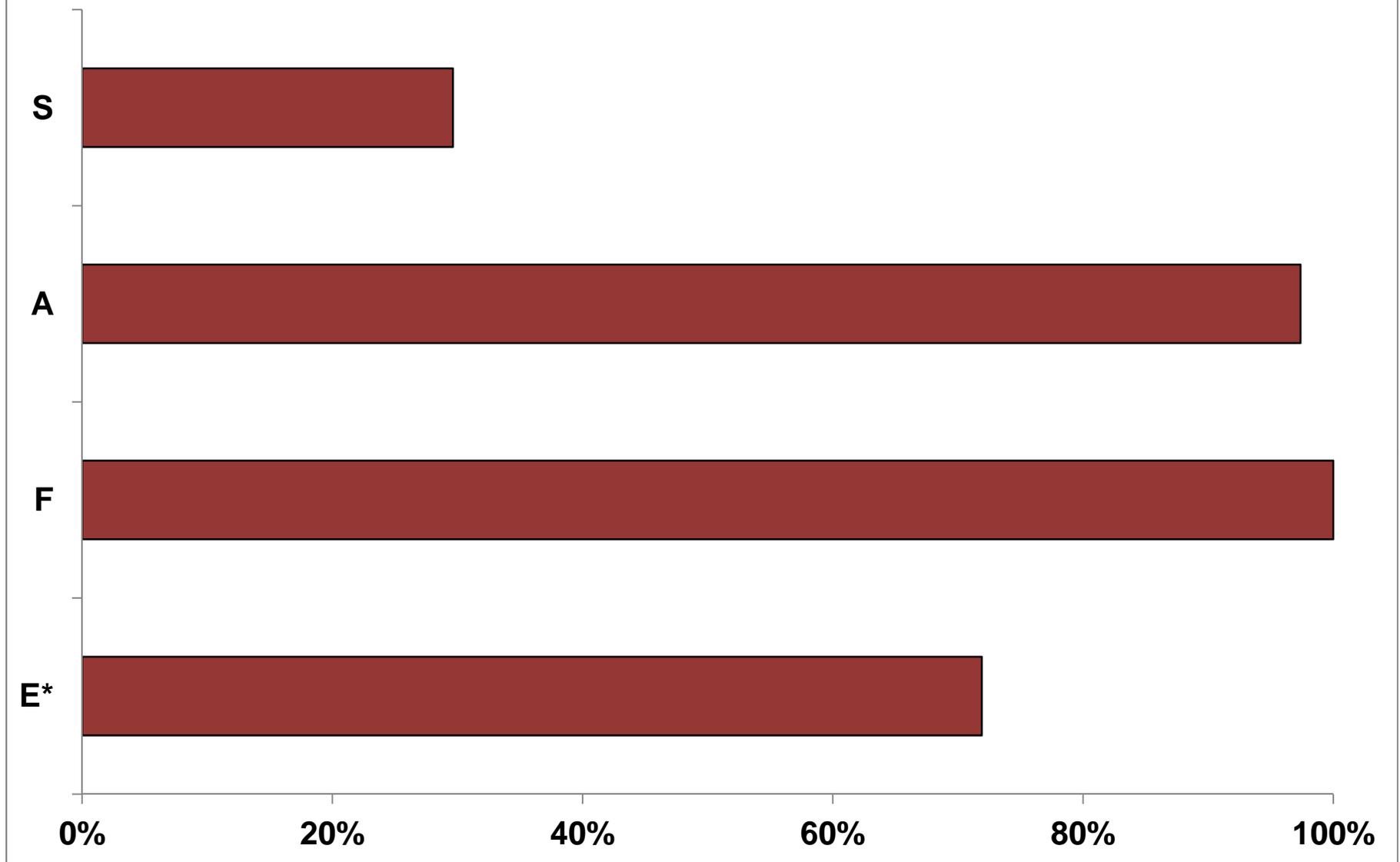
2010 Achievements against Ultimate Intervention Goals in Ethiopia (National Program)



*Carter Center output only against National target.

**Ethiopia's target is 100% latrine coverage by 2015.

2010 Achievements against Ultimate Intervention Goals in Amhara (TCC supported)



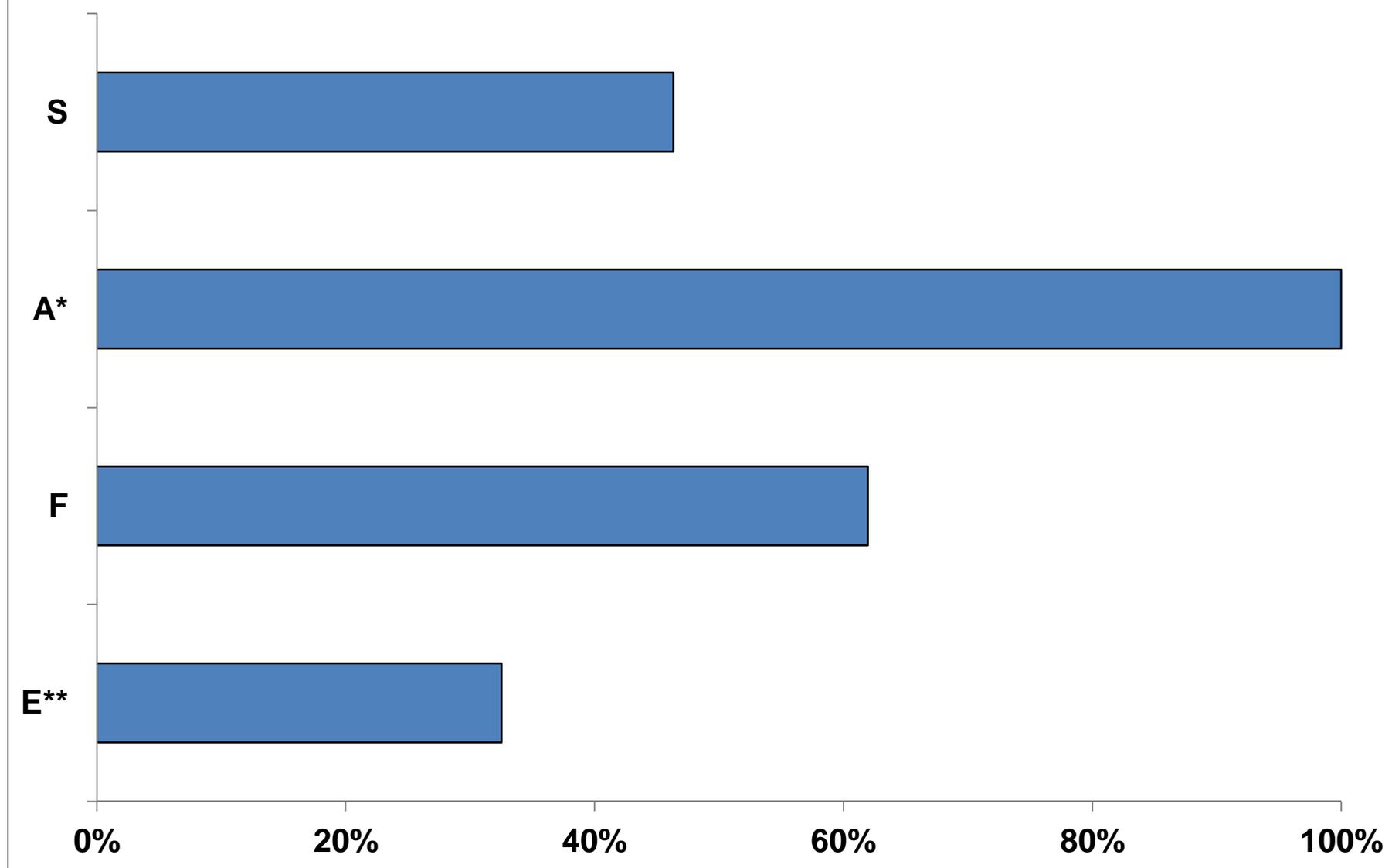
*Ethiopia's target is 100% latrine coverage by 2015.

Ethiopia

Intervention	National Achievements	UIG	Percentage of UIG Achieved by National Program
Surgery	442,868	1,742,868	25%
Antibiotic Distribution	18,880,414	63,000,000	30%
Facial Cleanliness (Villages)	N/A	15,000	N/A
Environmental Change (Latrines)	12,873,198	17,352,198	74%

Intervention	TCC-Supported Achievements	UIG	Percentage of UIG Achieved with TCC Support
Surgery	193,262	651,889	30%
Antibiotic Distribution	16,157,659	16,591,836	97%
Facial Cleanliness (Villages)	3,428	3,428	100%
Environmental Change (Latrines)	1,862,180	2,590,060	72%

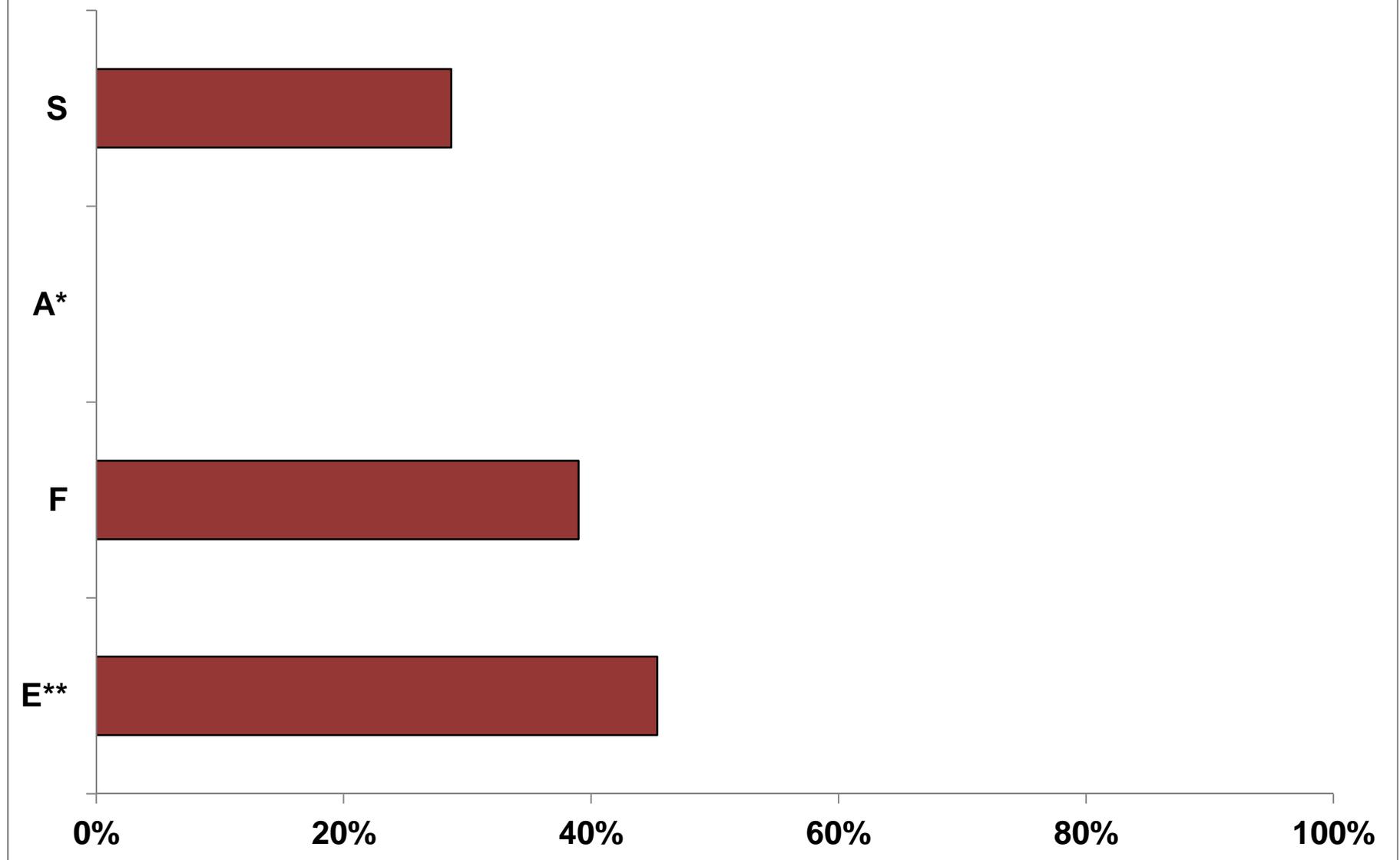
2010 Achievements against Ultimate Intervention Goals in Mali (National Program)



*The ATO denominator is based on the population where TF>10%; in Mali, MDA also occurred in areas where TF is between 5-9%.

**Target is to halve the proportion of the population without access to a latrine by 2015 (MDG 7c).

2010 Achievements against Ultimate Intervention Goals in Mali (TCC supported)



*The Carter Center does not support the distribution of antibiotics in Mali.

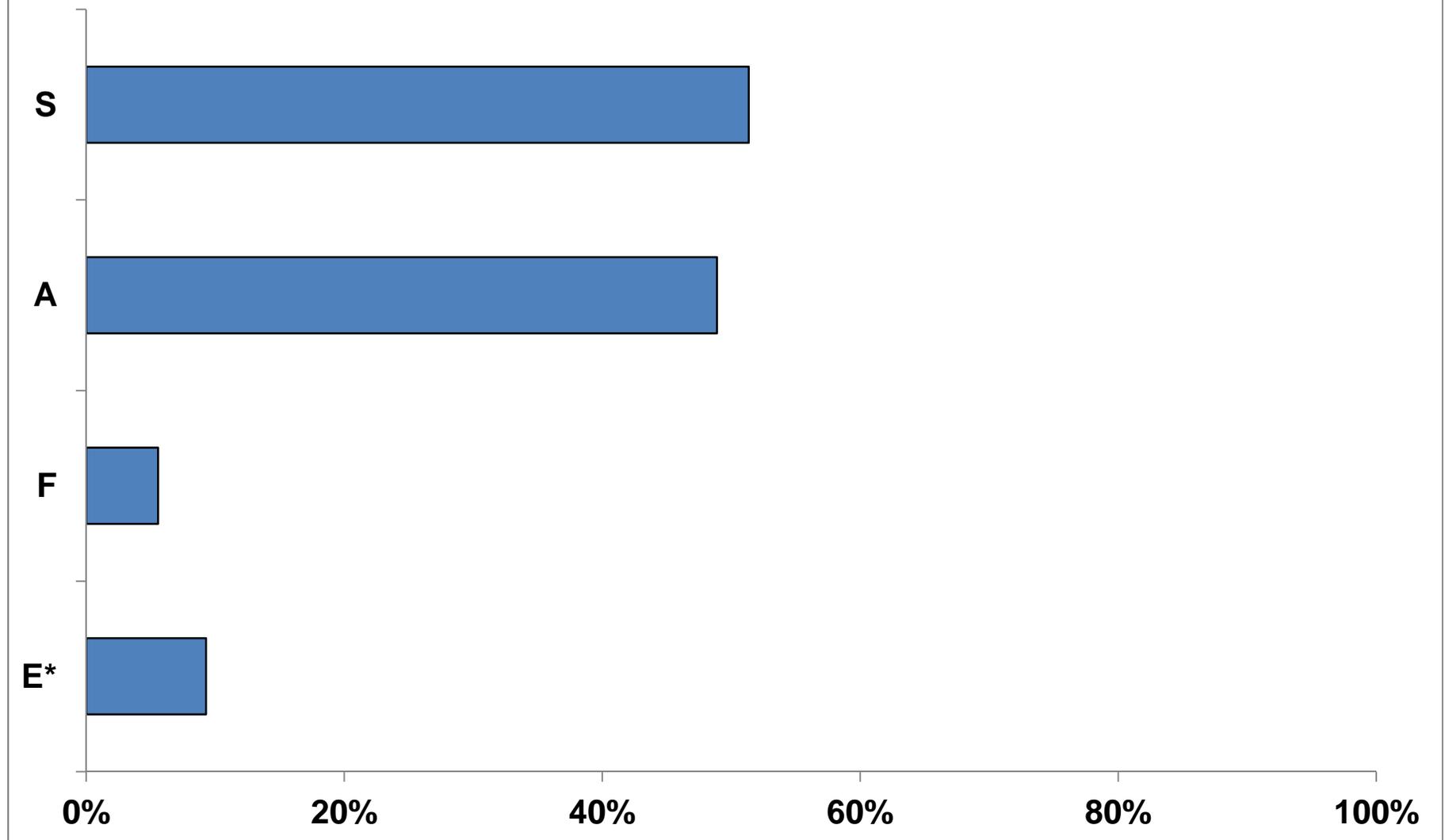
**Target is to halve the proportion of the population without access to a latrine by 2015 (MDG 7c).

Mali

Intervention	National Achievements	UIG	Percentage of UIG Achieved by National Program
Surgery	55,139	118,996	46%
Antibiotic Distribution	3,613,179	3,613,179	100%
Facial Cleanliness (Villages)	6,500	10,491	62%
Environmental Change (Latrines)	98,499	302,714	33%

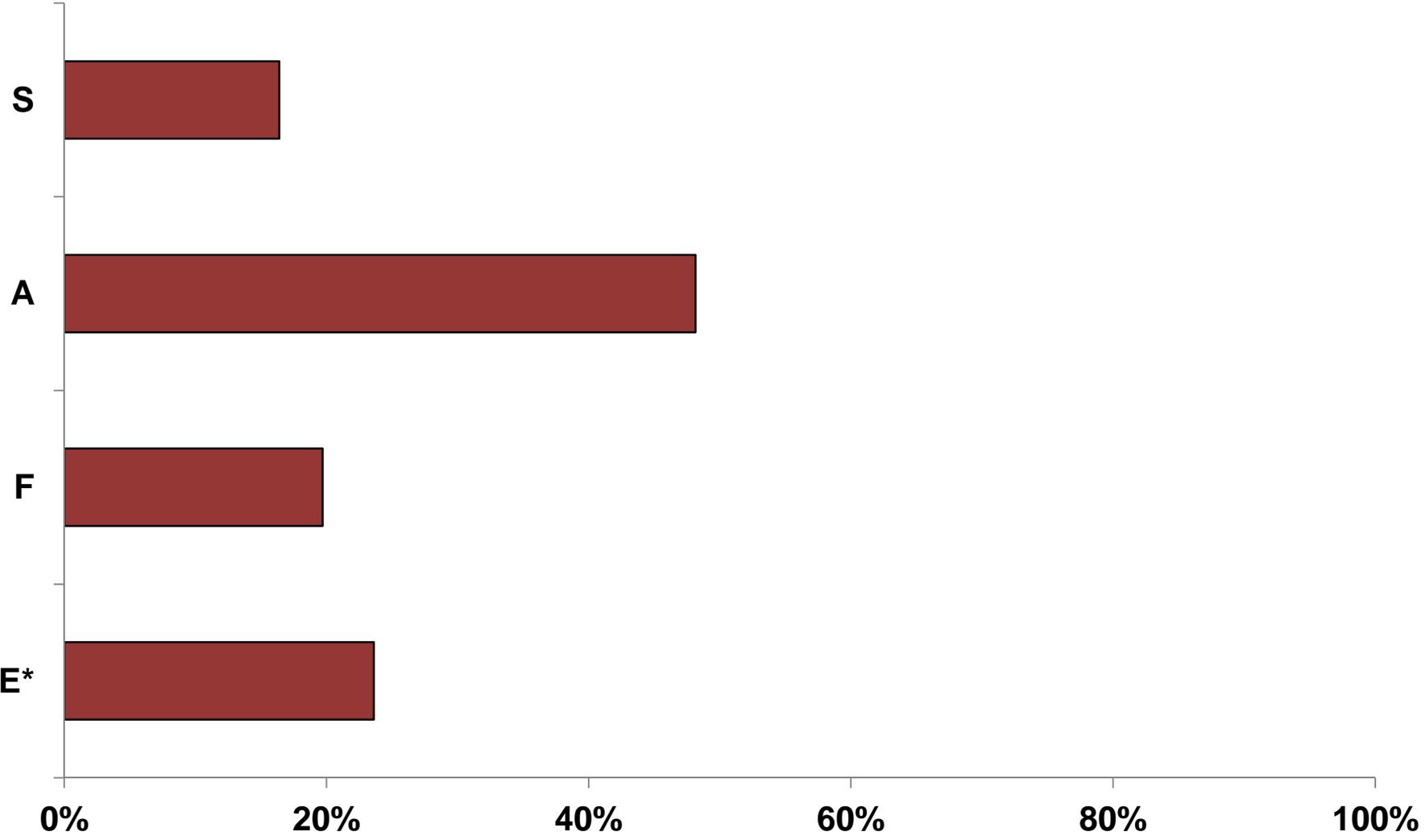
Intervention	TCC-Supported Achievements	UIG	Percentage of UIG Achieved with TCC Support
Surgery	12,595	43,892	29%
Antibiotic Distribution	N/A	N/A	N/A
Facial Cleanliness (Villages)	2,095	5,374	39%
Environmental Change (Latrines)	72,746	160,431	45%

2010 Achievements against Ultimate Intervention Goals in Niger (National Program)



*Target is to halve the proportion of the population without access to a latrine by 2015 (MDG 7c).

2010 Achievements against Ultimate Intervention Goals in Niger (TCC supported)



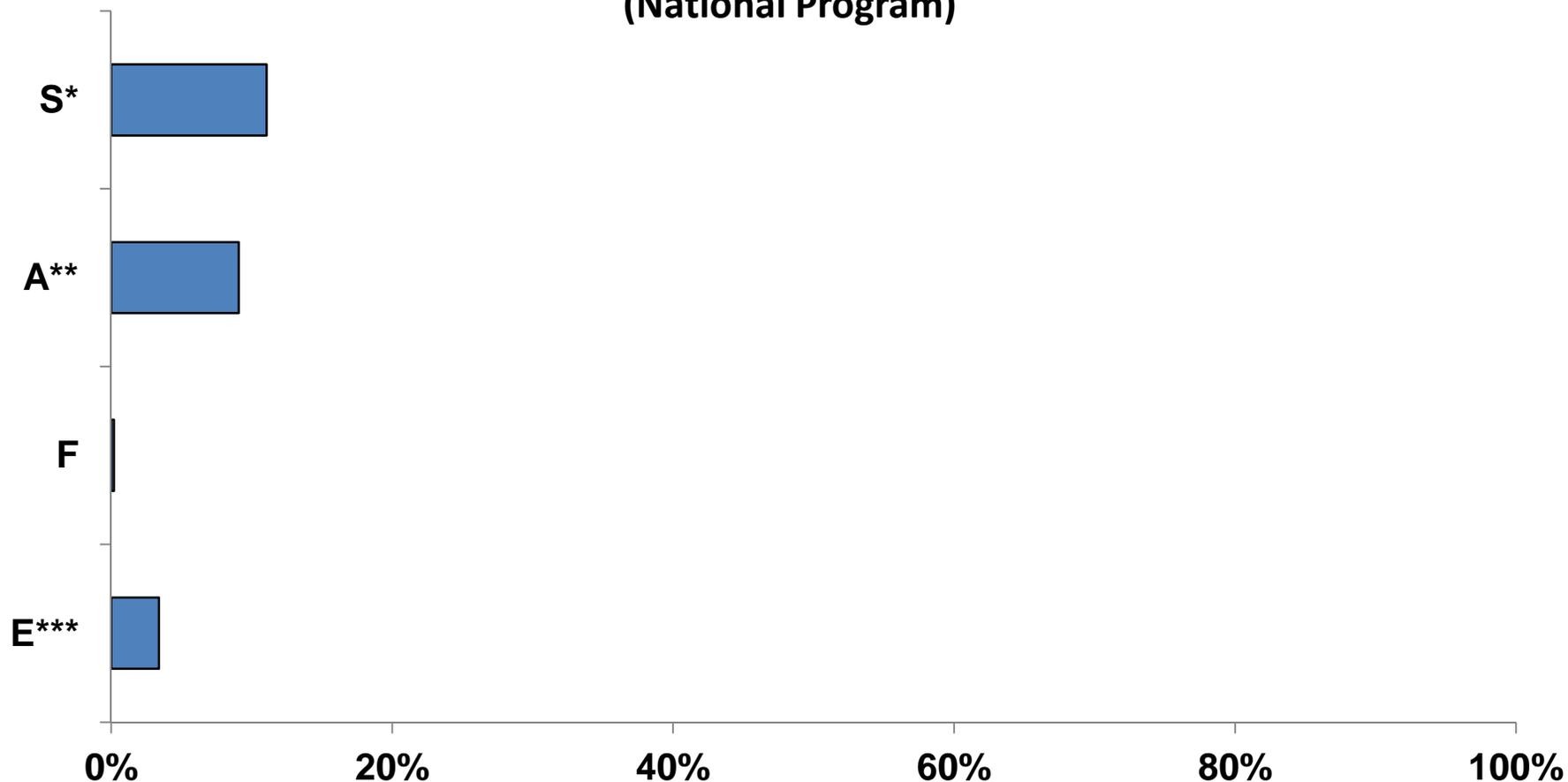
*Target is to halve the proportion of the population without access to a latrine by 2015 (MDG 7c).

Niger

Intervention	National Achievements	UIG	Percentage of UIG Achieved by National Program
Surgery	51,496	100,265	51%
Antibiotic Distribution	3,832,130	7,838,611	49%
Facial Cleanliness (Villages)	634	11,370	6%
Environmental Change (Latrines)	83,200	896,261	9%

Intervention	TCC-Supported Achievements	UIG	Percentage of UIG Achieved with TCC Support
Surgery	8,519	51,951	16%
Antibiotic Distribution	1,161,732	2,412,439	48%
Facial Cleanliness (Villages)	634	3,217	20%
Environmental Change (Latrines)	54,178	229,359	24%

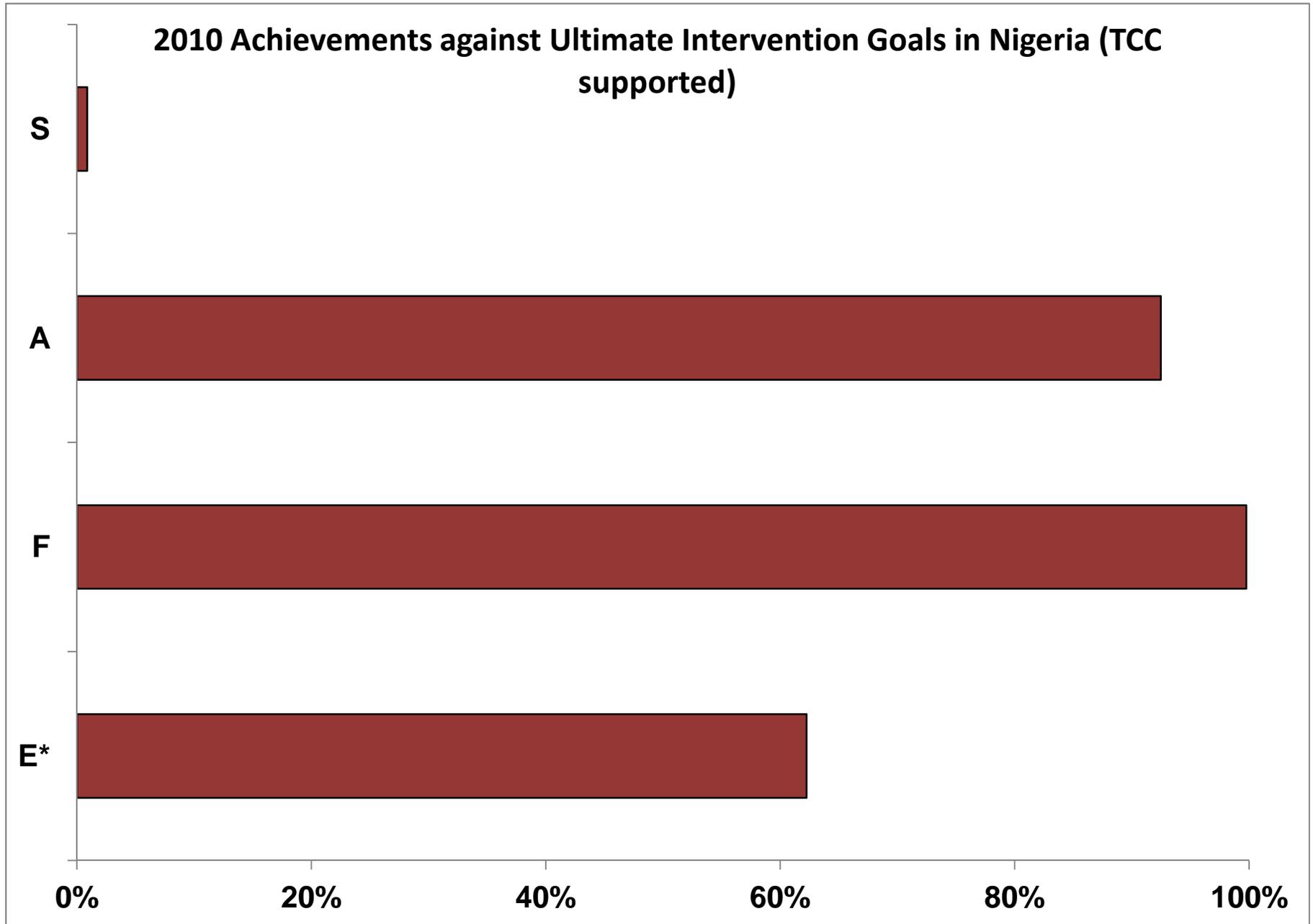
2010 Achievements against Ultimate Intervention Goals in Nigeria (National Program)



*Based only on districts with previous survey data.

**The denominator is based on surveyed districts where TF>10%.

***Target is to halve the proportion of the population without access to a latrine by 2015 (MDG 7c).



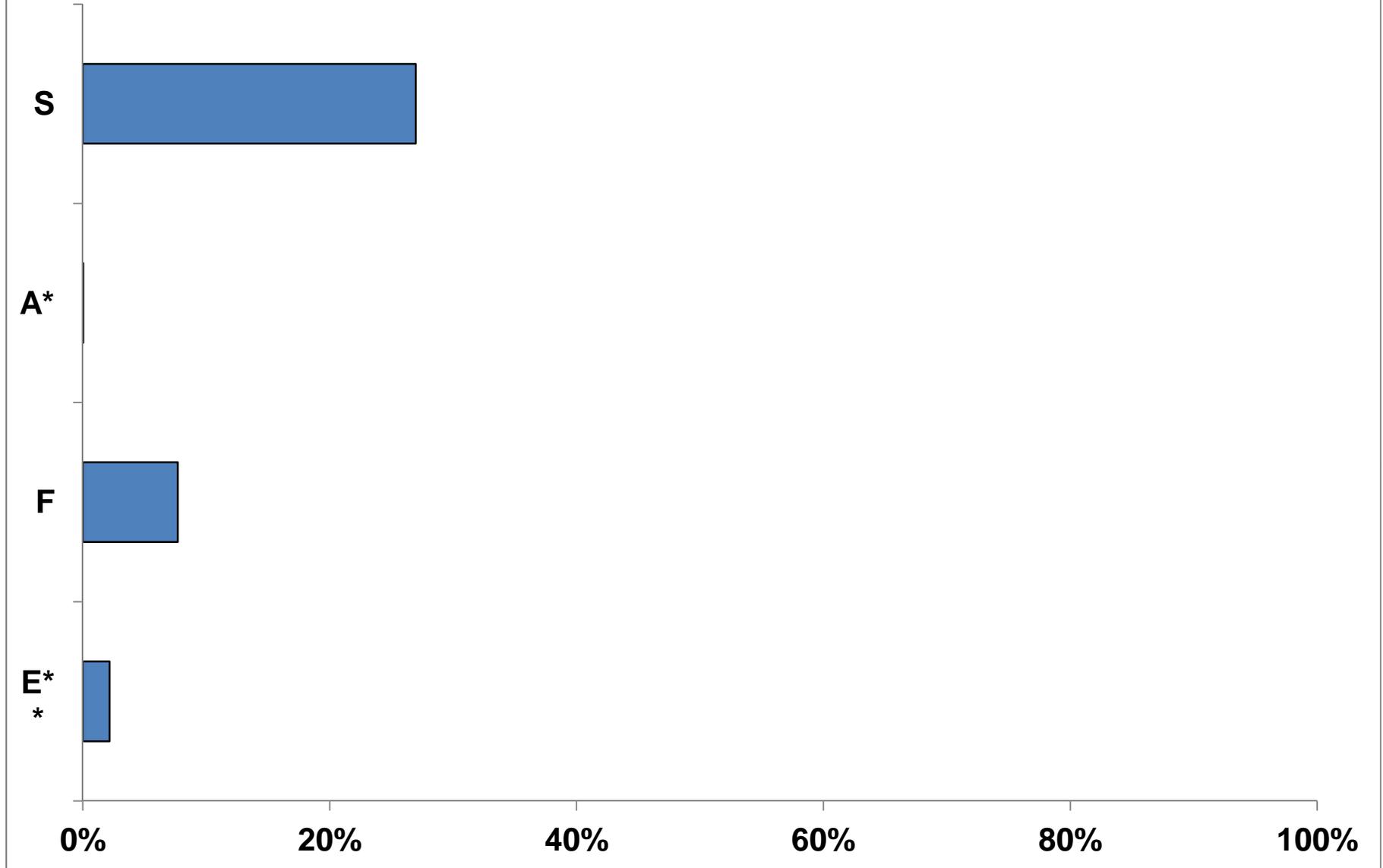
*Target is to halve the proportion of the population without access to a latrine by 2015 (MDG 7c).

Nigeria

Intervention	National Achievements	UIG	Percentage of UIG Achieved by National Program
Surgery	72,577	656,187	11%
Antibiotic Distribution	1,271,332	14,000,000	9%
Facial Cleanliness (Villages)	2,624	1,404,378	0%
Environmental Change (Latrines)	33,314	979,295	3%

Intervention	TCC-Supported Achievements	UIG	Percentage of UIG Achieved with TCC Support
Surgery	26	2,964	1%
Antibiotic Distribution	726,774	786,000	92%
Facial Cleanliness (Villages)	853	855	100%
Environmental Change (Latrines)	31,979	51,376	62%

2010 Achievements against Ultimate Intervention Goals in GOS (National Program)

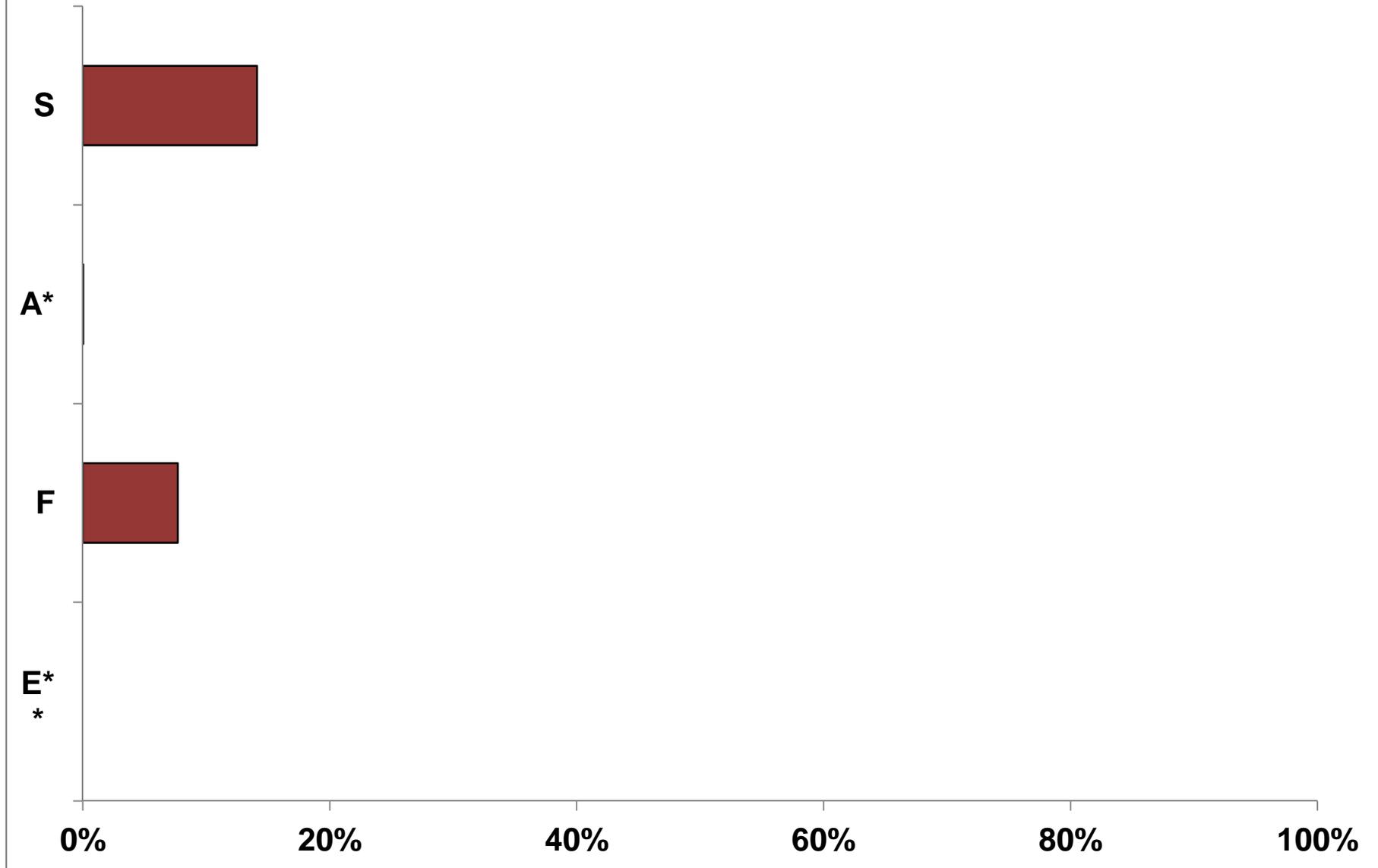


*The denominator is based on districts where TF>5%.

**Target is to halve the proportion of the population without access to a latrine by 2015 (MDG 7c).

NB: Targets and interventions do not include the three states of Darfur.

2010 Achievements against Ultimate Intervention Goals in GOS (TCC supported)



*The denominator is based on districts where TF>5%.

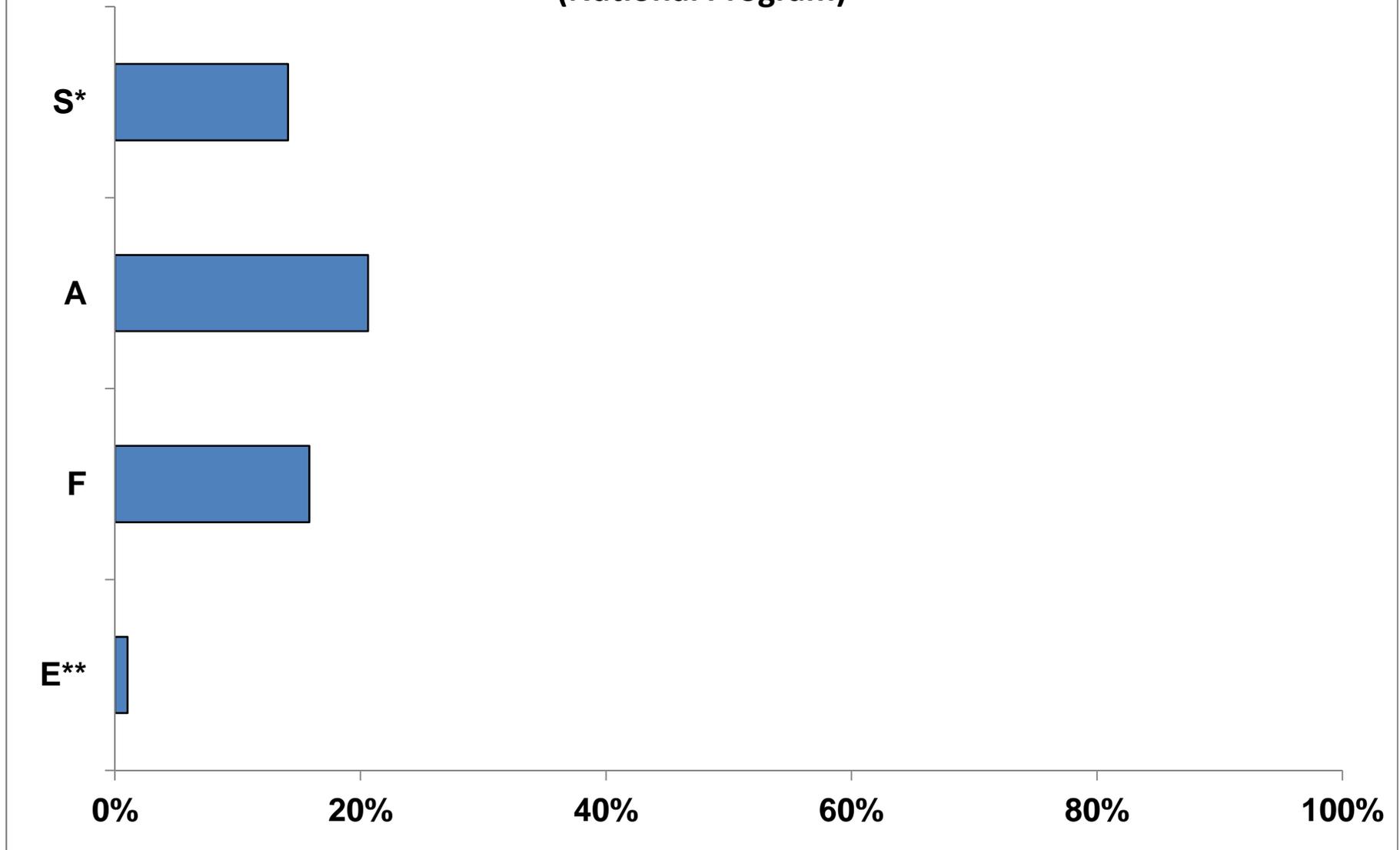
**Target is to halve the proportion of the population without access to a latrine by 2015 (MDG 7c).

Government of Sudan

Intervention	National Achievements	UIG	Percentage of UIG Achieved by National Program
Surgery	11,483	42,555	27%
Antibiotic Distribution	1,157	2,704,184	0%
Facial Cleanliness (Villages)	20	260	8%
Environmental Change (Latrines)	3,776	174,142	2%

Intervention	TCC-Supported Achievements	UIG	Percentage of UIG Achieved with TCC Support
Surgery	5,105	36,177	14%
Antibiotic Distribution	1,121	2,704,184	0%
Facial Cleanliness (Villages)	20	260	8%
Environmental Change (Latrines)	0	172,253	0%

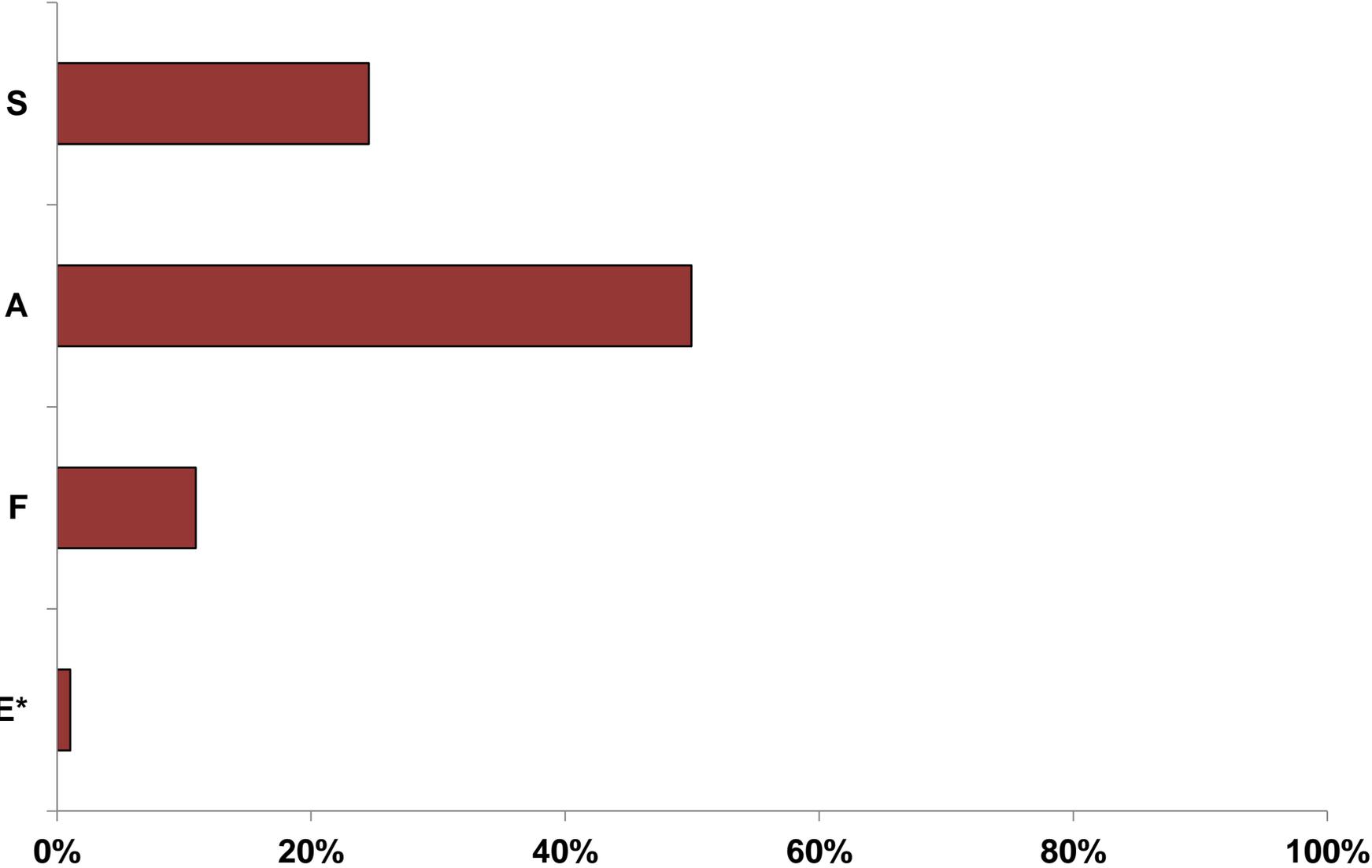
2010 Achievements against Ultimate Intervention Goals in GOSS (National Program)



*Based on UIG estimated only in surveyed areas.

**Target is to halve the proportion of the population without access to a latrine by 2015 (MDG 7c).

2010 Achievements against Ultimate Intervention Goals in GOSS (TCC supported)



*Target is to halve the proportion of the population without access to a latrine by 2015 (MDG 7c).

Government of Southern Sudan

Intervention	National Achievements	UIG	Percentage of UIG Achieved by National Program
Surgery	16,196	52,738	14%
Antibiotic Distribution	458,861	2,225,064	21%
Facial Cleanliness (Villages)	4,674	29,506	16%
Environmental Change (Latrines)	2,573	248,455	1%

Intervention	TCC-Supported Achievements	UIG	Percentage of UIG Achieved with TCC Support
Surgery	5,859	23,865	25%
Antibiotic Distribution	322,093	645,000	50%
Facial Cleanliness (Villages)	3,226	29,506	11%
Environmental Change (Latrines)	567	53,750	1%

APPENDIX IV: Agenda
“Achieving Elimination Targets”
The Twelfth Annual Trachoma Control Program Review
February 22-24, 2011

Tuesday, February 22

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	Opening Remarks	Dr. Paul Emerson
10:00 – 10:30	<u>Coffee Break & Group Photo</u>	
10:30 – 11:00	Ethiopia	Dr. Tizita Hailu
11:00 – 11:30	Amhara Regional State	Dr. Asrat Genet
11:30 – 12:30	Mali	Dr. Bamani Sanoussi
12:30 – 1:45	<u>Lunch</u>	
1:45 – 2:00	<u>Announcements</u>	
2:00 – 3:00	S. Wollo Impact Evaluations	Mr. Tesfaye Teferi
3:00 – 3:30	Mali Surveillance	Dr. Bamani Sanoussi
3:30 – 4:00	<u>Coffee Break</u>	
4:00 – 5:00	TTT Study Results	Dr. Saul Rajak/Dr. Matthew Burton
5:30	*Shuttle Departure for Hotel Palomar*	

Wednesday, February 23

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	Nigeria	Dr. Benjamin Nwobi
12:30 – 1:45	<u>Lunch</u>	
1:45 – 2:00	<u>Announcements</u>	
2:00 – 2:30	Nigeria Integrated Coverage Survey	Dr. Nimzing Jip
2:30 – 3:00	Evaluation of latrine promotion in North Shewa Zone, Amhara Regional State, Ethiopia	Ms. Rachael Ross
3:00 – 3:30	Studies on Trachoma in The Gambia	Dr. Robin Bailey
3:30 – 4:00	<u>Coffee Break</u>	
4:00 – 4:30	Integrated Trachoma Control	Ms. Emily Toubali
4:30 – 5:00	ITI Update/Trachoma Atlas	Dr. Danny Haddad
5:30	*Shuttle Departure for Hotel Palomar	
6:00 – 8:00	Reception at Hotel Palomar Ballroom	

Thursday, February 24

8:00	*Shuttle Pick-up at Hotel*	
8:30 – 9:00	<u>Breakfast</u>	
9:00 – 9:40	Tanzania	Dr. Bernadetha Shilio
9:40 – 10:40	Niger	Dr. Kadri Boubacar
10:40 – 11:00	Hilton / KCCO Surgical Quality Assurance Study	Dr. Paul Courtright
11:00 – 11:30	<u>Coffee Break</u>	
11:30 – 12:00	Global Scientific Meeting Update	Dr. Silvio Mariotti
12:00 – 12:30	Niger Trichiasis Recurrence	Dr. Kadri Boubacar
12:30 – 1:45	<u>Lunch</u>	
1:45 – 2:00	Lions Update	Dr. Tebebe Y. Berhan
2:00 – 2:30	TT Case Search in Ghana	Ms. Kelly Callahan
2:30 – 3:00	Is Elimination of Infectious Trachoma from Hyperendemic Ethiopia an Achievable Goal? An Update from the TANA study	Dr. Bruce Gaynor/Ms. Nicole Stoller
3:00 – 3:30	<u>Coffee Break</u>	
3:30 – 4:00	Trachoma Road Map	Dr. Lieven Van der Veken
4:00 – 5:00	Conclusions and Recommendations	
5:30	*Shuttle Departure for Hotel Palomar*	

APPENDIX V: List of Participants

Ethiopia

Dr. Teshome Gebre (The Carter Center)
Dr. Asrat Genet
Dr. Tizita Hailu Gudeta
Dr. Zerihun Tadesse (The Carter Center)
Mr. Tesfaye Teferi (The Carter Center)
Mr. Mulat Zerihun (The Carter Center)

Government of Sudan

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

Government of South Sudan

Dr. Lucia Kur
Mr. Peter Magok (The Carter Center)
Mr. David Stobelaar (The Carter Center)

Mali

Mr. Yaya Kamissoko (The Carter Center)
Mr. Sadi Moussa (The Carter Center)
Dr. Bamani Sanoussi

Niger

Dr. Kadri Boubacar
Dr. Sabo Hassan Adamou (The Carter Center)
Mr. Mohamed 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. Benjamin Nwobi

Tanzania

Dr. Bernadetha Shilio

Bill & Melinda Gates Foundation

Ms. Erin Shutes

The Centers for Disease Control and Prevention

Dr. Els Mathieu

Conrad N. Hilton Foundation

Mr. Gregory Anderson

Francis I. Proctor Foundation

Dr. Bruce Gaynor
Ms. Nicole Stoller

Helen Keller International

Dr. Peter Nyanda (HKI Tanzania)
Ms. Emily Heck Toubali

International Trachoma Initiative

Dr. Danny Haddad
Ms. Anne Heggen
Ms. Lisa Rotondo

Kilimanjaro Centre for Community Ophthalmology

Dr. Paul Courtright

Lions Clubs-Ethiopia

The Honorable World Laureate Dr. Tebebe Y. Berhan

London School of Hygiene and Tropical Medicine

Dr. Robin Bailey
Dr. Matthew Burton
Dr. Saul Rajak

McKinsey & Company

Dr. Lieven Van der Veken

Pfizer Inc

Ms. Rekha Chalasani
Mr. Stephen Jordan

Research Triangle International

Dr. Eric Ottesen

Rollins School of Public Health

Dr. Christine Moe
Ms. Rachael Ross

Sightsavers

Dr. Agatha Aboe

Taskforce for Global Health

Dr. Mark Rosenberg
Dr. Yao Sodahlon

World Health Organization

Dr. Silvio Mariotti

The Carter Center

Ms. Sarah Bartlett
Ms. Rebecca Brookshire
Ms. Kelly Callahan
Ms. Elizabeth Cromwell
Ms. Michele Cullom
Mr. Don Denard
Dr. Paul Emerson
Mr. Darin Evans
Ms. Maggie Fisher
Dr. Patricia Graves
Ms. Madelle Hatch

Ms. Alicia Higginbotham
Dr. Donald Hopkins
Ms. Nicole Kruse
Mr. Jonathan King
Mr. Ayc Mosher
Dr. Jeremiah Ngondi
Ms. Stephanie Palmer
Mr. Jay Papisan
Ms. Amy Patterson
Dr. Frank Richards
Ms. Paige Rohe
Dr. Ernesto Ruiz-Tiben
Mr. Randall Slaven
Ms. Emily Staub
Mr. Craig Withers