

## Summary Proceedings

### Nineteenth Annual Trachoma Program Review

# *Celebrating 20 Years of Impact*

THE  
CARTER CENTER



*Waging Peace. Fighting Disease. Building Hope.*

**Atlanta, Georgia**

**March 19-20, 2018**

THE  
CARTER CENTER



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## **“Celebrating 20 Years of Impact”**

**The Nineteenth Annual**

**Trachoma Control Program Review**



**The Carter Center**  
**Atlanta, Georgia**

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## Table of Contents

<b>Acronyms</b>	1
<b>Executive Summary</b>	3
<b>Trachoma Control Country Program Summaries</b>	
SAFE in Ethiopia	5
SAFE in Amhara, Ethiopia	10
SAFE in Mali	18
SAFE in Niger	25
SAFE in South Sudan	32
SAFE in Sudan	39
SAFE in Uganda	47
<b>Summary Tables &amp; Figures</b>	
Table 1: Summary of National Data from Trachoma Control Programs (Carter Center-Assisted Countries)	55
Table 2: National Trachoma Control Program Annual Targets 2018 (Carter Center-Assisted Countries)	56
Table 3: Carter Center-Assisted Implementation of SAFE (Carter Center-Assisted Outputs)	57
Table 4: Carter Center-Assisted Implementation of SAFE (1999-2017)	58
Figure 1: Persons Operated for Trichiasis, Carter Center-Assisted Countries	59
Figure 2: Azithromycin Distribution, Carter Center-Assisted Countries	60
Figure 3: Health Education, Carter Center-Assisted Countries	61
Figure 4: Household Latrines Constructed, Carter Center-Assisted Countries	62
<b>Special Sessions</b>	
Interpreting Coverage Survey Results to Facilitate Decision-Making in NTD Programs	63
Predictors for MDA Participation	67
The “F” in SAFE: Why We Measure It and How Reliable Is It	69
Dossier Development: Experiences from the Field	70
The Cost of Trachoma Impact Surveys	75
Characteristics of Patients Presenting with Postoperative Trichiasis (PTT) and Opinions on PTT Management	77
A Randomized Placebo Controlled Trial of Doxycycline to Improve Trichiasis Surgery Outcomes; and Ongoing Studies	78
WASH Working Group Update	83
WASH Upgrades for Health in Amhara (WUHA) Update	85
MORDOR and Trachoma	91
Role of Surveillance in the Trachoma End-Game: Investigation of “Hot Spots”	97
Providing Trachoma Services to Refugees/IDPs	100
GET2020 Update	103
International Coalition for Trachoma Control Update	104
<b>Appendix Materials</b>	
Appendix I: 2018 Program Review Recommendations	106
Appendix II: Trachoma: The Disease	109
Appendix III: Program Review Agenda	110
Appendix IV: List of Participants	112

## Acronyms

<b>ARHB</b>	Amhara Regional Health Bureau
<b>BLTR</b>	Bilamellar tarsal rotation
<b>CI</b>	Confidence Interval
<b>CLTS</b>	Community-led Total Sanitation
<b>DFID</b>	UK Department for International Development
<b>EDHS</b>	Ethiopia Demographic and Health Survey
<b>EU</b>	Enumeration Unit
<b>FMOH</b>	Federal Ministry of Health
<b>GET 2020</b>	Alliance for the Global Elimination of Blinding Trachoma by 2020
<b>GTMP</b>	Global Trachoma Mapping Project
<b>HEW</b>	Health Extension Worker
<b>HKI</b>	Helen Keller International
<b>HMIS</b>	Health Management Information System
<b>HPW</b>	Hygiene Promotion Workers
<b>HSTP</b>	Health Sector Transformation Plan
<b>ICTC</b>	International Coalition for Trachoma Control
<b>IDP</b>	Internally displaced peoples
<b>IEC</b>	Information, education, and communication
<b>IECW</b>	Integrated Eye Care Worker
<b>IGA</b>	Inter-grader agreement
<b>ITI</b>	International Trachoma Initiative
<b>LF</b>	Lymphatic Filariasis
<b>MDA</b>	Mass Drug Administration
<b>M&amp;E</b>	Monitoring and Evaluation
<b>MMP</b>	Matrix Metalloproteinase
<b>MOH</b>	Ministry of Health
<b>MORDOR</b>	Macrolides Oraux pour Réduire les Décès avec un Oeil sur la Résistance
<b>NGDO</b>	Nongovernmental Development Organization
<b>NNN</b>	Neglected Tropical Diseases NGDO Network
<b>NPPB</b>	National Program for Prevention of Blindness
<b>NTD</b>	Neglected Tropical Disease
<b>OR</b>	Odds Ratio
<b>OV</b>	Onchocerciasis
<b>PCT</b>	Preventative Chemotherapy
<b>PHQ</b>	Patient health questionnaire
<b>PLTR</b>	Posterior lamellar tarsal rotation
<b>PNLC(C)</b>	Programme National de Lutte contre la Cecité (National Prevention of Blindness Program)
<b>PNSO</b>	Programme National de Soins Oculaire (National Eye Health Program)
<b>PTT</b>	Post-operative Trachomatous Trichiasis
<b>QoL</b>	Quality of Life
<b>SAFE</b>	Surgery, Antibiotics, Facial Cleanliness, and Environmental Improvement
<b>SCH</b>	Schistosomiasis
<b>SRQ</b>	Self-reporting questionnaire
<b>STH</b>	Soil transmitted helminthes
<b>STHP</b>	School Trachoma Health Program
<b>SWIFT</b>	Sanitation, Water and Instruction in Face-Washing for Trachoma
<b>TAP</b>	Trachoma Action Plan

<b>TEO</b>	Tetracycline Eye Ointment
<b>TF</b>	Trachomatous Inflammation-Follicular
<b>TI</b>	Trachomatous Inflammation-Intense
<b>TIS</b>	Trachoma Impact Survey
<b>TRA</b>	Trachoma Rapid Assessment
<b>TSS</b>	Trachoma Surveillance Surveys
<b>TT</b>	Trachomatous Trichiasis
<b>UNHCR</b>	United Nations High Commissioner for Refugees
<b>UNICEF</b>	United Nations Children's Fund (formerly United Nations Children's Education Fund)
<b>USAID</b>	United States Agency for International Development
<b>WASH</b>	Water, Sanitation, and Hygiene
<b>WG</b>	Working Group
<b>WHO</b>	World Health Organization
<b>WUHA</b>	Water Uptake in Amhara

## Executive Summary

The 19<sup>th</sup> Annual Trachoma Control Program Review took place at The Carter Center in Atlanta from March 19<sup>th</sup>-20<sup>th</sup>, 2018. The theme of this year's review was "Celebrating 20 Years of Impact", which brought attention to the progress made in the fight against trachoma since The Carter Center launched its Trachoma Control Program in 1998. Attending this year's review were representatives from the Ministries of Health and Carter Center field offices in the six countries where the Center currently focuses its efforts: Ethiopia, Mali, Niger, South Sudan, Sudan, and Uganda. Partners and donors in attendance included representatives from the University of North Carolina at Chapel Hill, the Wilmer Eye Institute at Johns Hopkins Hospital, the World Health Organization, the London School of Hygiene and Tropical Medicine, Francis I. Proctor Foundation, Helen Keller International, International Coalition for Trachoma Control, RTI International, the Trachoma Expert Committee, Emory University School of Medicine Department of Ophthalmology, the International Trachoma Initiative, PATH, Rollins School of Public Health at Emory University, the Task Force for Global Health, the U.S. Centers for Disease Control and Prevention, Noor Dubai Foundation, Sightsavers, Lions Clubs International Foundation, the END Fund, The Queen Elizabeth Diamond Jubilee Trust, Abbott Laboratories, the Bill & Melinda Gates Foundation, WaterAid, the Conrad N. Hilton Foundation, Pfizer Inc, and the U.S. Agency for International Development.

The 2018 program review, as with past reviews, provided an opportunity for national programs to present progress made in the previous year, as well as challenges they faced and targets for the next year. In accordance with the theme of the review, The Carter Center celebrated progress made over the past 20 years in each country where it assists trachoma control activities. With only three years remaining to 2020, this review also evaluated what is needed by each National Program to reach elimination targets.

Since its Trachoma Control Program launched in 1998, The Carter Center has assisted national programs in completing 784,736 trachomatous trichiasis (TT) surgeries. We have assisted in the distribution of nearly 182 million doses of antibiotics through mass drug administration (MDA). 359,133 people in over 10,000 villages have been trained in health education and 3,613,828 latrines have been constructed. In 2017 alone, 103,262 TT surgeries were performed, with 66.3% of these being performed on women and 92 new TT surgeons trained. Last year, more than 15 million doses of antibiotics were distributed through MDA. Additionally, we trained 29,963 people in health education and supported the construction of 129,020 latrines.

The review noted several exceptional accomplishments from 2017. In the Amhara region of Ethiopia, a collaboration between the Regional Health and Education Bureau has led to the implementation of a new School Trachoma Health Program in which 19,470 teachers, school principals, and supervisors were trained in 7,737 primary schools. Furthermore, there are now a total of 36 districts in Amhara that have met elimination criteria for trachomatous follicular (TF), making them exempt from MDA. Niger has initiated a systematic and effective method to cover all endemic areas called "ratissage", which is an approach to sweep villages to search for TT cases and offer surgery. In Mali, all districts have met the elimination criteria for TF.

As more advances towards global elimination of trachoma are made, national programs must prepare to submit documentation of elimination of trachoma as a public health problem to the World Health Organization (WHO). During a panel on dossier development, moderated by Ms. Aisha Stewart, speakers provided experience-based recommendations regarding successful documentation of elimination efforts from Ghana, Cambodia, Nepal, and Laos. Dr. Jeremiah Ngondi of RTI presented on the importance of continued

surveillance throughout elimination efforts and how this practice helps to locate and investigate small, but trachoma-endemic areas, referred to as “hot spots”. Mr. Caleb Ebert, a graduate student at the Rollins School of Public Health and graduate assistant to the Center’s Trachoma Control Program, presented research methods and preliminary findings regarding predictors for participation in MDA, helping programs to better target populations who may be systematically underrepresented in treatment.

As part of the Global Program Update, Dr. Anthony Solomon presented on the status of the WHO Global Elimination of Trachoma 2020 (GET2020) goal; Mr. Scott McPherson set out the International Coalition for Trachoma Control’s (ICTC) strategic plan to achieve elimination in 2020; Ms. Julie Jenson of Pfizer, Inc reiterated Pfizer’s corporate responsibility and commitment to ending trachoma, even in the face of unforeseeable obstacles like Hurricane Maria; and Dr. Paul Emerson, of the International Trachoma Initiative (ITI), presented on ITI’s 2017 performance and discussed successes in scaling up coverage where needed and in scaling down on involvement where merited.

To close the meeting, Ms. Kelly Callahan, Director of The Carter Center’s Trachoma Control Program brought to attention that only three years remain until the global elimination target. While this review celebrated The Carter Center’s 20 years of impact, Ms. Callahan emphasized that significant work still remains. As a final note, she underlined the importance of The Carter Center and partners to continue working together to successfully eliminate trachoma as a public health problem by 2020.

## SAFE in Ethiopia

*Presented by Mr. Nebiyu Negussu, NTD Team Leader, Federal Ministry of Health, Ethiopia*

### Background

The National Survey on Blindness, Low Vision, and Trachoma conducted in 2006 revealed that 2.8 million people in Ethiopia had low vision and 1.2 million people were blind. It was estimated that 87% of blindness was from avoidable diseases. The survey revealed that active trachoma was endemic in virtually all regions of the country, with more than 1.3 million people in the country living with TT. The results of the survey showed that Ethiopia had approximately 30% of the burden of trachoma in sub-Saharan Africa.

From 2010 through 2014, the National Program worked with partners to complete mapping of all districts in Ethiopia as part of the Global Trachoma Mapping Project (GTMP). Data collected from the project has shown that 70% of the global burden of trachoma is in Ethiopia. The results from the GTMP will have assisted with the Neglected Tropical Disease (NTD) effort related to trachoma elimination.

There has been growing momentum on the issue of NTDs in Ethiopia. In 2013, a national NTD master plan was launched, with regional states preparing their own NTD master plans. An NTD team was formed within the Federal Ministry of Health (FMOH) and NTD indicators became part of the national Health Management Information System (HMIS).

National treatment registers and health extension worker (HEW) pocket guidelines are in the process of being developed, with ongoing efforts for NTDs to be integrated into the existing health system. To better understand the NTD burden in Ethiopia, mapping of diseases that can be treated with preventative chemotherapy (PCT), such as onchocerciasis, lymphatic filariasis, schistosomiasis, and soil-transmitted helminthiasis, are being conducted.

### Timeline of Events

- 2001: National guideline for Primary Eye Care developed<sup>1</sup>
- 2003: Trachoma Control Program launched in 4 districts
- 2006: National guideline for mass antibiotics distribution developed; national taskforce for trachoma control established
- 2006-2007: Amhara region's baseline survey at zonal level
- 2008: Trachoma Campaign, formerly MalTra, launched in Amhara region<sup>2</sup>
- 2012: National Trachoma Action Plan (TAP) was prepared
- 2010-2014: GTMP completed in 672 districts
- 2013: Trachoma becomes part of national NTD program under disease prevention and control directorate
- 2015: Fast Track Initiative launched by FMOH; Health Sector Transformation Plan (HSTP) finalized; SAFE scale up to 358 districts
- 2016: Further scale up of trachoma program to 521 districts; SAFE activities launched in 26 districts in SNNPR and 4 districts in Ethiopian Somali region; Fast Track Initiative scaled up
- 2020: Target date for elimination

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<sup>1</sup> A five-year document, currently in 3<sup>rd</sup> cycle.

<sup>2</sup> MalTra (Malaria and Trachoma) week was a biannual weeklong outreach campaign that involved the mass distribution of azithromycin to prevent and treat trachoma. Additionally, recipients were provided with health education and testing and treatment for malaria with Coartem®.

**Table 1. Program Achievements in 2017**

Indicator	Goal	National	
		Plan	Achieved
# of persons operated	391,758	287,489	173,945 (60.4%)
# of women operated			N/R
# of surgeons trained		224	28 (12.5%)
Doses of azithromycin distributed during MDA	72,187,787	62,269,910	39,339,311 (63.2%)
Doses of TEO distributed during MDA	1,473,220	1,270,814	1,035,299 (81.5%)
# of villages with health education		Not reported	
# of household latrines built		Not reported	

### **Surgery (S)**

The National Program reported that 690 districts require TT surgical interventions. As of 2017, 29 districts have a TT prevalence above 5%; 357 districts have a TT prevalence of 1 to 4.9%; 304 districts have a TT prevalence of 0.2 to 0.9%; and 44 districts have a TT prevalence below 0.2%. In 2017, 173,945 people were operated for TT across the country, which was 60.5% of the planned surgeries for the year. The output in 2017 was lower than in 2016, possibly due to the political unrest that occurred across the country in 2017. Additionally, 28 integrated eye care workers (IECWs) were trained to provide TT surgery, which is 12.5% of the target for 2017.

Since the launch of the Fast Track Initiative in 2014, the FMOH and the National Program has been focused on clearing the estimated TT backlog. This included accelerating the training of IECWs to reach the target as quickly as possible. At the start of the Initiative, the estimated TT backlog was about 693,037 cases to be operated. The pilot, conducted in 4 zones in 2015, and subsequent scale of the Initiative across the country, has resulted in 475,224 TT surgeries conducted. As of March 2018, about 217,813 patients require surgery to clear the TT backlog. A total of 660 districts have an estimated backlog of 2,000 patients or less. Thirty districts have about 2,000 or more patients to operate to clear their backlog. At the current surgical rate, the program expects to clear the backlog in 1.5 years.

The National Program recognizes the importance of TT surgical quality assurance. Previously, implementing partners conducted TT surgery audits and supervision. The methodology used includes randomly selecting 10 to 15% of operated patients who received surgery with the past 3 to 6 months from when the audit is initiated. The audit was not completed regularly and was not usually monitored by the FMOH. In 2017, the National Program implemented the National TT Quality Improvement and Implementation framework to standardize the methodology used and strengthen supervision of TT surgery across the country. A workshop was held to train those involved at the regional level on the guidelines.

Following the roll out of the new guidelines for TT surgery assessments, a 3 to 6 months assessment was carried out in 35 districts by TT surgeons. The National Program expected 8,379 patients to participate in the assessment, however, a total of 1,827 people presented for the assessment. The program is looking at ways in which more TT patients are made aware of and participate in the TT surgery assessments moving forward. Of those that participated in the assessment, 99.3% were found to have a good outcome, meaning their surgery was successful. Additionally, in 2017, the National Program conducted a surgical audit at 3 to 6 months. The audit was carried out by the secondary eye care unit, health professionals, or ophthalmologists in

104 districts. The auditors collected registration forms from the health centers to confirm that the TT surgeries reported were carried out and consistent with data presented to the FMOH. The audit showed that of 3,077 patients evaluated, 87% were well-corrected, meaning the surgery was successfully completed, 6% had signs of post-operative trichiasis, 2% presented with granuloma, and 1% had an over-correction of the eyelid.

### **Antibiotic Therapy (A)**

In 2017, the National Program achieved 77% geographical coverage in antibiotic distribution, reaching 394 districts with MDA. Of the 394 districts reached in 2017, 88% had achieved adequate therapeutic coverage of 80% or higher. The program planned to distribute 63,540,724 doses of antibiotics (Zithromax® and tetracycline eye ointment (TEO)) and achieved 63.5 % of this goal. The program distributed 39,339,311 doses of Zithromax® and 1,035,299 doses of TEO through MDA in 2017.

The GTMP, completed in 2014, provided the FMOH with a complete picture of the burden of trachoma across Ethiopia. The GTMP showed that at least 642 districts required interventions to reduce the TF prevalence (36 districts were not mapped). In 2017, the program supported 47 trachoma impact surveys (TIS) and 2 surveillance surveys. Since the inception of the program, 189 TIS have been conducted. Survey data shows that 66 districts have achieved less than 5% trichomatous inflammation-follicular (TF) in children ages 1 to 9 and no longer require MDA. Total population in these districts is 7,643,488 people. Surveys have also shown that 95 districts have a TF prevalence of 5 to 9.9%, 269 districts have a TF prevalence of 10 to 29.9%, and 253 districts have a TF prevalence greater than 30%.

### **Facial Cleanliness (F) & Environmental Improvement (E)**

The National Program utilizes HMIS to track progress of water, sanitation, and hygiene (WASH)-related initiatives, including access to water and sanitation at the household level. The HMIS has limited indicators to monitor WASH implementation that impacts NTDs across Ethiopia. Because of this, the National Program relies on data from the Ethiopia Demographic and Health Survey (EDHS), which is conducted every 5 years in all regions. The 2016 EDHS survey showed that only 14.8% of households surveyed have access to an improved latrine, and the remaining 85.2% have access to an unimproved latrine. The survey also showed that only 8.7% of households are treating their water sources with chlorine. These results highlight the National Program needs more attention and focus on WASH activities, especially as they relate to NTDs.

Over time, the use of latrines is improving. Data from the EDHS on latrine utilization showed that 73% of available latrines are being utilized in communities surveyed in Tigray, Amhara, Oromia, and SNNP regions. To measure latrine usage, 3 criteria are used to determine if a latrine is being utilized: the presence of fresh excreta inside the pit, the presence of a foot path to the latrine, and the presence of flies in the latrine. The presence of flies in the latrine does not align with trachoma indicators. This provides additional evidence of the need for capacity building and coordination among the NTD and WASH sectors.

In addition to documenting household access to water and latrines, the EDHS survey also completed an assessment on the overall knowledge of WASH in each region. Overall, 58.8% of communities have good knowledge of WASH, with the highest reported knowledge of WASH in Oromia and SNNP regions. Data from the Amhara region show an overall good knowledge of 37.9%, and Tigray region reported 20.6% overall good knowledge of WASH.

In 2017, the National Program remained focused on coordination of the WASH and NTD sectors at the national level and have included WASH-NTD integration as part of the FMOH NTD portfolio. The program initiated high-level discussions to engage partners working in communities where either NTD programs or WASH programs are being implemented. Because of the discussions, the National Program established a

WASH-NTD technical working group. One of the deliverables of the working group is to clearly define how WASH and NTD integration can occur at the community level. With support from WHO, the program also developed WASH and NTD guidelines and a WASH and NTD tool kit which can be used by regions, zones, districts, schools, and communities. Four technical assistants were also hired and dispatched to the 4 largest regions to further facilitate WASH and NTD activity integration.

At the grassroots level, the communities and schools are critical in providing health education on the importance of WASH and prevention of NTDs. The HEWs provide health education in their communities, with 70% of their work focused on prevention of diseases and 30% on the curative aspect of interventions. During training, the HEWs are provided with 18 packages of information within their curriculum that focus on NTDs and are used to educate their communities.

Funding from the United Kingdom Department for International Development (DFID) supports health education activities in some areas in Ethiopia, including zones in SNNP, Tigray, Oromia, and Amhara regions. The funding supports both community-based and school-based platforms. In Tigray, this support has led to the creation of Early Starters, a health education program that is focused on children under 5 who are not yet in school.

School-based health education is very important to the increased awareness of the F&E aspects of the SAFE strategy. Amhara has had great progress in health education, as it implemented the School Trachoma Health Program, which provides blanket coverage in F&E across the entire region. Support from The Carter Center has allowed the region to lead the way in terms of F&E interventions. SNNP, Tigray, and Oromia regions are also implementing school-based initiatives, but not yet at the scale that Amhara has reached. As a part of the school-based initiatives, the National Program is distributing mini-medias, which includes messaging on NTDs, including trachoma, as well as IEC materials.

### **Programmatic Challenges**

The program faced several challenges in 2017. MDA activities were delayed across the country due to delayed shipping from Pfizer Inc's production plant in Puerto Rico, which was affected by Hurricane Maria. The program aims to support quality services in all regions. However, it was unable to expand TT services in 4 regions and *woredas* where TF is below 5%. The program experienced a shortage of resources to fully implement a TT quality improvement plan. It also is working towards institutionalizing impact surveys; however, this is not yet complete. While the National Program has made great progress in the implementation of health education for primary school children, it is still working towards reaching children under 5 that are not yet in school. The Early Starters pilot in Tigray is a starting point for this work.

### **Status of 2017 Program Review Meeting Recommendations**

**Recommendation 1:** The Ethiopia National Trachoma Control Program should present, when and where possible, TT patients' data by age, sex and severity of disease. If possible, these data should be compared with historical data (treatment of TT studies).

**Status:** The National Program has refined its reporting template to consider sex aggregation on the TT surgery outcome and began collecting data in 2017. Through this recommendation, the program noted that 70% of TT cases are provided to women. The new HMIS register and reporting template now contain age and sex, so 2018 data will include this information.

**Recommendation 2:** The Program should consider, when and where possible, working with the National Guinea Worm Eradication Program to promote awareness creation and knowledge of cash rewards.

**Status:** Through the integration platform now in use, the National Program is able to include NTD activities,

namely the Guinea Worm and Trachoma programs in Gambella and Benishangul regions.

**Recommendation 3:** The significant financial contributions of the Ethiopia Federal Ministry of Health to the trachoma program should be quantified and highlighted as a laudable example of program ownership as evidenced by domestic investment.

**Status:** Financial contributions from the FMOH supported the purchase of 300 TT kits to distribute in regions that lack additional support for trachoma interventions.

**Targets for 2018 and Plans to Meet Targets:**

*Surgery (S)*

- Operate on 217,813 TT patients; clear backlog by end of 2018
- Train 207 IECW and 104 supervisors

*Antibiotic Therapy (A)*

- Distribute 69,717,342 doses of azithromycin
- Distribute 1,411,802 doses of TEO
- Complete 145 impact surveys and 25 surveillance surveys

*Facial Cleanliness (F) & Environmental Improvement (E)*

- Roll out guidelines for WASH & NTD coordination
- Mobilize resources for implementation of WASH & NTD tool kit
- Focus on school interventions
- High level advocacy

*Operational research*

- Establish research advisory wing established at national level for all NTDs, including trachoma
- Roll out NTD operational agenda at the national level as a road map for all NTDs

## SAFE in Amhara, Ethiopia

*Presented by Dr. Abebaw Gebeyehu, Head, Amhara Regional Health Bureau*

### Background

In the Amhara region of Ethiopia, a trachoma prevalence survey at the zonal-level was conducted in 2007 to quantify the zonal prevalence of active trachoma and TT. This survey estimated that over 17 million people were at risk of trachoma and 643,904 people required surgery to correct TT in the Amhara region alone. Critically, the survey indicated that all zones in the Amhara region were eligible for the full SAFE strategy, which was scaled up to all districts in 2008. The regional trachoma program is part of the National Committee for the Prevention of Blindness and there is a trachoma focal person assigned in the Amhara Regional Health Bureau (ARHB).

Following 5 years' implementation of the WHO-endorsed SAFE strategy, the WHO requires a trachoma impact survey be conducted to assess progress towards meeting the elimination targets. Impact surveys were conducted in all 167 districts of the Amhara region from 2011-2015 through collaboration with the ARHB and The Carter Center. These surveys showed dramatic reductions in all clinical signs of trachoma. Results indicated that 9 of the 167 districts had meet the elimination criteria for TF, reducing the prevalence of TF among children ages 1 to 9 to less than 5%. The results also indicated that the remaining districts continue to warrant the full SAFE strategy. Additional impact surveys will be conducted to assess the impact of the program and progress towards meeting the elimination thresholds.

### Timeline of Events

- 2001: Phase I agreement (4 districts); first 5-year TAP, updated every 5 years; S, F, & E implementation begins in 4 districts
- 2003: Full SAFE implementation begins
- 2004: SAFE expansion to 19 districts
- 2006: National baseline survey; SAFE expansion to entire region (167 districts)
- 2006-2007: Amhara zonal-level baseline survey
- 2008: Trachoma Campaign, formerly MalTra, launched
- 2015: 167 districts completed 1<sup>st</sup> impact survey after 5 years of SAFE; Fast Track TT Clearing Initiative piloted in East Gojjam zone
- 2016: Region-wide school trachoma health program launched
- 2017: The number of districts exempted from MDA reached 36, with 22 new districts exempted in 2017
- 2020: Target date for elimination

Table 1. Program Achievements in 2017

Indicator	Goal	Amhara Region (Carter Center-Assisted)	
		Target	Achieved
# of persons operated	267,823	110,922	91,977 (83%)
# of women operated			61,993
# of surgeons trained		63	80 (127%)
Doses of azithromycin distributed during MDA	15,097,277	15,097,277	13,651,377* (90%)
Doses of TEO distributed during MDA	309,833	308,108	288,557* (94%)
# of villages with health education		3,459	3,459 (100%)
Latrine ownership		2,612,988	1,802,962 (69%)

\*Data from five zones in West Amhara provisional at time of presentation

### Surgery (S)

In 2017, the ARHB, with assistance from The Carter Center, continued implementation of the FMOH Fast Track Initiative. From January through December, 91,977 people received TT surgery across the region. Of those operated, 61,993, or 67.3%, were women, who are twice as likely as men to suffer from TT. The remarkable performance was due to leadership of the ARHB, involvement of political leaders, and support from partners in the region.

The program also supported training for 80 new IECWs, who will help continue the work clear the TT backlog in Amhara. Baseline surveys completed in 2007 showed an estimated backlog of more than 600,000. As of the end of 2017, it is estimated 198,626 patients require surgical services to clear the backlog. At the current pace, the program estimates clearing the backlog in 2 years.

In order to identify TT patients requiring surgery, HEWs conducted intensive house-to-house case searches in all zones in the region. In 2017, more than 2.2 million households were visited by HEWs. Throughout the case searches, 136,920 people were screened for TT. Of those screened, 68.4%, or 93,607, had confirmed TT. Among those who had confirmed TT, 98.3% accepted surgical services, with a small percentage, 1.7%, who refused to have TT surgery. The program also carried out surgical validation activities in all zones in 2017. Over 7,000 patients who received TT surgery were randomly selected from the health center patient registers to be interviewed. Of those randomly selected, 85% were interviewed, and 98% were confirmed to have received TT surgery. Those not interviewed were not available at their home when the validation team visited.

A TT surgery quality audit was also completed in 2017 to check the quality of TT surgeries conducted. During the audit, 2,319 people were examined, which resulted in 3,056 lids examined. Of those examined, 2,615, or 85.6%, were found to be well corrected, 74, or 2.4%, had granuloma, 173, or 5.6%, were found to be under corrected, and 180, or 5.9%, were found to be over corrected. Post-operative TT was found in 203 patients (8.7%).

### Antibiotic Therapy (A)

As of March 2018, 36 districts in the Amhara region have achieved the elimination target for TF and no longer require MDA. This achievement shows great progress throughout the region. For the districts with TF greater than 5%, MDA activities continued in 2017, with 2 Trachoma Campaigns carried out. Through the Trachoma Campaigns, 13,651,377 doses of azithromycin and 288,557 doses of TEO were distributed. The

majority of districts achieved over 80% coverage during the campaigns. As of March 2018, MDA was in progress in 2 districts. TIS are planned for 54 districts in 2018, which will inform the program on MDA still required, although it is thought that most districts with TF greater than 5% will still require 1 to 2 more rounds of MDA. The program also plans to conduct 9 surveillance surveys in 2018. The surveys will take around 5 months to complete and many IECWs will be involved in the surveys, which could affect TT outputs in 2018.

### **Facial Cleanliness (F) & Environmental Improvement (E)**

The ARHB supports community and school-based health education activities in all districts in Amhara. In 2017, all villages had ongoing health education activities. Notably in 2017, the region prepared the Regional Hygiene and Environmental Health Strategy. The document was adapted from the national strategy for the Amhara region. Training on F&E activities was conducted for 292 hygiene and sanitation officers and blindness prevention officers. Regional WASH-NTD task force meetings were conducted monthly in 2017, and a WASH-NTD learning forum was conducted.

Following the launch of the School Trachoma Health Program (STHP) in 2016, all training for the program was completed in 2017. The STHP is expected to enhance behavior change in school-age children, as well as community members. In 2017, 11,849 school principals, teachers, cluster supervisors, and *woreda* education office staff received training on the STHP. Following training, STHP was rolled out to all schools in the region. To measure the progress of STHP, quarterly supportive supervision visits were conducted. The visits are conducted by a team composed of representatives from the regional education bureau, ARHB, and The Carter Center. Each district was also assigned a STHP focal person to ensure the curriculum and associated activities are implemented in the primary schools in each district.

To measure the impact of the STHP, indicators were developed and will be measured on a regular basis. From October-December 2017, 5,959 schools reported on the indicators. Data reported that 75% of primary school students had received health education on hygiene, sanitation, and trachoma in their classrooms, and 44% of students reported receiving health education from HEWs or other health professionals in their communities. Of the schools who reported during this period, 90% of the schools had established trachoma clubs, 88% of the schools had functional latrines considered safe for children to use, and only 43% of the schools had hand and face washing facilities.

In 2016, the AHRB changed the indicator related to the E portion of the SAFE strategy. The program now monitors latrine ownership, instead of just focusing on new latrines constructed in a reporting period. This change came in response to the challenges the region faced in routine monitoring of latrines constructed as it was difficult to know when latrines were constructed. Routine monitoring now captures if a home has a latrine, if it is an improved latrine, or if a home does not have latrine. An improved latrine indicates durable materials are used for construction, a superstructure was constructed, and the latrine is usable beyond one season. A traditional pit latrine with or without a superstructure is also included. In 2017, data collected showed that 69.8% of households in Amhara have a latrine, with 41.8% having an improved latrine. Over 1.8 million latrines were accounted for in the data collection.

### **Operational Research**

There is a wide variety of operational research ongoing and planned in the Amhara region that looks at all aspects of the SAFE strategy. The London School of Hygiene and Tropical Medicine, in partnership with The Carter Center and ARHB, is conducting 4 studies related to TT surgery. The University of California at San Francisco Francis I. Proctor Foundation, in partnership with The Carter Center and ARHB, is conducting a study focused on F&E. Two studies focused on antibiotics are awaiting ethical approval.

## Programmatic Challenges

The program had several challenges in 2017. First, the delayed shipment of azithromycin resulted in delayed MDA, mainly in West Amhara. Identification of TT cases has become a challenge; however, the region is working to address this issue. The program also faced a challenge of a shortage of some TT surgery consumables in the local market. The ARHB is working with partners to resolve this issue.

## Status of 2017 Program Review Meeting Recommendations

**Recommendation 1:** The Amhara Region Trachoma Control Program should leverage the STHP data with partners responsible for provision of latrine and hand-washing facilities in schools. STHP should provide monitoring data to the responsible organizations for advocacy.

**Status:** STHP data were shared during the annual Amhara Regional Trachoma Program Review meeting, WASH-NTD learning forum and Amhara region WASH-NTD taskforce meeting, which meet for advocacy purposes.

**Recommendation 2:** The Program should review program monitoring data from 2008 through 2016 including clinical signs (TF and TI), *Chlamydia trachomatis* PCR results, F&E uptake and MDA coverage survey results to evaluate progress to date and publish these results.

**Status:** A paper on the MDA coverage was published. Papers describing results of PCR, Trachoma Impact Survey, TIS costs are in progress. TESFA (Trachoma Elimination Study by Focused Antibiotic) study proposed. WHO-led Trachoma program external evaluation conducted in March 2018.

## Targets for 2018 and Plans to Meet Targets:

### *Surgery (S)*

- Operate on 93,126 TT patients, all with Carter Center assistance
- Train 34 new TT surgeons

### *Antibiotic Therapy (A)*

- Distribute 15,820,003 doses of azithromycin, all with Carter Center assistance
- Distribute 316,400 doses of TEO, all with Carter Center assistance
- Complete 54 impact surveys and 9 surveillance surveys

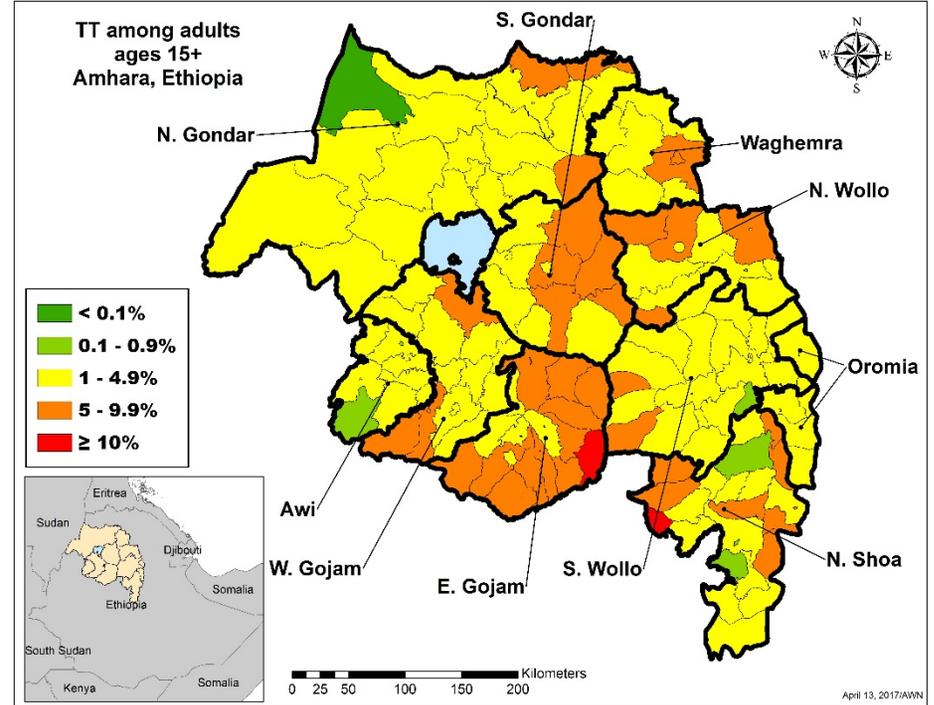
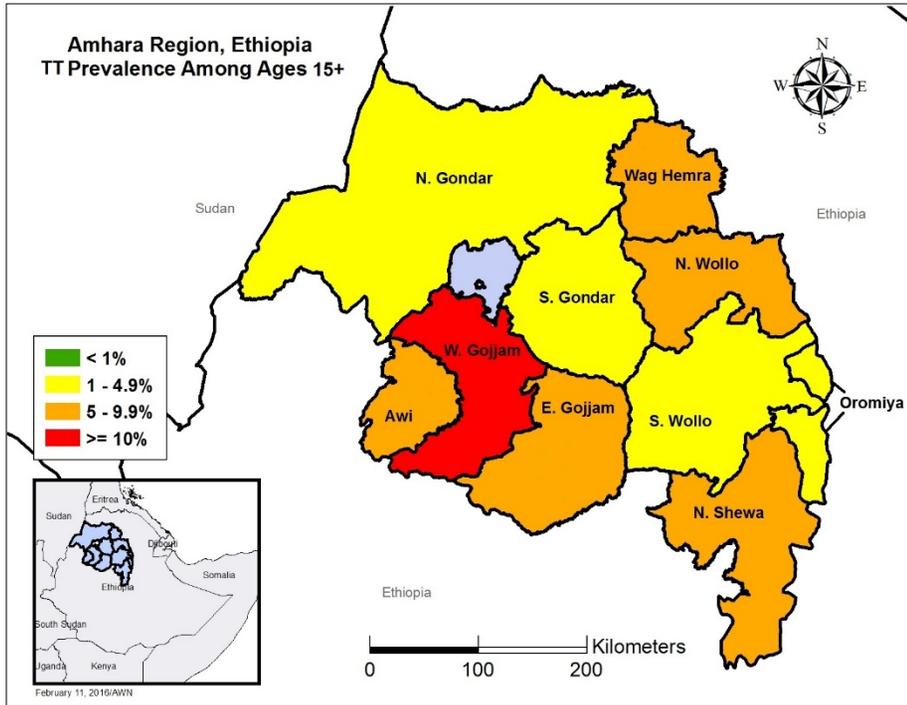
### *Facial Cleanliness (F) & Environmental Improvement (E)*

- Support health education in 3,838 villages, all with Carter Center assistance
- Conduct baseline survey for hygiene and environmental health activities
- Conduct STHP supportive supervision

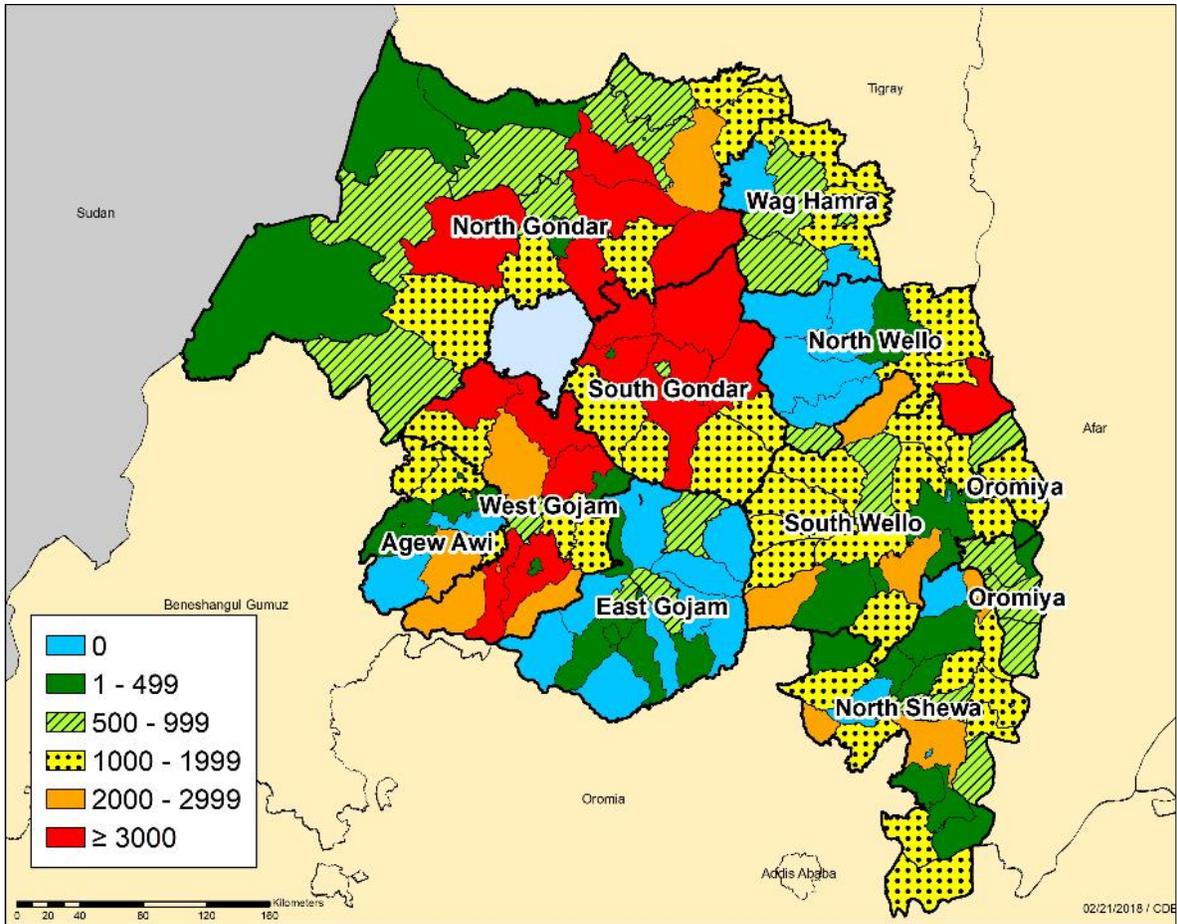
# Amhara, Ethiopia: TT Prevalence among Adults ≥ 15 years

Baseline, 2007

2017

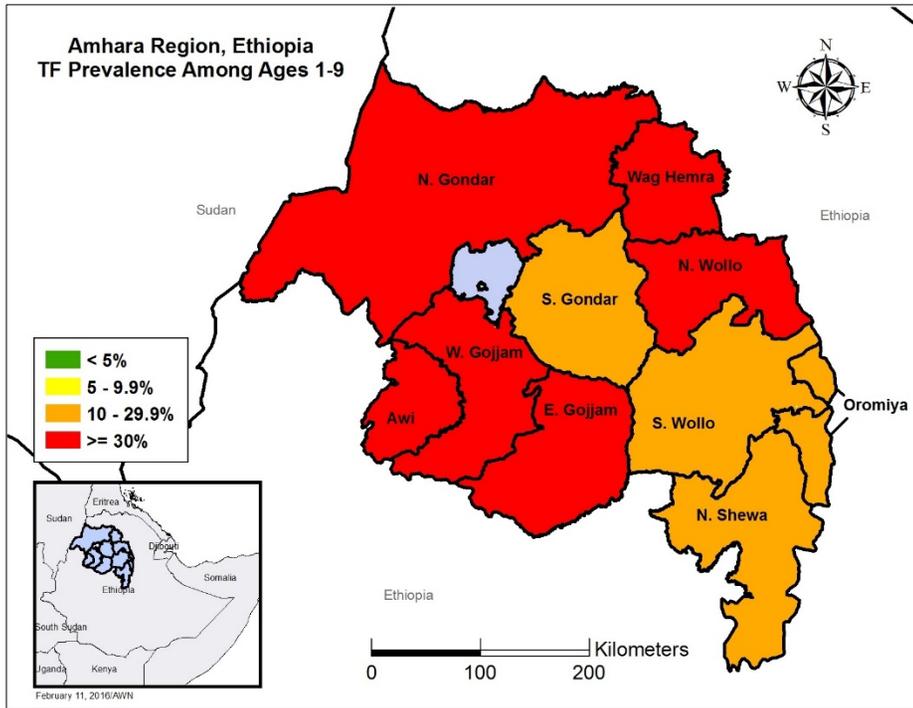


# Amhara, Ethiopia: Surgical Backlog, 2017

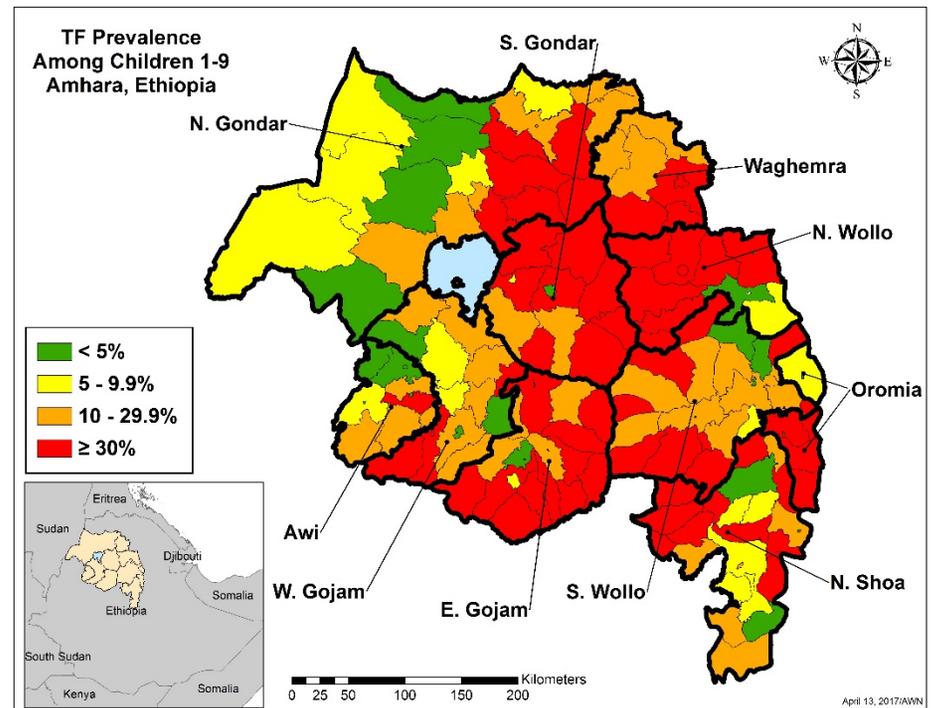


# Amhara, Ethiopia: TF Prevalence among Children 1-9 years

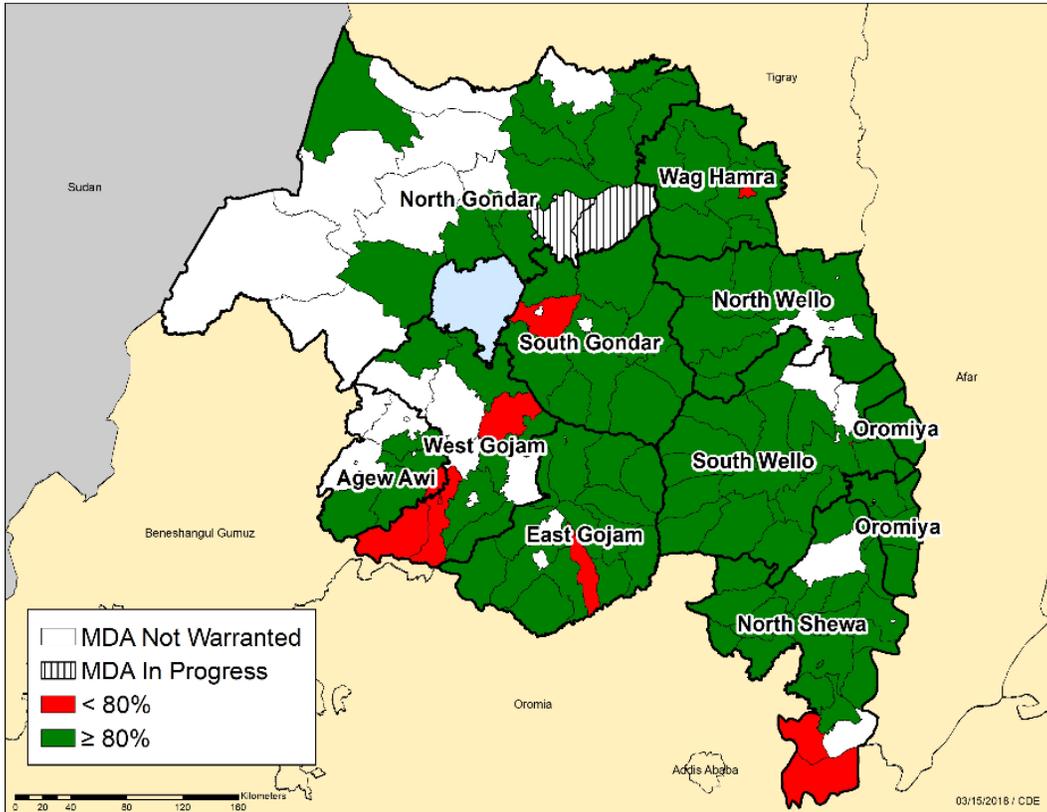
Baseline, 2007



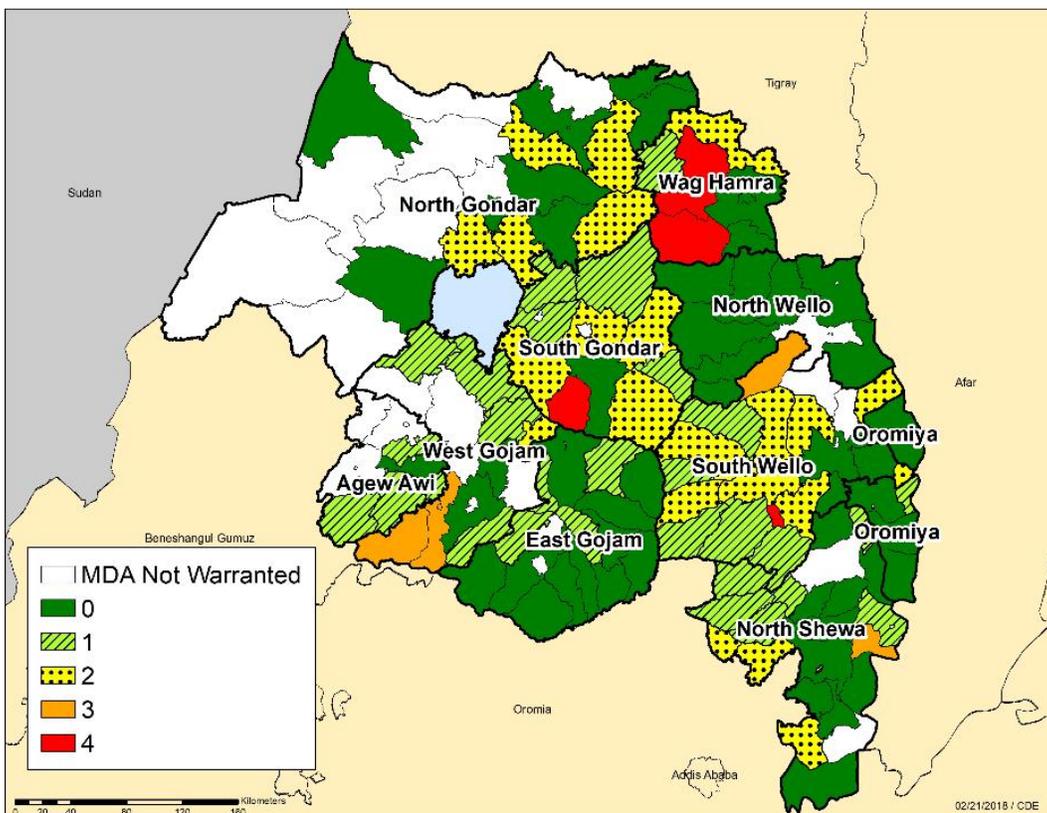
2017



### Amhara, Ethiopia: MDA Coverage, 2017



### Amhara, Ethiopia: MDA Rounds Remaining, 2017



## **SAFE in Mali**

*Presented by Professor Lamine Traoré, Coordinator PNSO, Ministry of Health, Mali*

### **Background**

In 1994, the Malian National Blindness Prevention Program (PNLC) was created; however, since December 2014, the PNLC has been known as the National Eye Health Program (PNSO). Following prevalence surveys conducted in 1996-1997, trachoma was identified as a major public health issue in Mali. Despite the Ministry of Health's (MOH) 3 priorities being malaria, HIV, and tuberculosis, a national trachoma control program was established in 1999. Though Mali does not have a formal TAP, at the end of each year, the PNSO develops a plan of action during its annual program review meeting. The Carter Center, along with other partners, currently supports the implementation of all SAFE components. For the A component another NGO partner supports azithromycin distribution, so The Carter Center is limited to the purchase of TEO.

### **Timeline of Events**

1994: PNLC launched

1996-1997: National baseline prevalence survey

1999: National Trachoma Control Program launched

1999: Surgeries initiated

2001: Distribution of Pfizer-donated Zithromax® begins

2003: Facial cleanliness and Environmental improvement activities initiated

2005-2016: TIS conducted

2014: PNLC becomes PNSO

2018: Target date for elimination of trachoma in Mali

**Table 1. Program Achievements in 2017**

Indicator	Goal	National		Carter Center-Assisted	
		Target	Achieved	Target	Achieved
# of persons operated	7,051	6,000	1,694 (28%)	2,400	497 (21%)
# of women operated			1,153		382
# of surgeons trained		0	17	0	0
Doses of azithromycin distributed during MDA	0	0	0	N/A <sup>3</sup>	N/A
Doses of tetracycline distributed during MDA	0	0	0	0	0
# of villages with health education		300	299 (100%)	250	199 (80%)
# of household latrines built		7,000	5,727 (82%)	5,000	4,729 (95%)

### **Surgery (S)**

The 1996 baseline survey in Mali revealed that 75% of districts surveyed were endemic for trachoma. After 20 years of program implementation of the SAFE strategy, great progress has been made towards the elimination of trachoma as a public health problem. In 2017, the National Program supported 1,694 TT surgeries, reaching 28% of its annual target of 6,000 surgeries. Of the total surgeries completed, 1,153 were provided to women. The Carter Center assisted 497 of the total surgeries, reaching 21% of its annual target of 2,400 surgeries. The program also trained 17 new TT surgeons. The current backlog is about 5,893. At the 2017 pace, it will take 3.5 years to clear the estimated backlog.

The National Program collects data on number of people screened for TT surgery and the number of people who refuse surgical services. In 2017, the program screened 627,311 people across the country for signs of TT. Nearly 100% of those screened, 625,450, had no signs of TT. Of the 1,861 people found to have TT, 87% accepted surgery, while 242 refused surgery.

### **Antibiotic Therapy (A)**

There are currently no districts in Mali that warrant MDA. All districts have reached the elimination threshold of TF less than 5%. This is a great achievement for the National Program. In 2017, the program conducted 4 TIS and 9 surveillance surveys. No TIS is planned in 2018. The program will focus on conducting 20 surveillance surveys. If security normalizes in 2018, the National Program expects to have all surveys conducted by the end of the year.

### **Facial Cleanliness (F) & Environmental Improvement (E)**

To carry out F&E activities, the National Program collaborates with its partners as well as various ministry departments. Since 1999, the National Program has been training masons and health workers in Mali to implement F&E activities. The program supported ongoing health education in 299 villages in 2017. The National Program supports community-led total sanitation (CLTS), which is fully implemented by the communities. Clusters of women are trained in health education, and information, education, and communication (IEC) messages are broadcast by local radio stations. Water points are created and maintained. In schools, trachoma has been introduced into the training curriculum for teachers, through funding from the World Bank. A training program for teachers and mothers of students has been finalized.

<sup>3</sup> The Carter Center does not assist MDA in Mali.

The National Program also supports activities related to Environmental improvement. In 2017, the National Program, with assistance from many partners, supported the construction of 5,727 latrines. Not all latrine building activities are coordinated by the National Program, but by partners unknown to the program. An effort is being made by the National Program to take into account and recognize those working in this area that are not strategic partners of the program.

### **Programmatic Challenges**

The program reported several current challenges with 2 being paramount: finding the remaining TT cases and insecurity. The National Program is finding it difficult to locate and diagnose the remaining TT cases in the country as the program works towards elimination. Great effort is being made in this area to screen as many patients as possible. There are also some refusal cases in some districts, even if measures are put in place to find refusal cases. Secondly, there is increased insecurity in the center of the country. Previously, insecurity was mostly in the northern regions; however, it has shifted to the central regions, where many activities were planned in 2017.

### **Status of 2017 Program Review Meeting Recommendations**

**Recommendation 1:** Given the current TT backlog and using a detailed TT plan, the Mali Program should aggressively plan to clear the TT backlog, using detailed planning and simultaneous activities, by 2018.

**Status:** The program has continued with *ratissage* to identify cases, as well as surveying. In 2017, the program conducted 9 surveillance surveys and 5 impact surveys.

**Recommendation 2:** Mali and Niger should continue cross border collaboration and bring in neighbouring countries to discuss issues and how they have been resolved.

**Status:** The National Program participated in a series of meetings in collaboration with Niger. First, the Mali program participated in the trachoma program review in Niger in October 2017, while the Niger program participated in the Mali review in December 2017. Additionally, both programs collaborated on 2 HEAD START training of trainer sessions. Mali, along with Niger and Burkina Faso, received funding through the World Bank NTD project. As a result, the 3 countries participate in meetings to discuss the use of funds through joint activities.

**Recommendation 3:** The Mali Program should consider whether to utilize different TT case finding methods for different contexts.

**Status:** The National Program uses *ratissage* to identify cases, as well as documenting refusal cases.

**Recommendation 4:** The Program should consider, when and where possible, working with the National Guinea Worm Eradication Program to promote awareness creation and knowledge of cash rewards.

**Status:** The National Program includes questions in trachoma surveys related to knowledge of guinea worm and the cash reward system. In this way, the program promotes the cash reward system.

## **Targets for 2018 and Plans to Meet Targets**

### *Surgery (S)*

- Operate on 5,893 TT patients, 1,500 with Carter Center assistance

### *Antibiotic Therapy (A)*

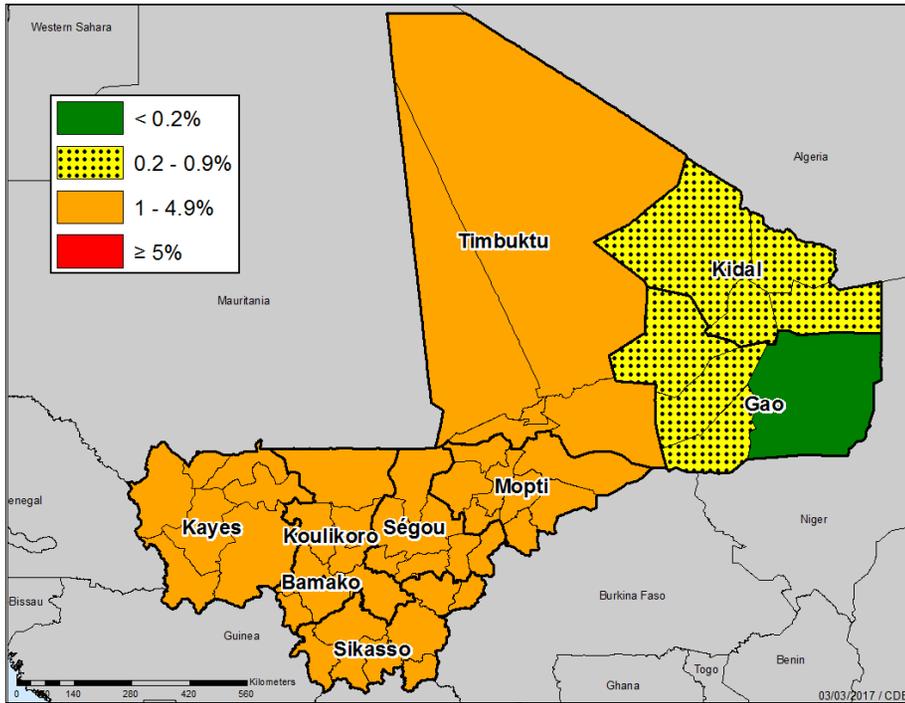
- No MDA activities are warranted in Mali
- Complete 20 surveillance surveys

### *Facial Cleanliness (F) & Environmental Improvement (E)*

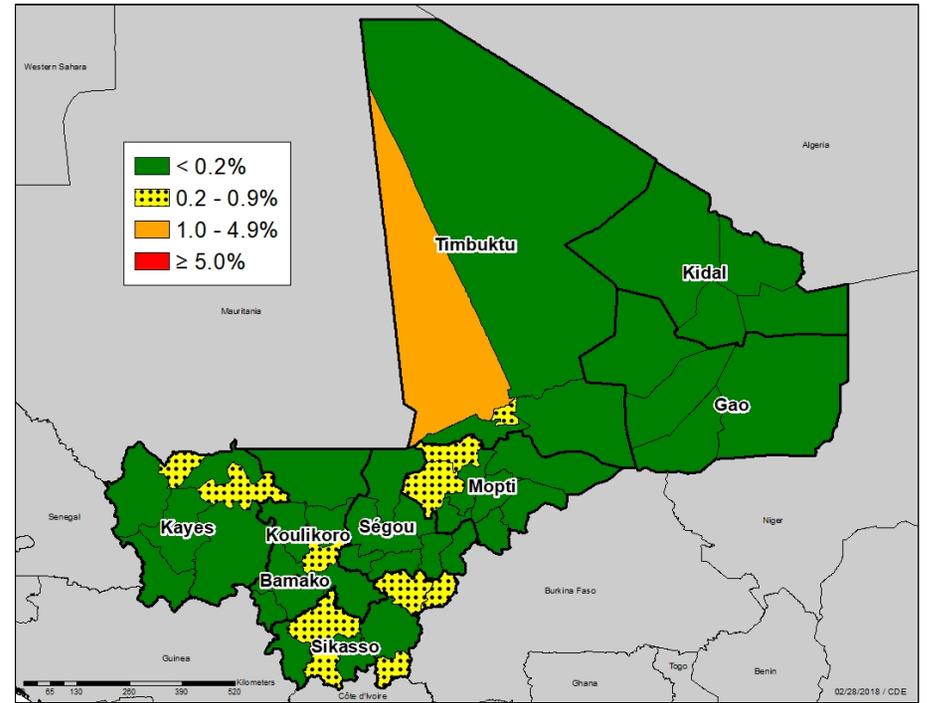
- Support health education in 400 villages, 240 with Carter Center assistance
- Construct 6,000 latrines, 5,000 with Carter Center assistance
- Continue current F&E activities

# Mali: TT Prevalence among Adults ≥ 15 years

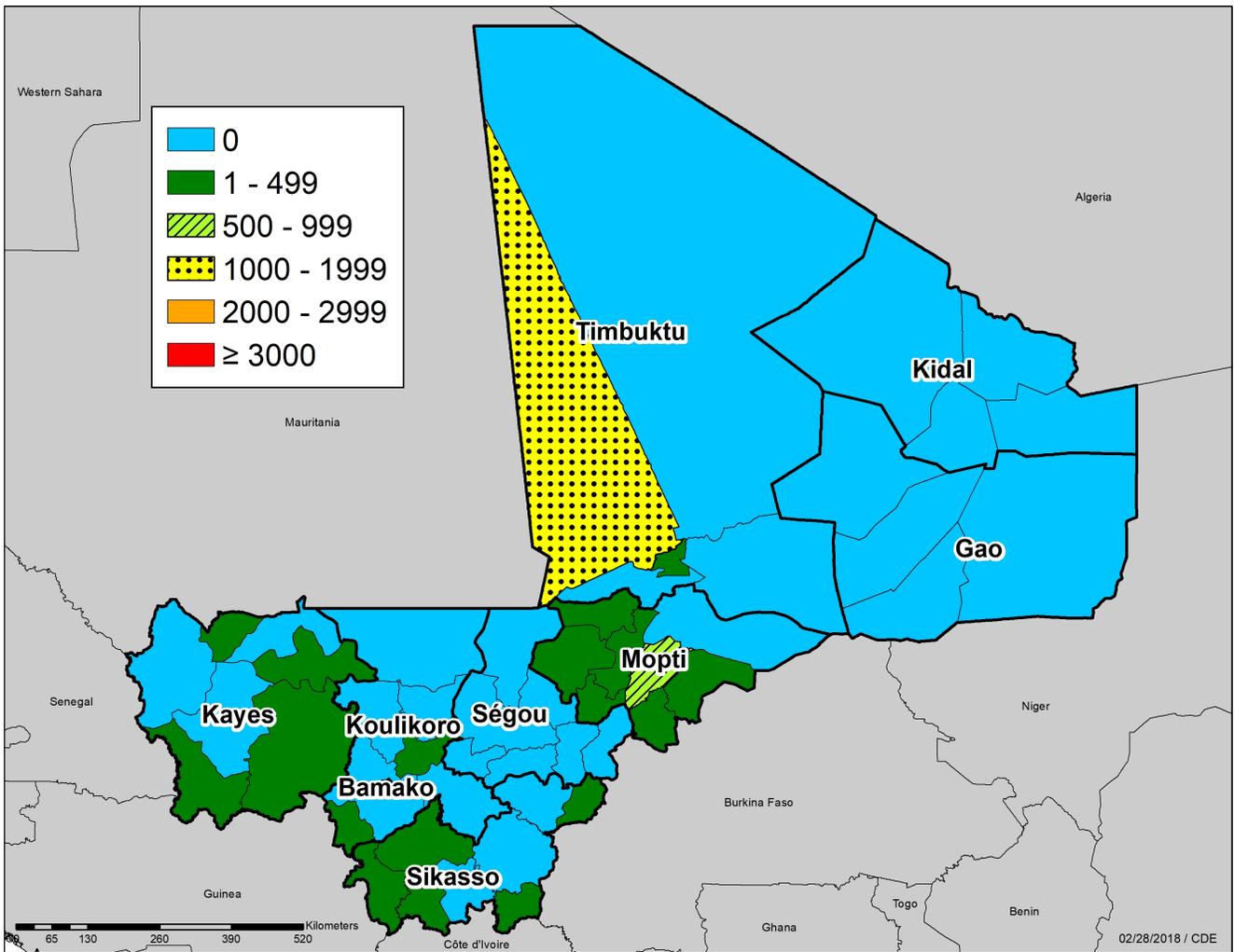
Baseline, 1996



2017

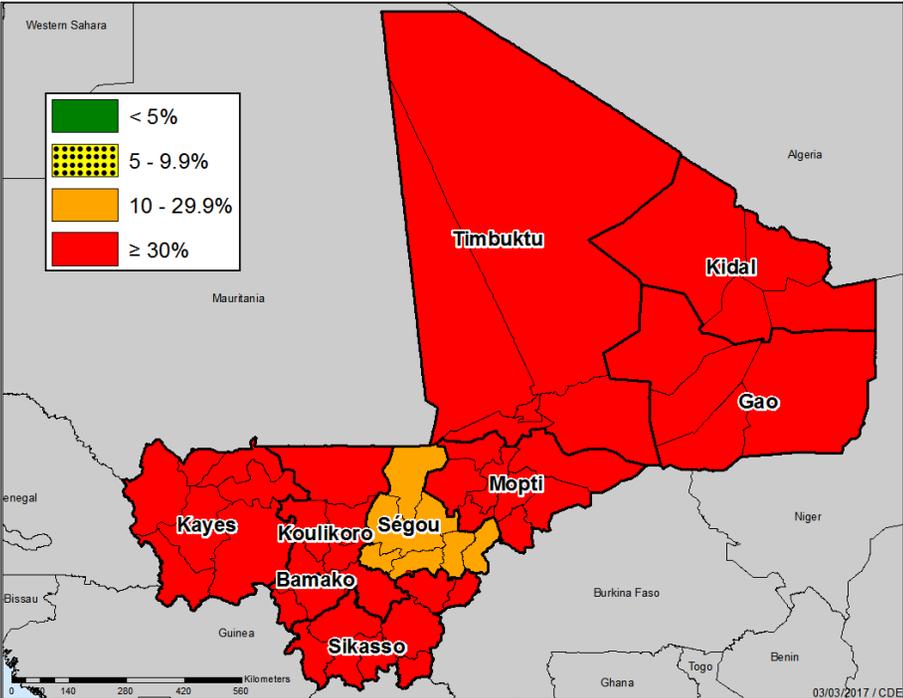


# Mali: Surgical Backlog, 2017

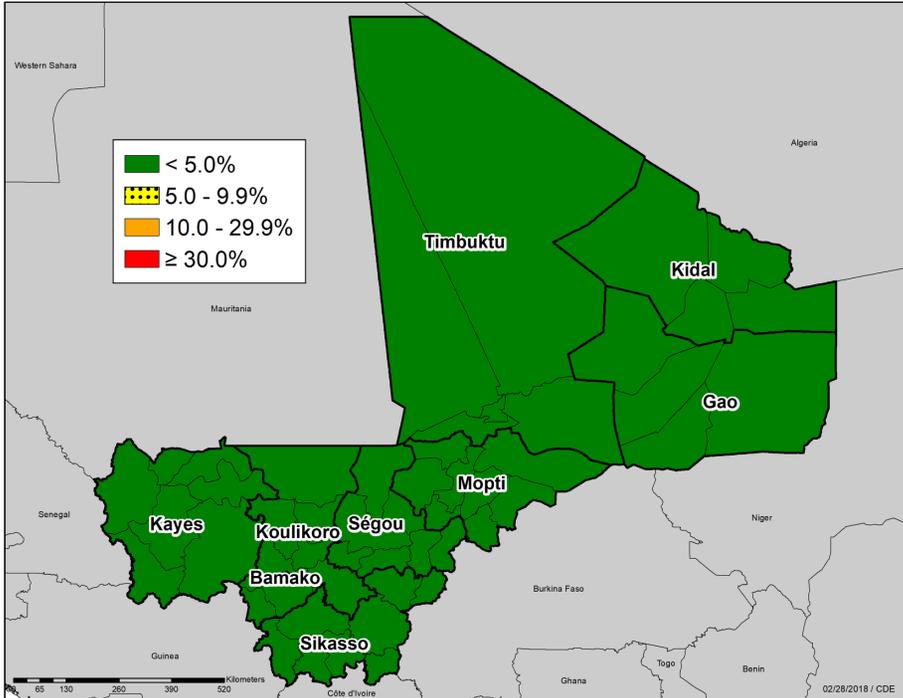


Mali: TF Prevalence among Children 1-9 years

Baseline, 1996



2017



## **SAFE in Niger**

*Presented by Dr. Kadri Boubacar, Deputy Coordinator PNSO, Ministry of Health, Niger*

### **Background**

The PNLC was established in 1987 following national surveys showing a prevalence of blindness of 2.2%, with one-quarter due to trachoma. Regional baseline surveys conducted from 1997 to 1999 found that 44% of children ages 1 to 9 had active TF and/or trichomatous inflammation-intense (II) and 1.7% of women over 15 years of age had trichiasis. In 1999, the PNLC formed the National Trachoma Task Force and, beginning in 2001, prevalence surveys were conducted at the district level. Currently, trachoma is part of the Department of NTDs and is not considered a high priority disease. Though trachoma is integrated into the NTD department, trachoma partners organize trachoma specific coordination and annual review meetings at the regional level. The program implements all components of the SAFE strategy where warranted.

In 2013, the Minister of Health made a statement of appreciation for the work of the MOH trachoma coordinators and the 2 main partners, The Carter Center and Helen Keller International (HKI). These statements were made during a TT surgical outreach week in March 2013. Also in 2013, the program name changed from PNLC to PNSO.

### **Timeline of Events**

1987: PNLC started  
1997-1999: Baseline surveys conducted at regional level  
2000: The Carter Center begins support of the program  
2001: District level baseline surveys started  
2002: SAFE strategy implementation begins  
2006: Trachoma impact surveys conducted  
2007: NTD Program launched  
2010 and 2012: TIS completed  
2013: PNLC becomes PNSO  
2016: TIS completed  
2020: Updated target date for the elimination of trachoma

Table 1. Program Achievements in 2017

Indicator	Goal	National		Carter Center-Assisted	
		Target	Achieved	Target	Achieved
# of persons operated	32,120	18,000	11,478 (64%)	11,100	9,897 (89%)
# of women operated			N/R		5,556 (56%)
# of surgeons trained		60	38 (63%)	30	24 (80%)
Doses of azithromycin distributed during MDA	4,854,335	4,854,335	2,151,297*	N/A <sup>4</sup>	N/A
Doses of tetracycline distributed during MDA	150,000	150,000		150,000	150,000 (100%)
# of villages with health education		527	527 (100%)	527	527 (100%)
# of household latrines built		11,000	13,273 (121%)	11,000	13,273 (121%)

\*Zithromax<sup>®</sup> and TEO; MDA is in process in eight districts at time of presentation

### Surgery (S)

The National Program has been providing TT surgery in Niger since 1999. The Carter Center began assisting TT surgeries in 2009. The program has had a significant increase in outputs since 2009, especially from 2011-2015. In 2017, the program operated 11,478 TT patients, reaching 64% of its annual target of 18,000 TT surgeries. The Carter Center provided assistance for 87% of the total achievement, or 9,987 surgeries. Also in 2017, 38 new TT surgeons were trained, with 24 trainees supported by The Carter Center. The estimated remaining backlog of TT patients to be operated is 20,195. At the current pace, the program will clear the backlog in less than 2 years. Data from surveys shows that districts in Maradi and Zinder have the highest backlogs remaining.

In 2017, the Niger program began implementing *ratisage* following cross-border collaboration with the Mali National Program. The system used in Niger is based on the procedure used in Mali, but is tailored to the Niger program. As a result, the National Program is collecting data on the number of people screened for TT and those who refuse surgical services. In 2017, the program recorded 28,500 people screened for TT, and 58% showed no signs of TT. Of those with TT, 11,925, or 99%, accepted surgery, while 155 refused surgical services.

Since 2011, the National Program has been monitoring the quality of TT surgery through follow-up surveys, including post-operative interviews with TT patients. Data collected includes the name of the surgeon, the instructions provided to the patient following surgery, and the outcome of the surgery. Data collected shows that currently there is a recurrence rate of about 10%.

### Antibiotic Therapy (A)

Baseline surveys, conducted in 2002, indicated that the southern regions of Niger were endemic for trachoma and many districts had a TF prevalence above 30%. The program has made significant progress to reduce the TF prevalence across the country. As of 2017, all areas have been surveyed to determine where SAFE interventions are required. Beginning in 2007, the Ministry of Health implemented integration of all MDA in the country. The National Program is required to wait for all medications to be received in country before distributions can begin. This has led to some delays with MDA in recent years.

<sup>4</sup> The Carter Center does not currently assist MDA in Niger.

In 2017, the National Program carried out MDA in several districts. 2,151,297 doses of azithromycin and TEO were distributed to districts warranting MDA. The Carter Center provided assistance in the purchase of 150,000 doses of TEO for distribution. MDA is still warranted in districts in Tahoua, Maradi, Zinder, and Diffa regions. Currently, 6 districts are planning for MDA, most with 1 or 2 rounds of MDA remaining. One district in Tahoua will require 3 rounds of MDA. Overall, there is a decrease in the doses of antibiotics to be distributed in Niger for the National Program.

In addition to MDA, the National Program supported surveys in 14 districts. A total of 6 TIS and 8 surveillance surveys were complete. The program is planning to conduct 8 TIS and 1 surveillance survey in 2018.

### **Facial Cleanliness (F) & Environmental Improvement (E)**

In 2017, the National Program supported health education activities in 527 villages. Training was provided to 1,568 people to support health education activities in their communities. Trainees include *marabouts* (Muslim religious leaders), community leaders, and local medical agents. Radio stations are contracted to broadcast messages about trachoma activities, including MDA and TT surgery camps, and to share messages on preventing trachoma in households and community-wide. The radio stations are essential to the success of the F&E activities.

The National Program also supported several activities related to health education in schools. The program organized sports and radio programs, provided hygiene kits to 227 schools, which include hand and face washing stations, and trained 280 teachers from endemic districts on trachoma-specific curriculum. The program also supported 2 joint regional health and education supervisory visits, a briefing for 40 educational advisors, follow-up activities at the 227 schools, and held a meeting to review the progress of implemented activities.

The program exceeded its target for latrine construction by 21% in 2017. A total of 13,273 latrines were constructed in all regions. Training was also provided for 230 new masons. The program coordinator noted there have been issues of coordination between interested parties, which has made it difficult for the National Program to plan meetings to discuss issues.

### **Operational Research**

The National Program is coordinating with partners to conduct operational research in several regions in the country. Currently, the program is collaborating with NGO partners on a study focusing on surgeons who received HEAD START training, as well as a study on post-operative follow-up on the quality of TT surgery. The National Program continues to coordinate with The Carter Center and the University of California at San Francisco Francis I. Proctor Foundation on the Macrolides Oraux pour Réduire les Décès avec un Oeil sur la Résistance (MORDOR) study. The program is also considering a study looking at the impact of radio messaging in the fight against trachoma.

### **Programmatic Challenges**

The program noted several challenges faced in 2017. First, TT kits, purchased with financial support from the World Bank, were delayed, arriving in December despite being needed in April. Once the kits arrived, the program determined that items in the kit, specifically the scissors, did not meet specifications. Secondly, they experienced a delay in receiving azithromycin for MDA due to Tropical Storm Maria and its effect on the production plants in Puerto Rico.

## Status of 2017 Program Review Meeting Recommendations

**Recommendation 1:** The Niger Program should investigate options for cross border collaboration with Nigeria.

**Status:** The National Program coordinator has obtained contact information for the Nigerian National Coordinator and is planning to make arrangements for a meeting.

**Recommendation 2:** Mali and Niger should continue cross border collaboration and bring in neighbouring countries to discuss issues and how they have been resolved.

**Status:** Niger and Mali participated in 2 meetings together in 2017, including the Niger program review.

**Recommendation 3:** The Program should continue working in the internally displaced camps to provide SAFE as much as possible, where warranted.

**Status:** The National Program supported MDA in 17 camps in Diffa region in 2017.

**Recommendation 4:** The Program should aggressively plan to operate all TT cases (including Agadez) using detailed planning and simultaneous activities before the end of 2019.

**Status:** The program developed a work plan and trained 4 surgeons using HEAD START. Some material difficulties did not allow surgery activities to be implemented. However, there are now 6 trained surgeons in the region to perform TT surgery.

## Targets for 2018 and Plans to Meet Targets

### *Surgery (S)*

- Operate 15,000 TT patients, 10,000 with Carter Center assistance

### *Antibiotic Therapy (A)*

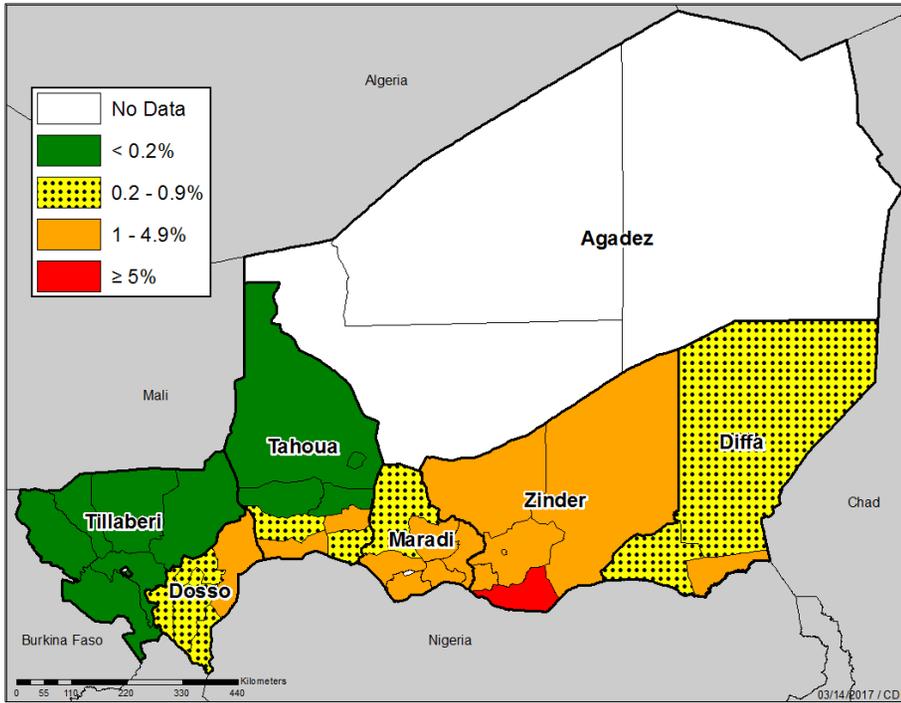
- Distribute 1,210,961 doses of azithromycin
- Distribute 150,000 doses of TEO, all with Carter Center assistance

### *Facial Cleanliness (F) & Environmental Improvement (E)*

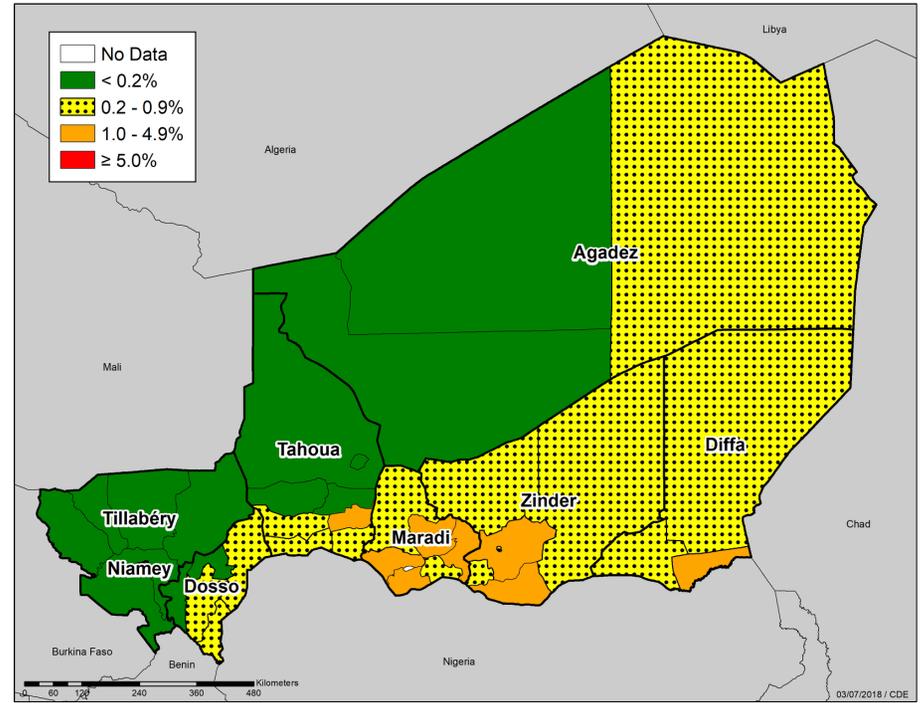
- Conduct health education in 600 villages, all with Carter Center assistance
- Construct 10,000 latrines, all with Carter Center assistance
- Train 300 masons in latrine construction
- Train 630 people in health education
- Sign radio contracts with 101 community radio stations and 5 regional stations
- Organize 38 public shows on F&E

# Niger: TT Prevalence among Adults ≥ 15 years

Baseline, 2000-2007

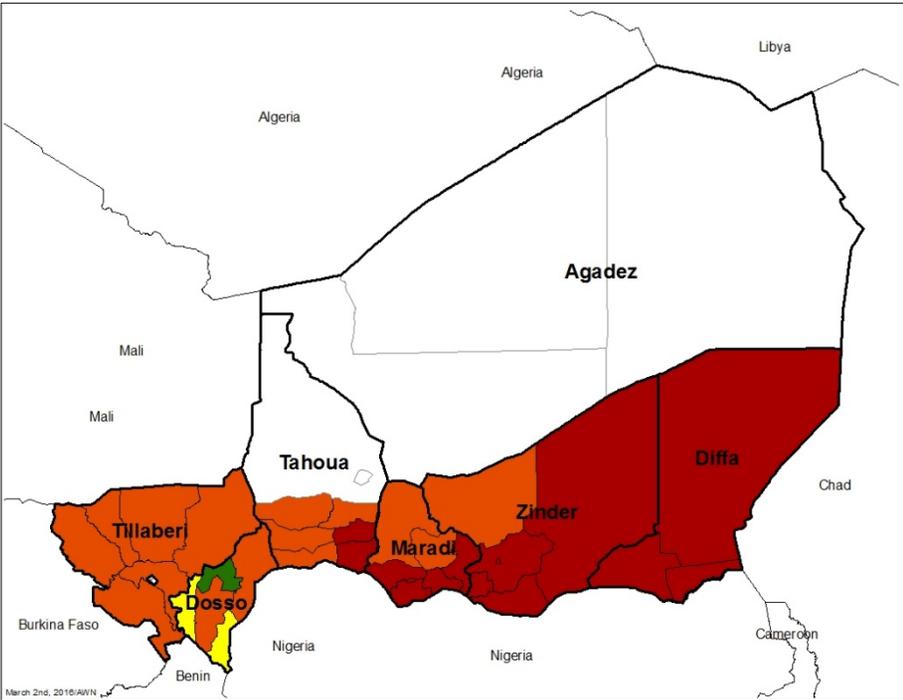


2017

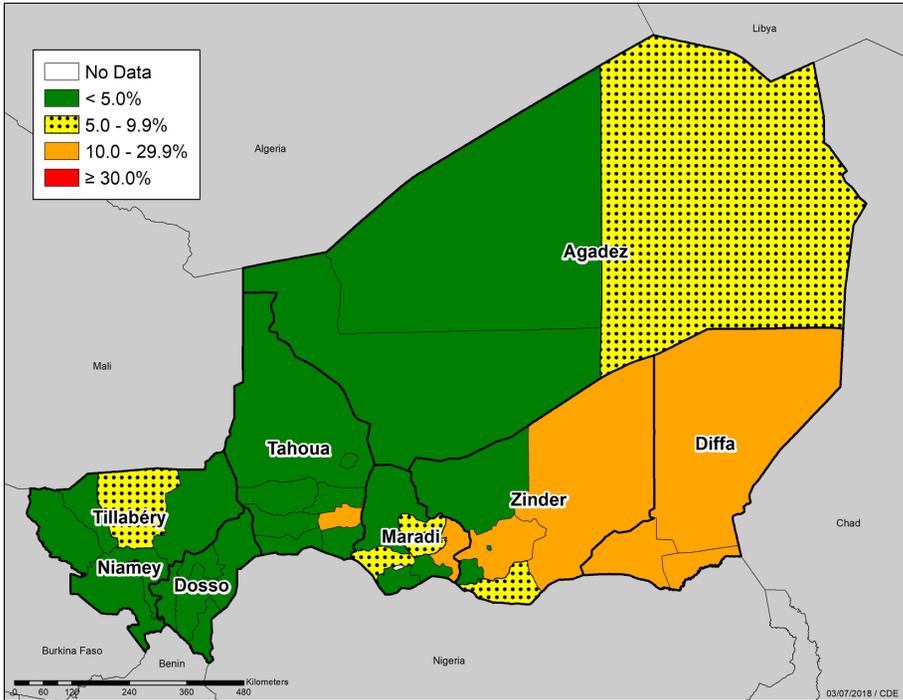


### Niger: TF Prevalence among Children 1-9 years

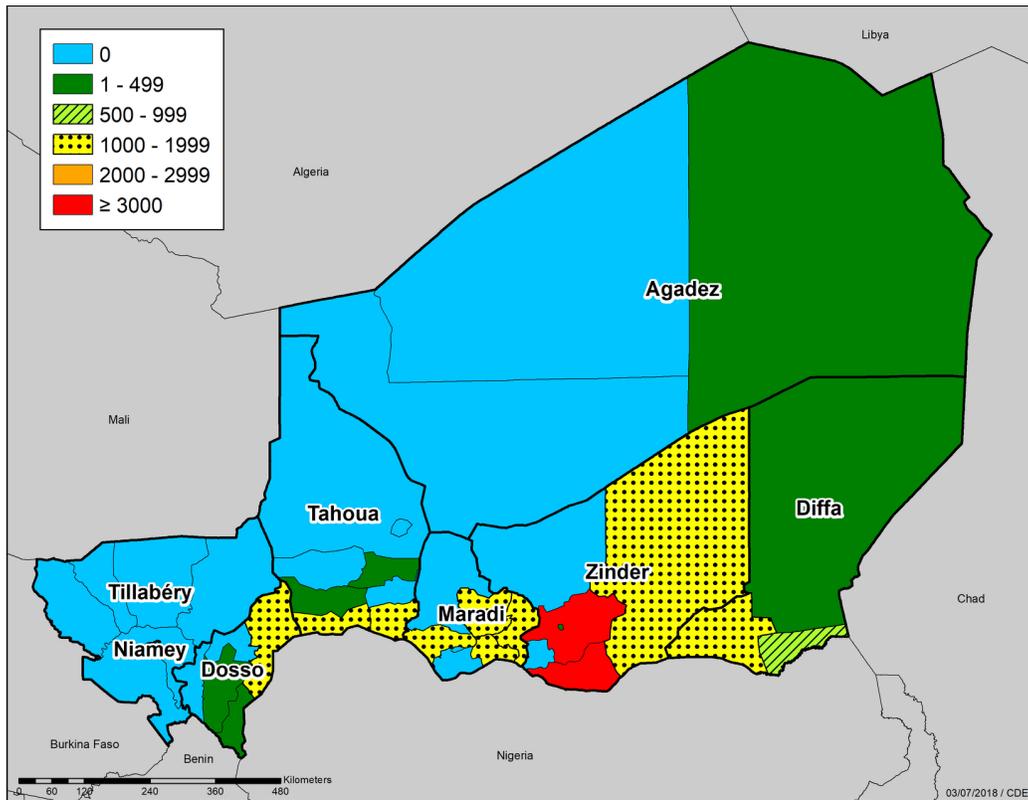
Baseline, 2000-2007



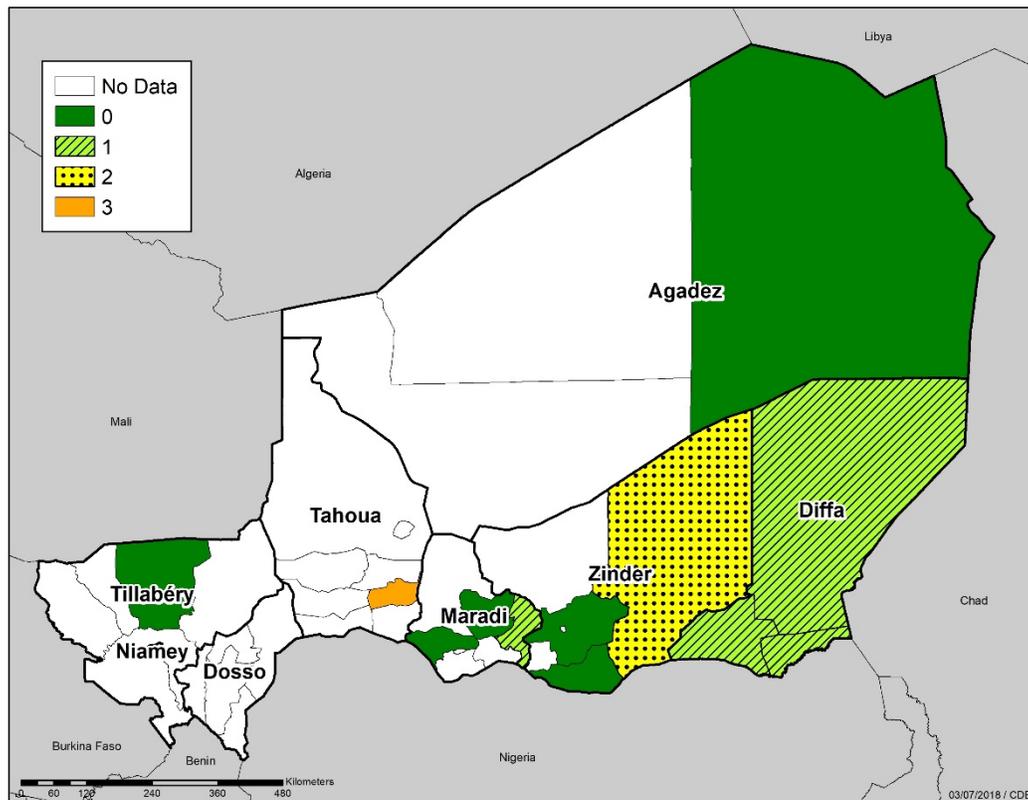
2017



### Niger: Surgical Backlog, 2017



### Niger: MDA Rounds Remaining, 2017



## **SAFE in South Sudan**

*Presented by Mr. Makoy Samuel, Director for Preventive Chemotherapy NTDs, Ministry of Health, South Sudan*

### **Background**

Prevalence surveys conducted between 2001 and 2006 showed TF prevalence as high as 77.2% among children 1 to 9 years old and TT prevalence as high as 15.1% among adults 15 years and older in some districts in the Greater Upper Nile region. Despite the high prevalence, trachoma currently is not a top priority for the government. The trachoma program was previously under the Department of Eye Care Services; however, in late 2013 it was relocated to the Department of NTDs. SAFE activities have not been conducted in all the districts due to a lack of resources. In the districts receiving SAFE interventions, most activities focus on the A component. The first TAP was completed in 2012.

The program had originally planned to conduct baseline surveys in 5 states in South Sudan as part of the GTMP and impact surveys in 8 districts in Carter Center-assisted areas; however, fighting throughout most of 2014 prevented these surveys from occurring. Due to the insecurity, The Carter Center suspended all activities in December 2013. Since the conflict began, more than 800,000 people have fled their homes, many of which were in districts supported by the Trachoma Control Program. The Carter Center recommenced program activities in September 2014.

In October 2014, the NTD task force was reactivated with a full review of a situational analysis and master plan launch. In 2015, the first TIS were conducted in 5 of the 29 districts known to be endemic. Due to insecurity, only 5 districts were accessible and The Carter Center was the only remaining partner in country.

### **Timeline of Events**

1999-2010: Baseline mapping

2001: Trachoma control activities began

2005: Comprehensive Peace Agreement signed

2007: MOH Government of Southern Sudan Trachoma Control Program established

2008: Trachoma Taskforce established

2011: South Sudan gains independence

2012: TAP finalized

2013-2014: Fighting in parts of the country causes displacement of population

2014 Jan-Sept: Suspension of program activities

2015: First TIS conducted in Budi, Lopa/Lafon, Kapoeta East, Kapoeta North and Kapoeta South

2020: Target date for elimination of blinding trachoma in South Sudan

Table 1. Program Achievements in 2017

Indicator	Goal	National		Carter Center-Assisted	
		Target	Achieved	Target	Achieved
# of persons operated	3,702 (5 of 29 districts)	2,500	0	1,000	0
# of women operated			0		0
# of surgeons trained		10	0	0	N/A
Doses of azithromycin distributed during MDA	468,061 (5 of 29 districts)	459,249	201,701 (44%)	250,153	201,701 (81%)
Doses of tetracycline distributed during MDA	9,552	9,372	12,548 (134%)	5,105	12,548 (246%)
# of villages with health education		776	796 (103%)	776	796 (103%)
# of household latrines built		N/A	N/A	N/A	N/A

### Surgery (S)

The National Program has been supporting TT surgery activities across South Sudan since 2001. The program has made progress in mapping districts, with data from Unity, Upper Nile, Jonglei, Western Equatoria, Central Equatoria, and Eastern Equatoria states. However, due to insecurity, much of the country remains to be mapped. Insecurity has also led to delayed or stopped activities across the country. Because of this, no surgical interventions were completed in 2017. However, surveys show that the TT prevalence has decreased in Kapoeta in Eastern Equatoria. The estimated backlog in the 5 counties mapped in Eastern Equatoria is 3,702. If activities can restart, the program estimates it will take 4 years to clear the Eastern Equatoria backlog. The estimated number of patients in other areas is unknown.

### Antibiotic Therapy (A)

Baseline surveys show that many of the districts are hyper-endemic for trachoma. Surveys in 2017 show that Budi district has reduced the TF prevalence from greater than 30% to between 10% and 29.9%. Despite challenges of insecurity and inaccessibility, the program was able to conduct year 2 of MDA in Eastern Equatoria. Through MDA, 201,701 people were treated with azithromycin, reaching 44% of the annual target. TEO was provided to 12,548 infants and pregnant women. This is a 23% increase in antibiotic output when compared to 2016 activities. During the MDA, the program strives to reach every person in the village, cattle camps, and surrounding settlement. Coverage was reported at greater than 80% in the counties that were treated. Kapoeta and Budi have 3 rounds of MDA remaining, while Lafon required 5 rounds of MDA.

TIS is planned for 7 counties in 2018, all of which are outside of the Carter Center-assisted areas. The National Program is prepared to do the surveys; however, support is needed. It is possible that Bor South, Twic East, and Duk may be accessible for TIS. Other areas remain inaccessible. The 3 Kapoetas and Budi will require TIS in 2021.

### Facial Cleanliness (F) & Environmental Improvement (E)

The National Program provided health education in 796 villages in 2017, exceeding its annual target of 776 villages by 3%. In the 3 counties where MDA was conducted, teams reached all communities except for 2, which were inaccessible due to insecurity. The program is focused on intensifying F&E interventions, especially F, during MDA, when most community members gather to receive antibiotics. The program is also working on providing health education in schools during MDA.

## Programmatic Challenges

The program continues to face multiple challenges, mainly insecurity. This has led to displacement of populations, a lack of reliable population data for forecasting activities, and keeps many areas inaccessible to the program. Large parts of the country also remain to be mapped. The program noted that there is an inadequate number of TT surgeons in country to provide TT surgery once interventions can restart. There is also extremely limited funding for the program.

### Status of 2017 Program Review Meeting Recommendations:

**Recommendation 1:** The Program should strive to implement the full SAFE strategy (with emphasis on F&E) in states considered secure. To achieve this, the program should consider engaging WASH partners to contribute toward latrine construction and water provision.

**Status:** The A and F arms of the SAFE strategy are being implemented, with some activities related to E. TT surgery activities remain suspended.

**Recommendation 2:** The trachoma community should consider supporting South Sudan in developing a strategy to clear the TT backlog and complete mapping for trachoma in the country.

**Status:** No progress.

**Recommendation 3:** The Program should utilize TT and TF historical and current data, any available WASH information, and internally displaced people (IDP)/refugee camp information to develop a plan to assist partners to provide interventions.

**Status:** No progress.

**Recommendation 4:** The Program should consider, when and where possible, working with the National Guinea Worm Eradication Program to promote awareness creation and knowledge of cash rewards.

**Status:** Integration has been successful and implemented on trial basis in 2017 and 2018 MDA activities. Cash award awareness messaging was included in outreach activities related to MDA. The program believes that over 200,000 people were reached through this method.

### Targets for 2018 and Plans to Meet Targets:

#### *Surgery (S)*

- Operate on 1,000 TT patients, 500 with Carter Center assistance
- Train 10 TT surgeons, 4 with Carter Center assistance

#### *Antibiotic Therapy (A)*

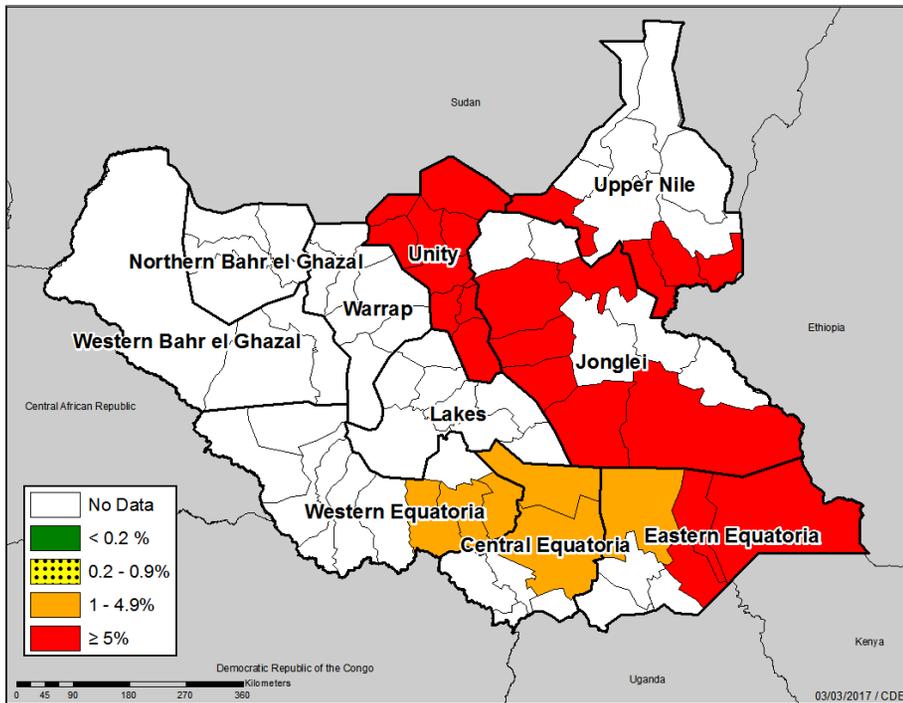
- Distribute 279,073 doses of azithromycin, all with Carter Center assistance
- Distribute 15,130 doses of TEO, all with Carter Center assistance

#### *Facial Cleanliness (F) & Environmental Improvement (E)*

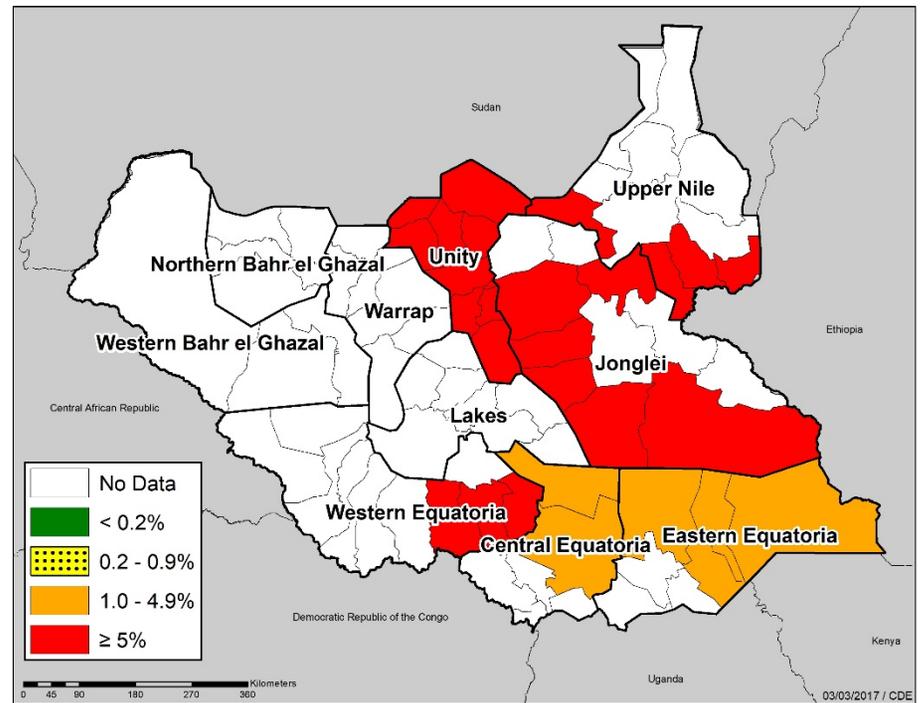
- Conduct health education in 1,000 villages, all with Carter Center assistance
- Construct 80 latrines, 20 with Carter Center assistance

### South Sudan: TT Prevalence among Adults ≥ 15 years

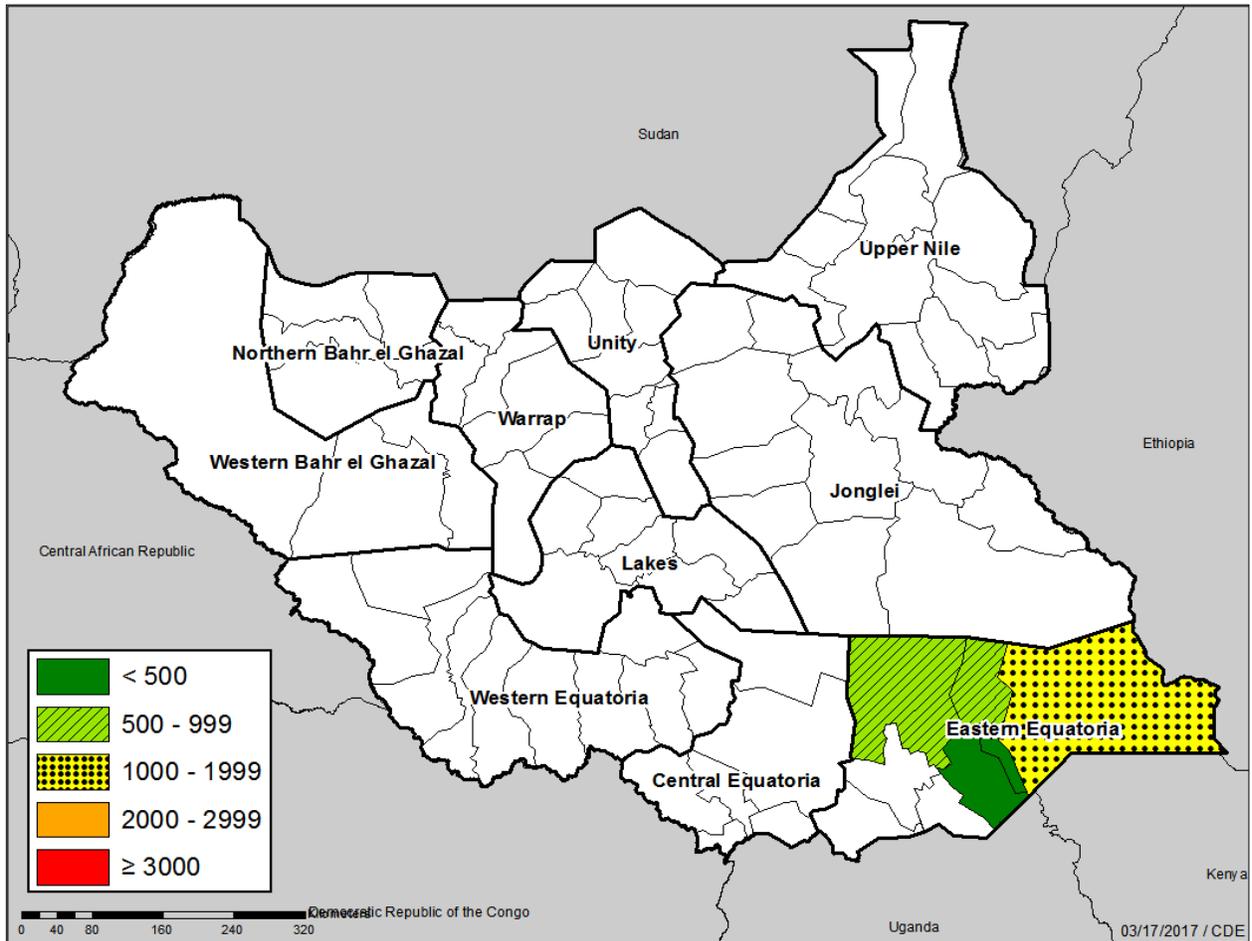
Baseline, 2001-2004



2017

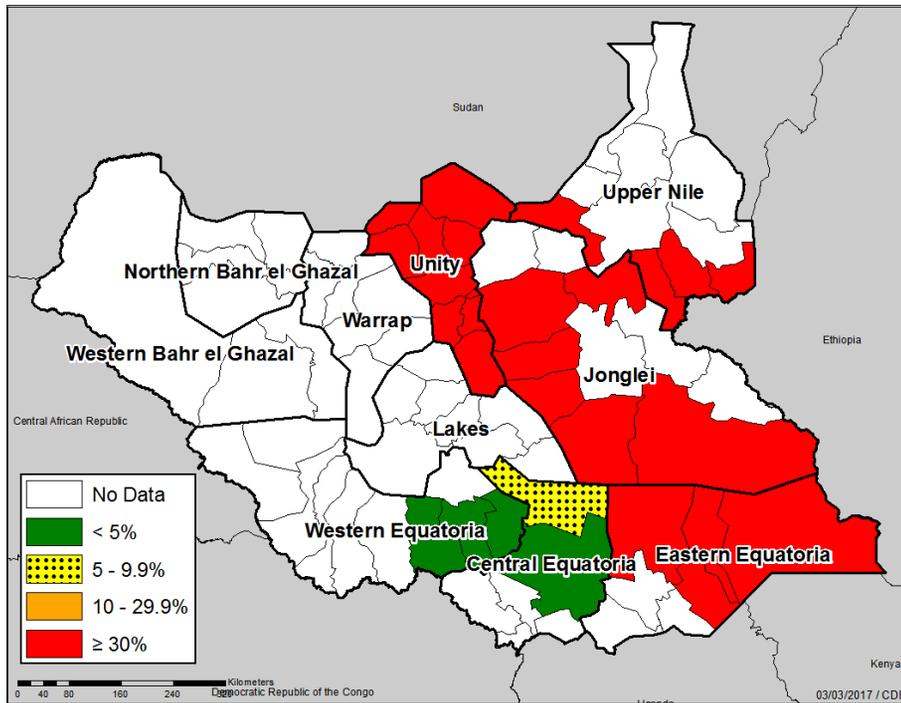


# South Sudan: Surgical Backlog, 2017

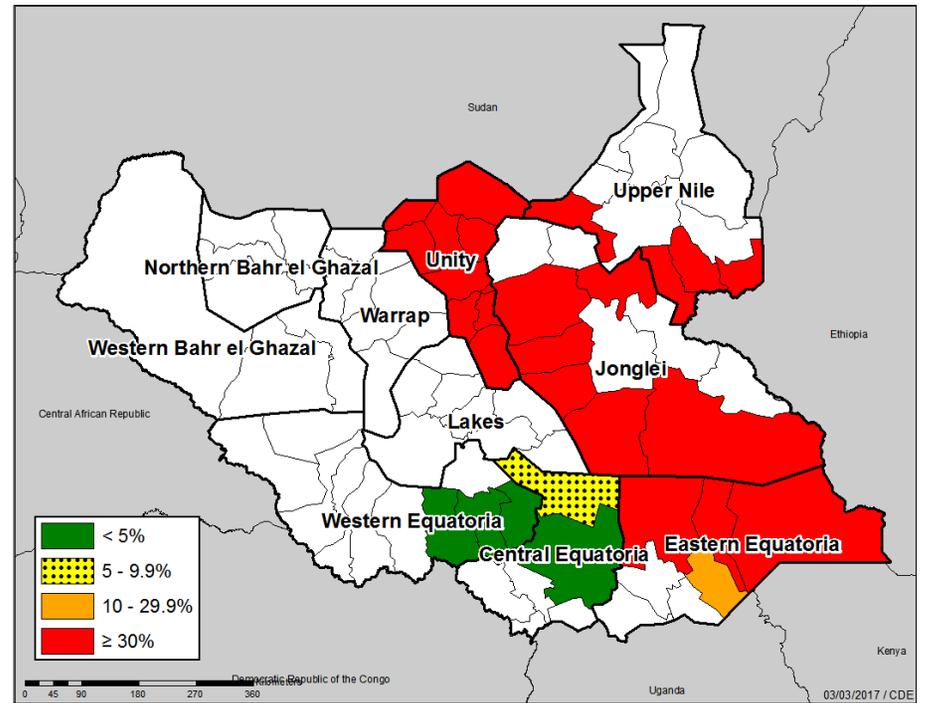


### South Sudan: TF Prevalence among Children 1-9 years

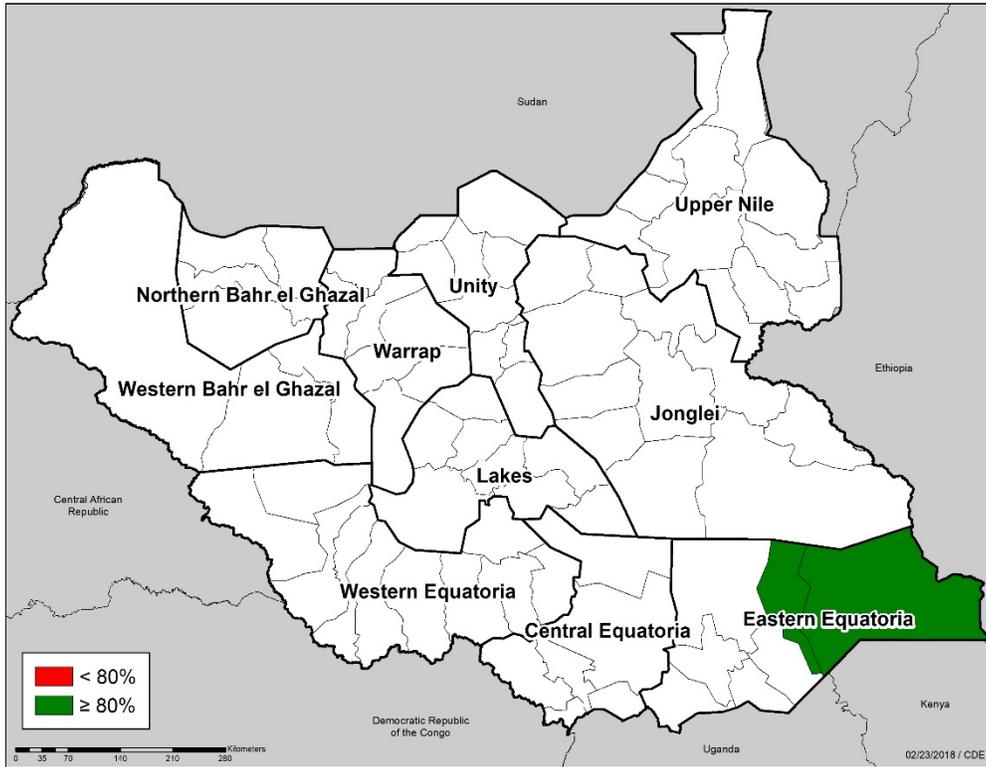
Baseline, 2001-2004



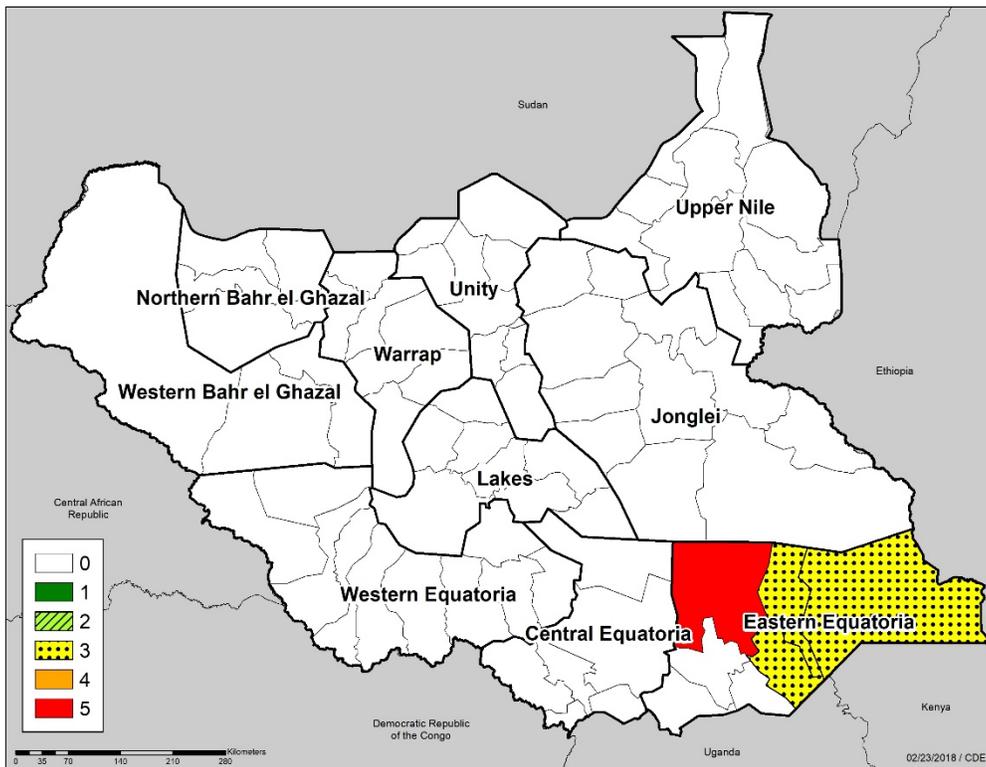
2017



### South Sudan: MDA Coverage, 2017



### South Sudan: MDA Rounds Remaining, 2017



## SAFE in Sudan

*Presented by Dr. Balgesa Elkheir Elshafie, National Coordinator, Trachoma Control Program, Federal Ministry of Health, Sudan*

### Background

The FMOH has been working towards trachoma control since 1962, when trachoma was incorporated into the National Program for the Prevention of Blindness (NPPB). The Academy of Medical Sciences and Technology took over the leadership of the program in the 1990s as contractors on behalf of the FMOH. In 2005, the FMOH relocated the Trachoma Control Program to the NPPB. The elimination of blinding trachoma is one of the FMOH's priorities and government funds are allocated to support the program. In 2012, the government allocated 1.5 million USD for 5 years to help support The Carter Center's partnership for trachoma control. There is a strong coordination mechanism between the government, represented by the FMOH and Federal Ministry of Finance, and implementing partners such as The Carter Center and Sightsavers.

National prevalence mapping began in 2006 and finished in 2010. Mapping was almost completed in Darfur in 2015 through the coordination of the FMOH, GTMP, Sightsavers, and The Carter Center; although about 14 localities remain. S, A, and F interventions are assisted by The Carter Center, Sightsavers, and the FMOH. The E intervention is implemented by various federal and state ministries and supported by UNICEF and other organizations. Though The Carter Center does not directly fund E activities, it supports advocacy for this component.

### Timeline of Events

- 1999: The Carter Center began supporting the trachoma control program
- 2000: Zithromax® donation by Pfizer Inc began
- 2005: National Trachoma Program moved to the FMOH
- 2005-2010: Baseline prevalence surveys conducted (except for Darfur and Khartoum states)
- 2010-2016: Impact surveys conducted in Northern, Blue Nile, White Nile, Red Sea, Sinnar, and Gedarif states
- 2013: Sightsavers begins support of TCP
- 2014: School health curricula and teacher guidelines on trachoma elimination were completed
- 2015: Mapping in Darfur and Khartoum is completed in accessible areas; trachoma curricula teacher's training; TAP workshop held
- 2016: TAP launched; MDA started in Darfur states
- 2017: First surveillance surveys and TT only pilot surveys conducted; F&E workshop completed
- 2020: Target date for elimination of trachoma

Table 1. Program Achievements in 2017

Indicator	Goal	National		Carter Center-Assisted	
		Target	Achieved	Target	Achieved
# of persons operated	42,008	10,000	3,635 (36%)	2,100	891 (42%)
# of women operated			2,181 (60%)		576 (64%)
# of surgeons trained		30	30 (100%)	N/A	N/A
Doses of azithromycin distributed during MDA	2,344,762	2,344,762	1,975,399 (84%)	490,264	856,623 (175%)
Doses of tetracycline distributed during MDA	46,895	46,895	20,928 (44%)	9,805	9,747 (99%)
# of villages with health education		1,651	1,331 (80%)	233	339 (145%)
# of household latrines built		N/A	N/A	N/A	N/A

### Surgery (S)

In 2017, the National Program provided 3,653 TT surgeries, reaching 36% of its annual target of 10,000 TT surgeries. The Carter Center assisted 891 of the total surgeries, achieving 42% of its annual target of 2,100. Of the total surgeries conducted, 60%, or 2,181, were provided to women. The program also trained 30 new TT surgeons, reaching 100% of its target for 2017. As of March 2018, about 34,926 patients remain to be operated in order to clear the TT backlog. At the current pace, the program will require an additional 25 years to clear the estimated backlog.

The program measured TT refusals during surgical camps to better inform the program. Over 20,000 people were screened for TT surgery. Of those screened, 96% were found to not require surgery, while 784 people required TT surgery. For those that required surgery, 83% accepted surgical services, and 17% refused.

A TT case finder strategy was implemented by the National Program in 80 villages in 2017. The case finders were selected from the community and trained by the National Program, using the training curriculum for trichiasis case finders, which was translated into Arabic. Following training, the case finders began working in their communities using a house-to-house approach registering suspected TT cases 2 weeks before surgical camps began. The case finders registered 175 suspected cases, however only 20%, of 35, of cases were found to be TT.

### Antibiotic Therapy (A)

The National Program has reached the TF elimination threshold in many districts since baseline surveys were completed in all areas, except Darfur, in 2007. Recent surveys show a decrease in TF prevalence in several areas. Darfur still requires baseline surveys in some districts to fully understand where SAFE interventions are needed. In 2017, the program conducted a surveillance survey in Al Jabalain in White Nile state. TIS were conducted in 8 localities in Red Sea, Gedarif, Blue Nile, and South Kordofan state. The program also conducted surveys in 2 refugee camps in White Nile state.

MDA activities continued in several areas in 2017. The program distributed 1,975,399 doses of azithromycin and 20,928 doses of TEO through MDA, achieving 84% and 44% of the annual targets. Carter Center-assisted MDA activities exceed the annual target by 75%, with 856,623 doses of azithromycin distributed. MDA coverage was greater than 80%. During MDA, trained volunteers went house-to-house in communities to ensure everyone eligible received antibiotics. The teams also distributed health education materials to

communities during MDA and other SAFE activities. MDA activities continue into 2018. Gedaref state has 1 round of MDA remaining, while North and Central Darfur have 2 rounds remaining.

### **Facial Cleanliness (F) & Environmental Improvement (E)**

The National Program carries out F&E activities during MDA in each district. By integrating these activities, the program reaches more people in the community. In 2017, 1,450 MDA volunteers were trained on F&E messaging and activities were conducted in 329 villages. The messaging focuses on ways to prevent and treat trachoma. Thousands of posters, flip-charts, leaflets, t-shirts, caps, and bags were distributed to communities to promote the MDA and share trachoma messaging. The program also provides pre-recorded messages that are broadcast by local radio stations before and during MDA campaigns. The program reported over 648 messages were broadcast during MDA activities in 2017. In addition to messaging shared, environmental cleaning campaigns were conducted in 20 villages and schools. More than 125 group discussions were conducted in targeted villages during MDA and TT surgical campaigns.

In December 2017, the National Program held an F&E workshop in Khartoum. The goal of the workshop was to develop an F&E situational analysis document for Sudan. Participants included national government departments working in WASH, national and international NGOs, and trachoma state coordinators. Key outcomes from the workshop focus on ways to increase F&E awareness including hand and face washing and latrine utilization, more engagement with women and youth groups, promotion of trachoma curriculum in schools, especially in Darfur, and increased engagement with WASH sectors and WASH NGOs in endemic areas.

The National Program also supports the implementation of trachoma curricula in primary and secondary schools. Teachers receive flip-charts, posters, and “rabbit” books, a health education tool developed specifically for schools in Sudan. The materials help to educate students on how to prevent the spread of trachoma. Students are encouraged to develop Trachoma Friendship Societies in their school to promote health education. Schools are also encouraged to participate in sanitation campaigns in the community. Students are important to behavior change in their schools, as well as their communities and homes, as they share the lessons learned with friends and family members.

### **Programmatic Challenges**

The program continues to face challenges in terms of insecurity in parts of the country, making areas such as Kormouk and Blue Nile inaccessible for any SAFE interventions. Seasonal migration of populations makes it difficult to survey as well as reach people during TT surgery camps. The program has difficulty purchasing TEO as there is a shortage of supplies in the local market. The program also dealt with a delay in the receipt of funds for round 2 of MDA in North and Central Darfur.

### **Status of 2017 Program Review Meeting Recommendations**

**Recommendation 1:** The Sudan Program should aggressively implement activities that were previously planned in the trachoma action plan to clear the TT backlog, using detailed planning and simultaneous activities, by 2020.

**Status:** Considered; activities implemented as planned.

**Recommendation 2:** The Program should identify ways to collaborate with other non-governmental organizations conducting TT surgeries to ensure appropriate reporting and alignment with Federal Ministry of Health recommended practices for conducting TT surgery.

**Status:** Ongoing.

**Recommendation 3:** The Program should ensure the FMOH completes the baseline mapping in Darfur states.

**Status:** The plan is prepared and funding has been secured for mapping in 9 of 14 localities.

**Recommendation 4:** Where TT prevalence data is in question, the Program should conduct TT only surveys as soon as possible to provide updated TT surgical backlog estimates.

**Status:** TT only pilot survey was conducted in 4 localities and data analysis is underway.

**Recommendation 5:** The significant financial contributions of the Sudan FMOH to the trachoma program should be quantified and highlighted as a laudable example of domestic investment.

**Status:** In FY17, the Government of the Republic of Sudan contributed funds that supported 9% of program activities. In addition to financial support, the Government of Sudan provides some logistical assistance, including providing a well-equipped storage area for Zithromax® stocks, at no cost to the program, as well as assisting with customs clearance of antibiotics and other imported items for program intervention activities.

### **Targets for 2018 and Plans to Meet Targets:**

#### *Surgery (S)*

- Operate 7,500 TT patients, 2,100 with Carter Center assistance

#### *Antibiotic Therapy (A)*

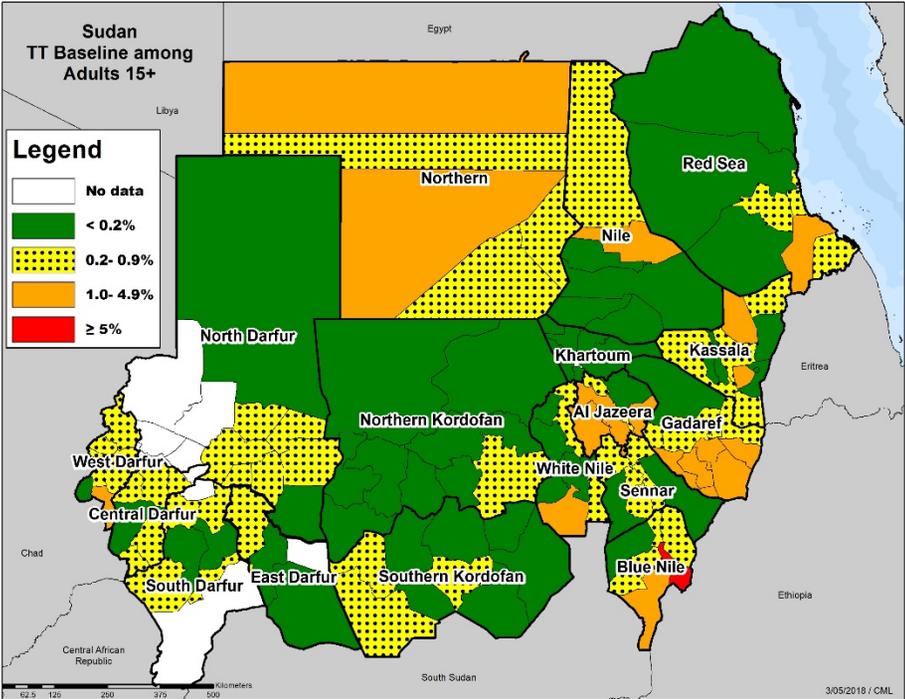
- Distribute 2,277,010 doses of azithromycin, 845,643 with Carter Center assistance
- Distribute 45,540 doses of TEO, 16,913 with Carter Center assistance
- Conduct 9 impact surveys and 5 surveillance surveys

#### *Facial Cleanliness (F) & Environmental Improvement (E)*

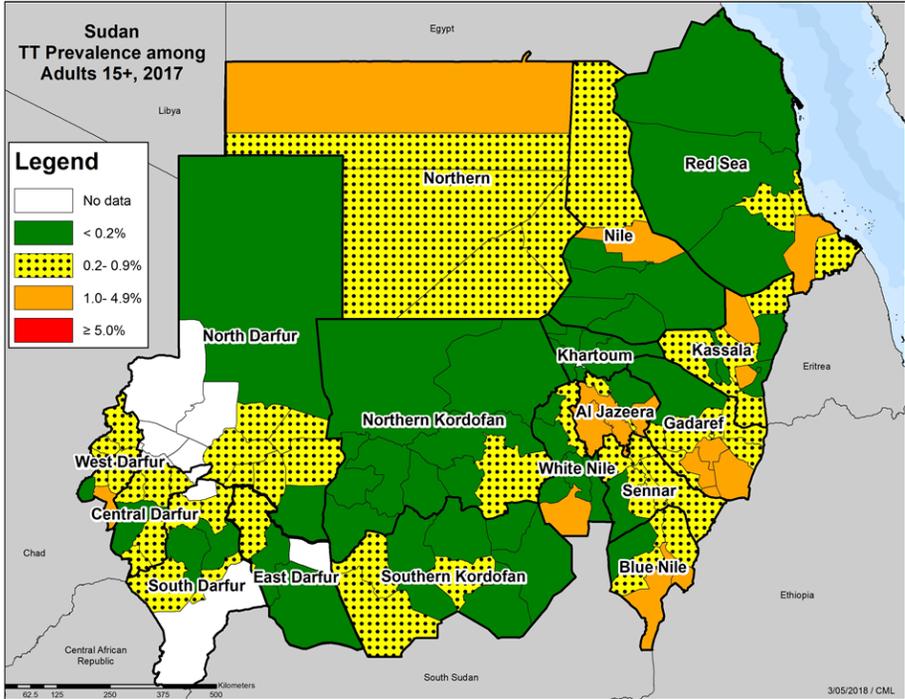
- Conduct health education in 847 villages, 277 with Carter Center assistance

Sudan: Prevalence of TT among Adults ≥ 15 years

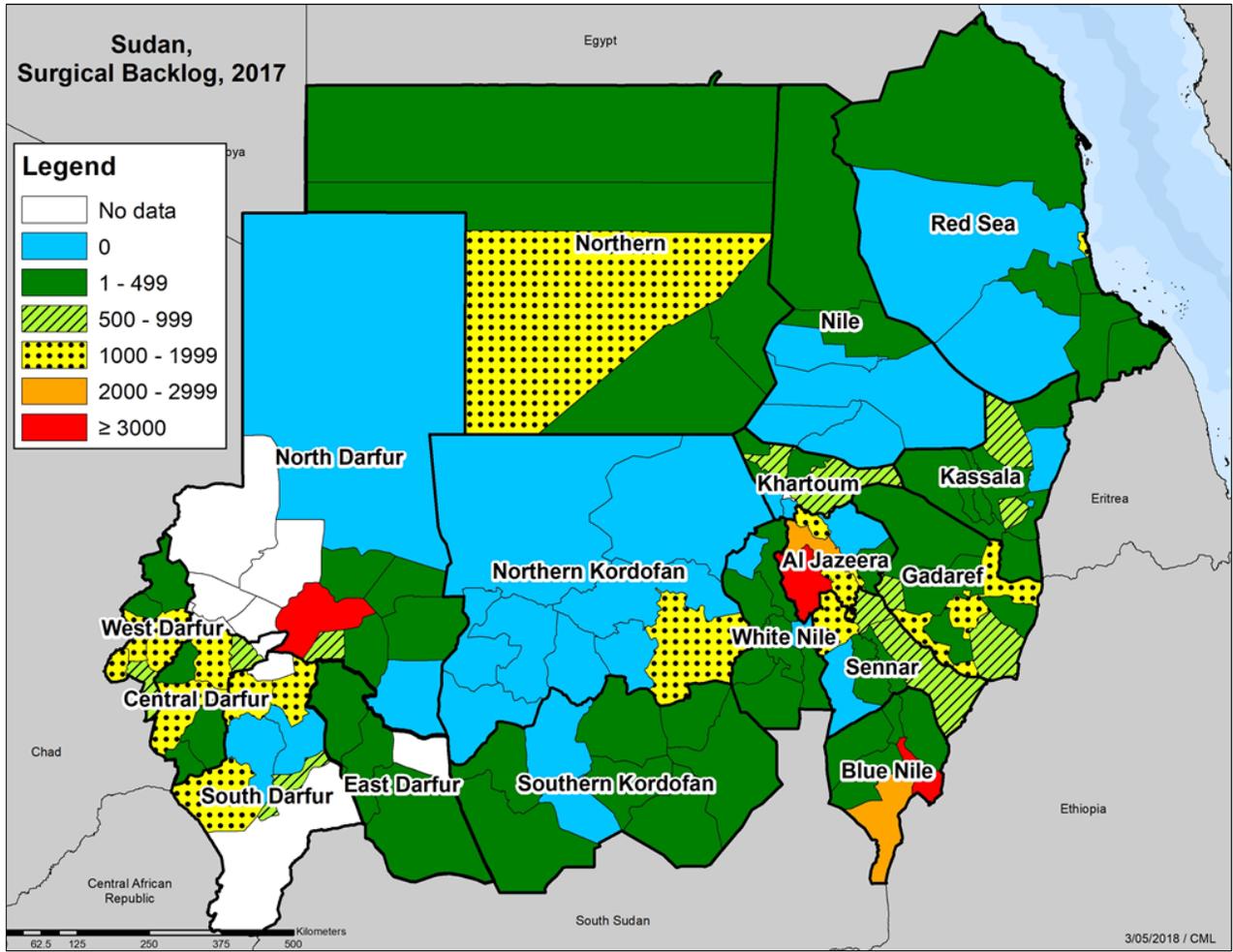
Baseline, 2006-2015



2017

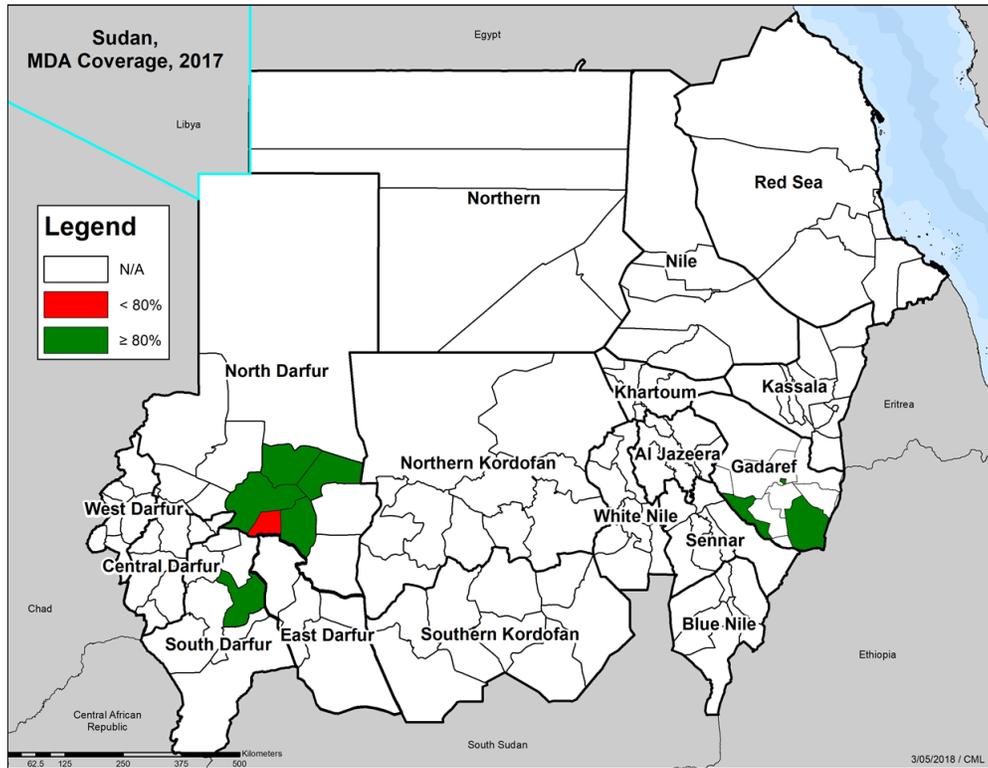


# Sudan: Surgical Backlog, 2017

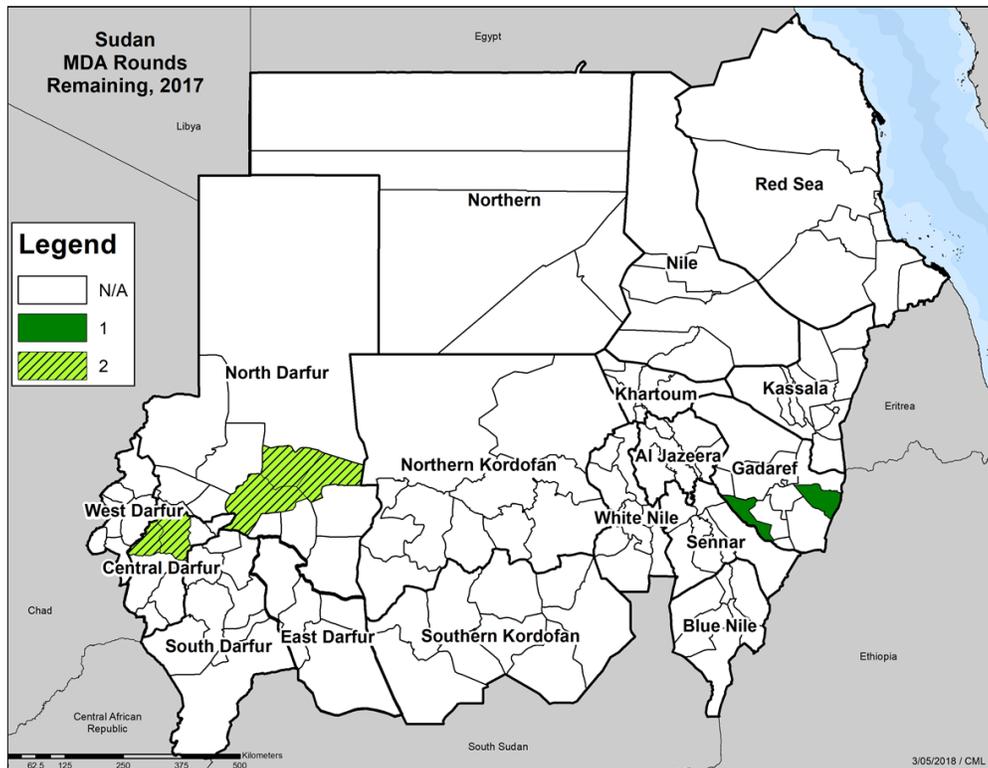




### Sudan: MDA Reported Coverage, 2017



### Sudan: MDA Rounds Remaining, 2017



## SAFE in Uganda

*Presented by Mr. Gilbert Baayenda, Trachoma Program Officer, Ministry of Health, Uganda*

### Background

Eye care is a key component of the Uganda National Minimum Health Care Package. Trachoma is included in the five-year Integrated NTDs Master Plan and is highlighted in the Uganda National Development Plan for the years 2011-2015. Trachoma and 4 other NTDs are earmarked for elimination by 2020 in the Health Sector Strategic and Investment Plan.

Trachoma is known to be endemic in 36 of 112 districts in Uganda. An estimated one million children less than 10 years old have active trachoma and 10.8 million more people of all ages are at risk. Currently, there are approximately 10,000 persons who have become blind due to trachoma. In regard to the implementation of the SAFE strategy, TT surgery is available in the 2 regions of Busoga and Karamoja and antibiotic distributions have been conducted annually in all 36 known endemic districts. The Facial cleanliness and Environmental improvement components of SAFE have not been adequately and uniformly addressed in endemic areas.

Following at least 3 years of MDA, impact assessments have been on-going since 2013 showing drastic reduction in TF in most of the surveyed districts. The NTD program has developed advocacy strategies and tools to support the program. In 2014, The Queen Elizabeth Diamond Jubilee Trust initiated its support for the elimination of trachoma as a public health problem in Uganda, and The Carter Center was selected as the coordinating partner for the five-year funding commitment. In the same year, the MOH launched its TAP. Following the launch of the TAP, the program initiated cross-border meetings in 2015, and received approval to expand the program to implement surgical services in endemic areas that had not yet been reached. The program completed baseline mapping of F&E activities in 2017. The target date for elimination of trachoma as a public health problem is 2020.

### Timeline of Events

2006-2014: Baseline mapping

2007: National Trachoma Control Program began

2007: MDA for trachoma control with Pfizer-donated Zithromax® officially launched

2013: TAP drafted and impact assessments began

2014: The Carter Center becomes coordinating partner for The Queen Elizabeth Diamond Jubilee Trust Trachoma Initiative; TAP launched; Initiation of TT surgeon refresher trainings

2015: Cross-border meetings initiated

2016: Expansion for surgeries in other endemic areas approved

2017: F&E baseline mapping conducted; National Program hosts the East African Annual Trachoma Cross-Border Partnership meeting; trachoma rapid assessments (TRA) in refugee settlements commenced

2020: Target date for the elimination of trachoma

**Table 1. Program Achievements in 2017**

Indicator	Goal	National	
		Target	Achieved
# of persons operated	20,000	2,500	2,112 (84%)
# of women operated			1,617 (76%)
# of surgeons trained		13	12 (92%)
Doses of azithromycin distributed during MDA	555,258	555,258	495,039 (89%)
Doses of TEO distributed during MDA	20,000	20,000	19,721 (98%)
# of villages with health education		23,246	23,246 (100%)
# of household latrines built		N/A	5,234

### **Surgery (S)**

There has been significant progress made in Uganda to reduce the TT prevalence and operate all estimated remaining TT patients. The reduction in TT prevalence is most notable in the Karamoja region in the northeast part of the country. Surgical services were expanded to 17 additional districts. The National Program supported 2,112 surgeries in 2017, achieving 84% of its annual target. Of the total surgeries performed, 1,617, or 76%, were provided to women. In addition to surgeries performed, the program supported training of 12 new TT surgeons to further support TT surgical services. As of March 2018, it is estimated 15,075 patients remain to be operated in order for the backlog to be cleared. At the 2017 pace, it will take 7 years for the program to clear the backlog.

Throughout surgical activities in 2017, the program recorded data on surgical refusals. The program screened 6,887 people for TT and found that 33%, or 2,281, required TT surgery. Of those who required surgery, 2,112, or 93%, accepted surgical services. The program also conducted a surgical audit in June 2017 on 6 supportive supervisor surgeons who had conducted surgeries in the past 3 to 6 months. The audit aimed to have quality assurance of the TT supportive supervisors. Of the surgeons included in the audit, 1 scored less than 10% surgical failure, 3 scored between 10% and 20% surgical failure, and 2 surgeons had greater than 20% surgical failure. It was recommended that those surgeons with greater than 20% surgical failure rate should stop performing TT surgeries and are unable to further supervise.

### **Antibiotic Therapy (A)**

The Karamoja region in the northeast part of the country still has the highest TF prevalence in the country. In 2018, MDA activities are only warranted in 2 districts in Karamoja, with 1 round of MDA remaining. In 2017, MDA was conducted in 4 districts. The National Program distributed 495,039 doses of azithromycin and 19,721 doses of TEO through MDA, reaching 89% and 98% of the annual targets. MDA coverage was over 80% in all districts treated. In addition to MDA, 9 TIS and 16 surveillance surveys were conducted in 2017. The program plans to conduct 2 TIS and 20 surveillance surveys in 2018.

In 2017, the National Program also supported TRA in districts bordering formerly endemic areas and refugee settlements. The TRA conducted in districts formerly bordering endemic areas showed that Arua, Maracha, Hoima, Kayunga, and Serere villages have a proportion of children with TF greater than 5%. Hoima, Kyankwazi, Kayunga, Ngora, and Buikwe villages were found to have TT greater than 1%. Based on the TRA results, it is recommended that baseline surveys be conducted in Arua, Maracha, Hoima, Kyunga, and Serere villages, and surveys be considered for Kyankwazi, Ngora, Buikwe villages.

The TRA results from the refugee settlements found that 4 districts had areas with a proportion of children with TF greater than 5%. Trichiasis cases were widespread across the refugee camps. Based on the TRA results, it was recommended that MDA with azithromycin be considered in all refugee camps in Adjumani, Arua, Moyo, and Yumbe districts and TT surgical services should be introduced in all refugee camps.

### **Facial Cleanliness (F) & Environmental Improvement (E)**

The National Program supports health education activities in communities and schools across the country. In 2017, 12,215 hygiene promoters were trained. The program printed and distributed health education behavior change materials. Additionally, 229 community and sub-county dialogues were conducted, 2,471 radio spots were broadcast, and 99 radio talk shows were held. All activities conducted help to share messaging on ways to prevent and treat trachoma in communities.

F&E activities in schools included the formation and training of 10 Health Clubs and construction of 3 latrines. Schools also perform health dramas to educate surrounding communities about hygiene, sanitation, and trachoma prevention. The new sanitation guidelines for schools is in the final stages of approval, following previous work with support from the National Program to update the guidelines.

The National Program also supported the Music, Dance, Drama, and Poetry Competition for primary schools in 2017. The theme of the competition was “Improve School WASH habits for better health of children to enhance inclusive Quality Learning and Development”. All 7 million students in primary schools across the country were eligible to participate. Ultimately, 44 primary schools were involved in the advanced stages of the competition. Prizes were awarded to the winners.

An F&E baseline survey was conducted in 2017 in 17 districts Karamoja and Busoga regions. Survey teams interviewed households using questionnaires, reaching 1,008 households in Karamoja and 958 households in Busoga. In Karamoja, school questionnaires and observations were completed in 11 schools, which included 588 school children. Indicators were developed, and targets set for the project period to measure future outputs. Impact surveys will be conducted in these same areas in late 2018.

### **Programmatic Challenges**

The National Program dealt with some challenges in 2017. Eight districts are now suspected to be endemic from the TRA, however the districts have not been mapped. The TRA results in refugee camps highlighted that SAFE interventions are needed in the camps, however funding for activities is limited. Additionally, the program will need to “sweep” all districts, using a house-to-house approach to confirm that all TT cases have been identified and offered services.

### **Status of 2017 Program Review Meeting Recommendations**

**Recommendation 1:** The National Program should ensure high MDA coverage (>80%) in the 2 districts to be treated in 2017. The National Program should conduct post-MDA coverage surveys in these 2 districts to validate coverage.

**Status:** Four districts were treated in 2017 all with 85% and above coverage achieved. Validation of coverage is planned for March 2018.

**Recommendation 2:** The Program should identify and strengthen effective efforts to improve data collection and reporting from districts.

**Status:** Two central supervisors (M&E) were added to each district implementation team to ensure better data collection.

**Recommendation 3:** The National Program should conduct TRA as soon as possible in districts bordering previously endemic districts that have never been mapped, particularly in the southwest.

**Status:** TRA completed in 18 districts bordering previously endemic districts.

### **Targets for 2018 and Plans to Meet Targets**

#### *Surgery (S)*

- Operate 7,000 TT patients

#### *Antibiotic Therapy (A)*

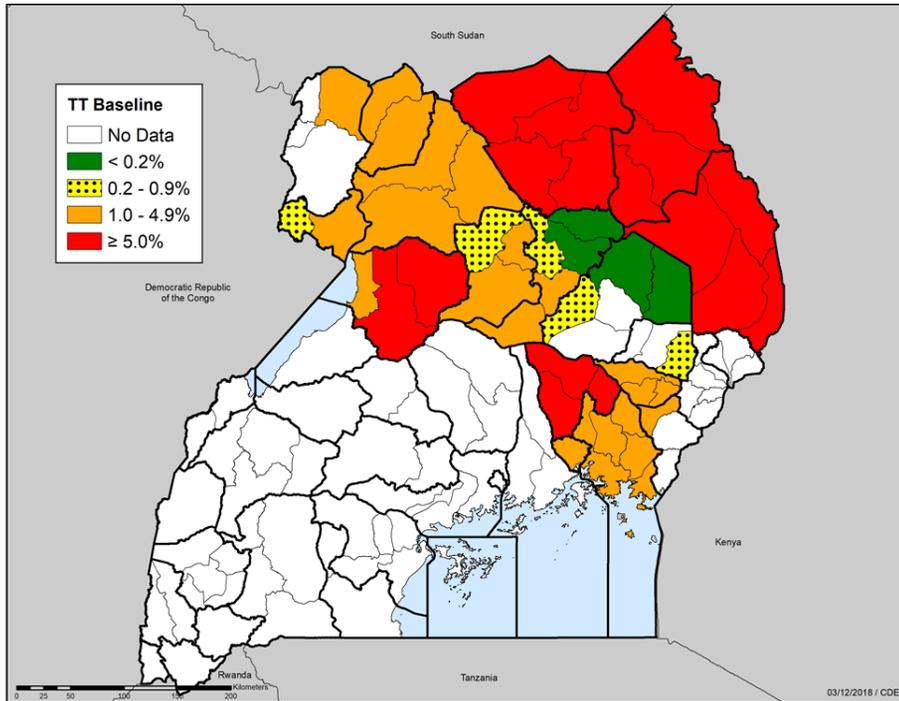
- Distribute 267,516 doses of azithromycin in 2 districts
- Distribute 25,110 doses of TEO

#### *Facial Cleanliness (F) & Environmental Improvement (E)*

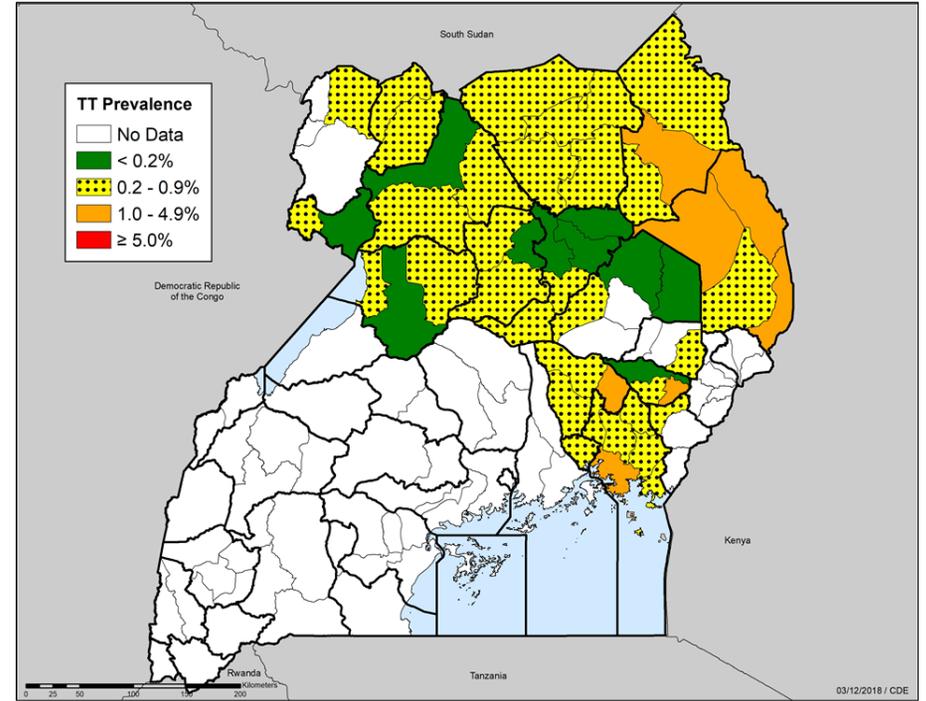
- Conduct health education in 25,000 villages
- Construct 7,165 latrines

# Uganda: Prevalence of TT among Adults ≥ 15 years

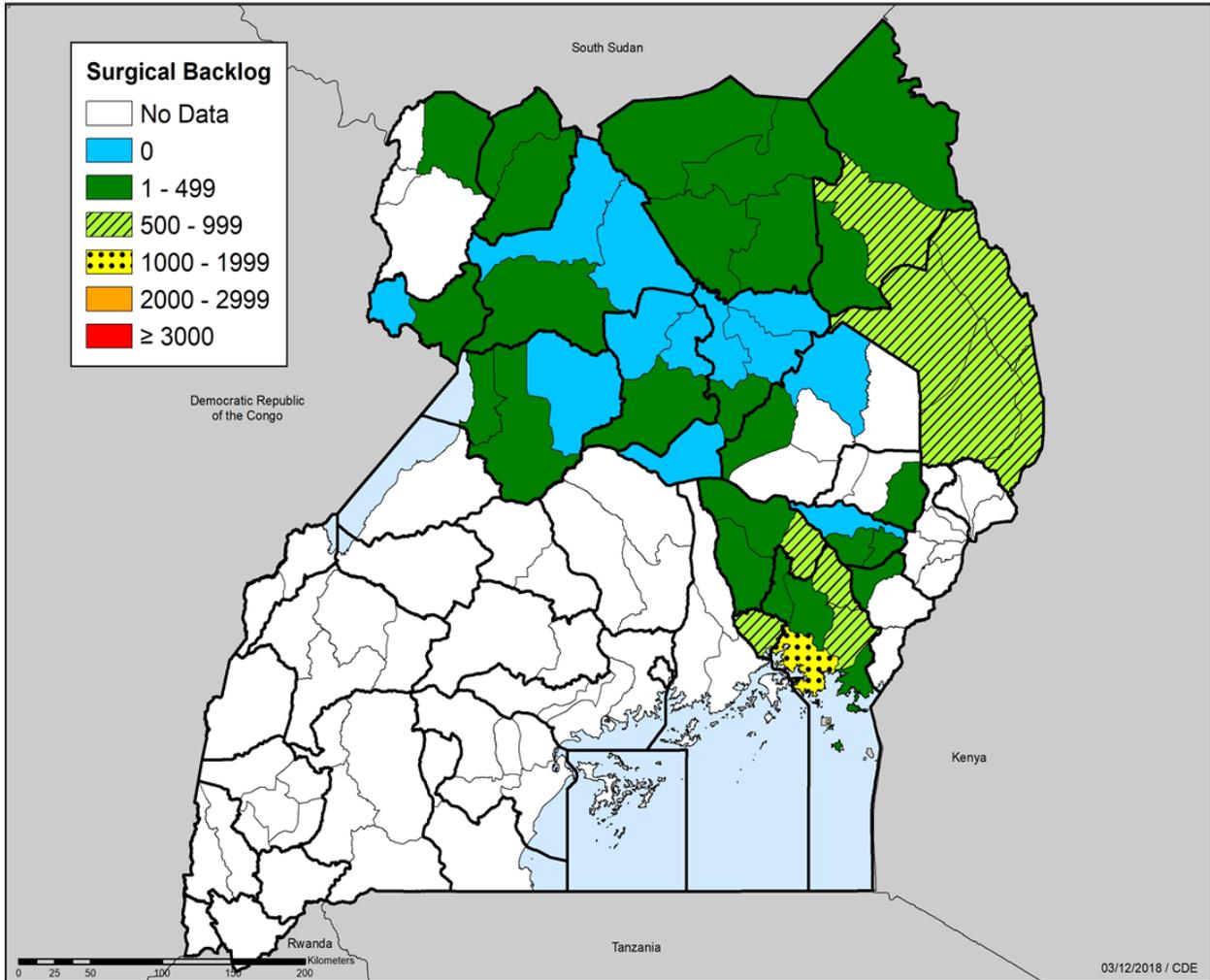
## Baseline, 2006-2012



## 2017

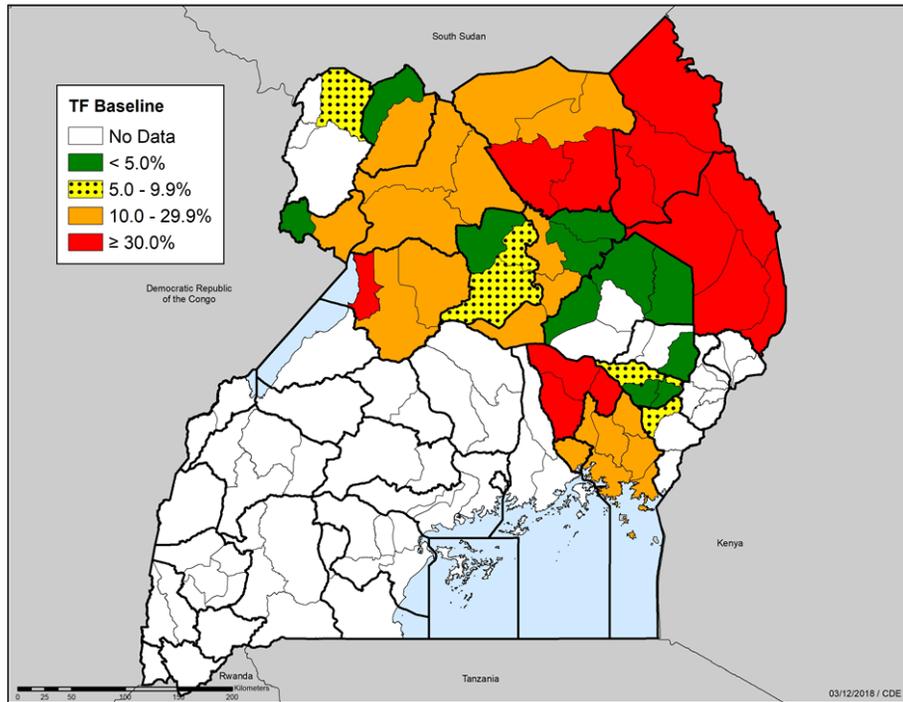


# Uganda: Surgical Backlog, 2017

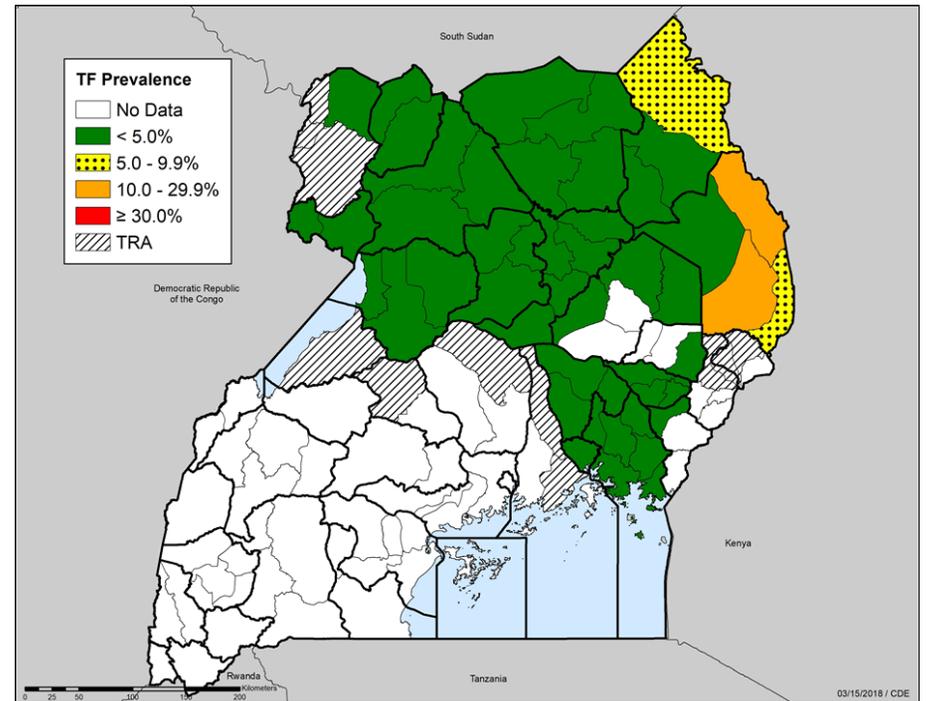


# Uganda: TF Prevalence among Children 1-9 years

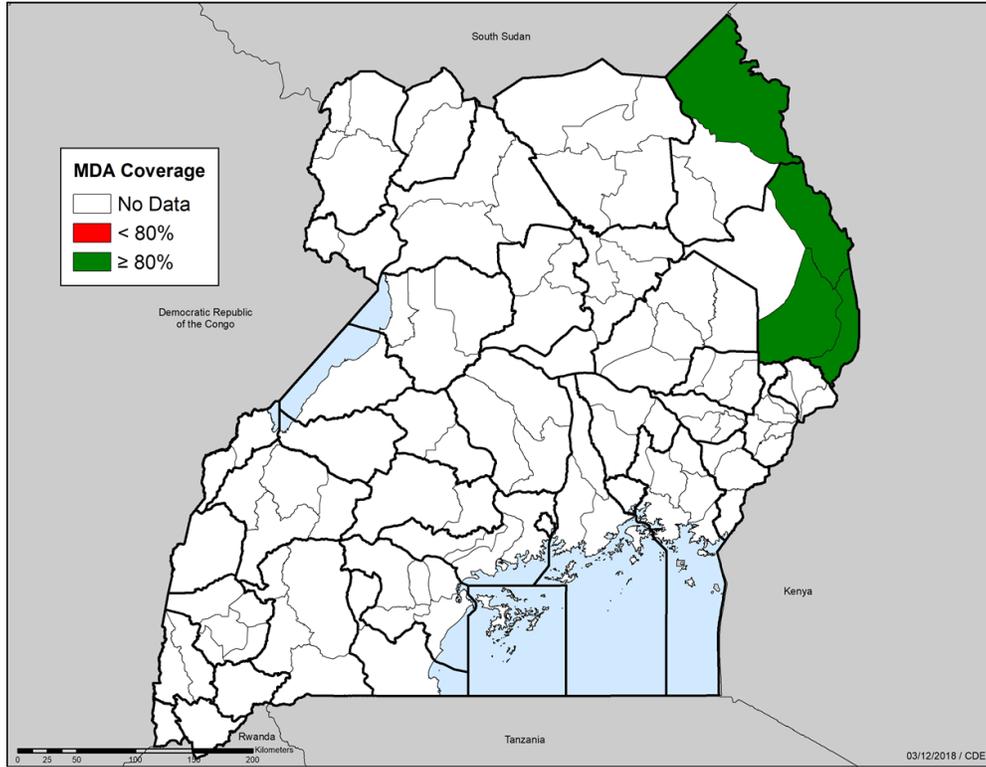
## Baseline, 2006-2012



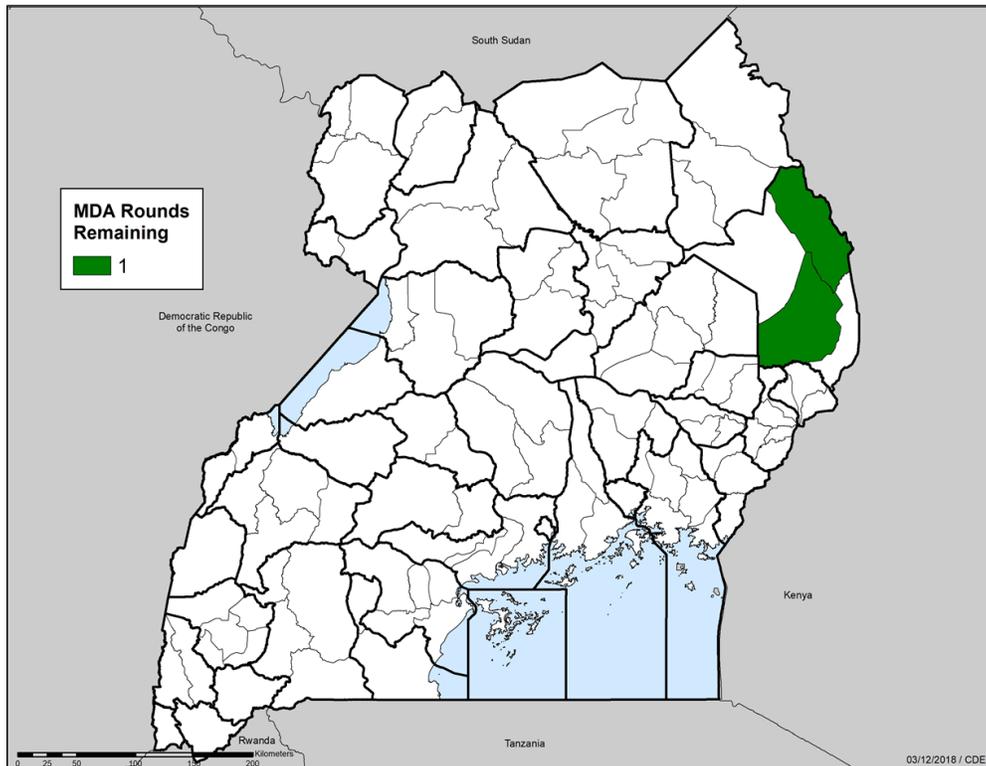
## 2017



### Uganda: MDA Coverage, 2017



### Uganda: MDA Rounds Remaining, 2017



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

*National Data as Reported for 2017 at the Nineteenth Annual Program Review, Atlanta, Georgia, March 19-20, 2018*

	<b>Mali</b>	<b>Niger</b>	<b>Sudan</b>	<b>South Sudan</b>	<b>Ethiopia</b>	<b>Uganda</b>	<b>Total**</b>
<b>Surgery</b>							
Surgeries	1,694	11,478	3,635	0	173,945	2,112	192,864
2017 Target	6,000	18,000	10,000	2,500	287,758	2,500	326,758
Percent Coverage	28.2%	63.8%	36.4%	0.0%	60.4%	84.5%	59.0%
<b>Antibiotics</b>							
<i>Azithromycin</i>							
Doses	N/A	2,151,297	1,975,399	201,701	39,339,311	495,039	<b>44,162,747</b>
2017 Target	N/A	4,854,335	2,344,762	459,249	62,269,910	555,258	<b>70,483,514</b>
Percent Coverage	N/A	N/R	84.2%	43.9%	63.2%	89.2%	<b>62.7%</b>
<i>Tetracycline</i>							
Doses	N/A	N/R	20,928	12,548	1,035,299	19,721	<b>1,088,496</b>
2017 Target	N/A	150,000	46,895	9,372	1,270,814	20,000	<b>1,497,081</b>
Percent Coverage	N/A	N/R	44.6%	133.9%	81.5%	98.6%	<b>72.7%</b>
<b>Facial Cleanliness and Health Education</b>							
Villages with Health Education	299	527	1,331	796	N/R	23,246	<b>26,199</b>
2017 Target	300	527	1,651	776	N/R	23,246	<b>26,500</b>
Percent Coverage	99.7%	100.0%	80.6%	102.6%	N/R	100.0%	<b>98.9%</b>
<b>Environmental Improvements</b>							
Latrines	5,727	13,273	N/A	N/A	N/R	5,234	<b>24,234</b>
2017 Target	7,000	11,000	N/A	N/A	N/R	N/A	<b>18,000</b>
Percent Coverage	81.8%	120.7%	N/A	N/A	N/R	N/A	<b>134.6%</b>

\*Niger doses of azithromycin reported includes TEO doses distributed

N/A=Not Applicable

N/R=Not Reported

\*\*Totals only include countries where data are available.

**Table 2. National Trachoma Control Program Annual Targets 2018 (Carter Center-Assisted Countries)**

*Targets<sup>†</sup> as Presented at the Nineteenth Annual Program Review, Atlanta, Georgia, March 19-20, 2018<sup>§</sup>*

	<b>Mali</b>	<b>Niger</b>	<b>Sudan</b>	<b>South Sudan</b>	<b>Ethiopia</b>	<b>Uganda</b>	<b>Total**</b>
<b>Surgery</b>							
Persons to operate for TT	5,893	15,000	7,500	1,000	217,813	7,000	<b>254,206</b>
<b>Antibiotics</b>							
Doses of azithromycin to distribute during MDA <sup>†</sup>	N/A	1,210,961	2,277,010	279,073	69,717,342	267,516	<b>73,751,902</b>
Doses of TEO to distribute during MDA	N/A	150,000	45,540	15,130	1,411,802	25,110	<b>1,647,582</b>
<b>Facial cleanliness</b>							
Villages to reach through health education	400	600	847	1,000	N/R	25,000	<b>27,847</b>
<b>Environmental improvement</b>							
Household latrines to construct	6,000	10,000	N/A	80	N/R	7,165	<b>23,245</b>

N/A=Not Applicable

N/R=Not Reported

<sup>§</sup>All targets are subject to change.

<sup>†</sup>Antibiotic targets do not reflect ITI-approved allocations of Zithromax<sup>®</sup>

\*\*Totals only include countries where data are available.

**Table 3. Carter Center-Assisted Implementation of SAFE (Carter Center-assisted output)***Summary of Interventions per Country, January - December 2017*

<b>Indicators</b>	<b>Mali</b>	<b>Niger</b>	<b>Sudan</b>	<b>South Sudan</b>	<b>Ethiopia-Amhara*</b>	<b>Total</b>
<b>Surgery</b>						
Persons operated for TT	497	9,987	891	0	91,977	<b>103,352</b>
2017 Target	2,400	11,100	2,100	1,000	110,922	<b>127,522</b>
Percentage	20.7%	90.0%	42.4%	0.0%	82.9%	<b>81.0%</b>
<b>Antibiotics</b>						
Doses of azithromycin distributed	N/A	N/A	856,623	201,701	13,651,377	<b>14,709,701</b>
2017 Target	N/A	N/A	490,264	250,153	15,097,277	<b>15,837,694</b>
Percentage	N/A	N/A	174.7%	80.6%	90.4%	<b>92.9%</b>
<b>Facial cleanliness and health education</b>						
Villages with ongoing health education	199	527	339	796	3,459	<b>5,320</b>
2017 Target	250	527	233	776	3,459	<b>5,245</b>
Percent Coverage	79.6%	100.0%	145.5%	102.6%	100.0%	<b>101.4%</b>
<b>Environmental improvement</b>						
Household latrines constructed	4,729	13,273	N/A	N/A	1,802,962	<b>18,002</b>
2017 Target	5,000	11,000	N/A	N/A	2,612,988	<b>16,000</b>
Percentage	94.6%	120.7%	N/A	N/A	69.0%	<b>112.5%</b>

\*Amhara reported latrine ownership, not latrines constructed in 2017; data not included in Total

N/A=Not Applicable

N/R=Not Reported

**Table 4. Carter Center-Assisted Implementation of SAFE**

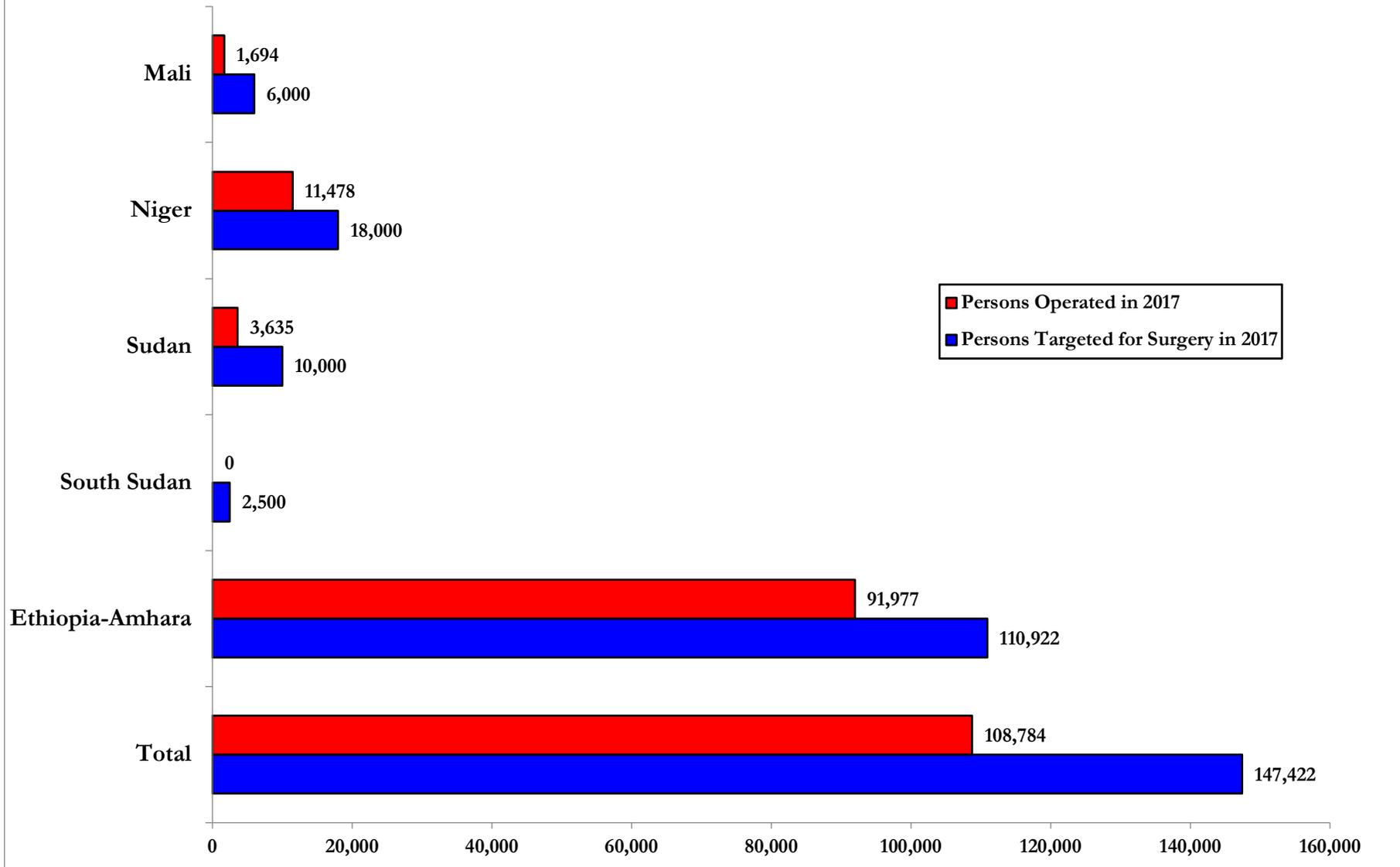
*Cumulative Interventions per Country, 1999-2017*

<b>Indicators</b>	<b>Mali</b>	<b>Niger</b>	<b>Sudan</b>	<b>South Sudan</b>	<b>Ethiopia-Amhara</b>	<b>Total</b>
Persons operated for TT	30,133	74,025	10,912	9,668	659,545	<b>784,283</b>
Doses of azithromycin distributed (MDA)	698,083	3,780,384	7,142,418	3,068,412	156,250,637	<b>170,939,934</b>
Villages with ongoing health education	2,622	1,708	2,899	3,574	3,459	<b>14,262</b>
Household latrines constructed	110,728	126,463	N/A	646	3,336,513	<b>3,574,350</b>

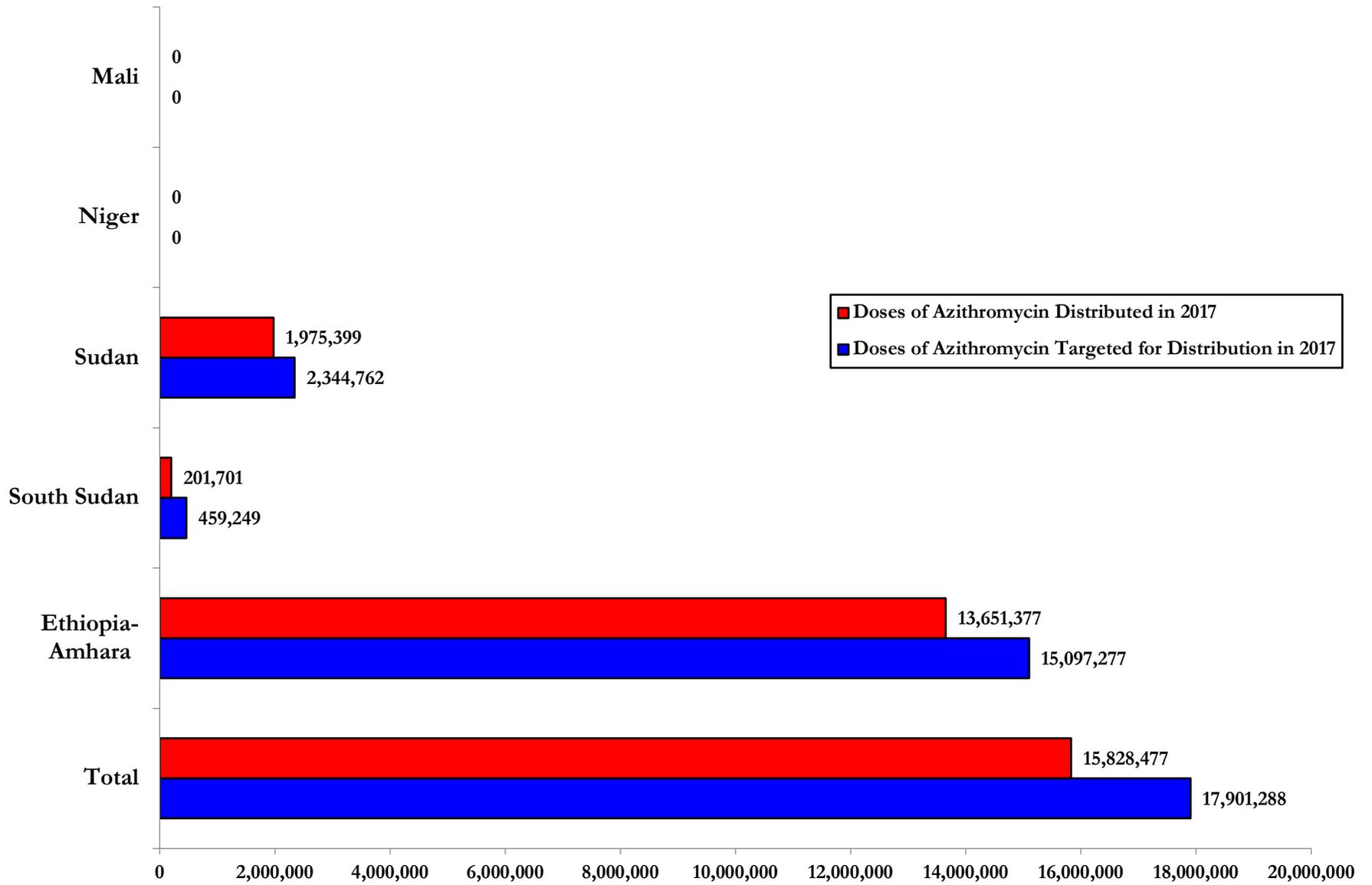
N/A=Not Applicable

**Figure 1. Persons Operated for TT, Carter Center-Assisted Countries**

*National Program data as presented for January - December 2017*

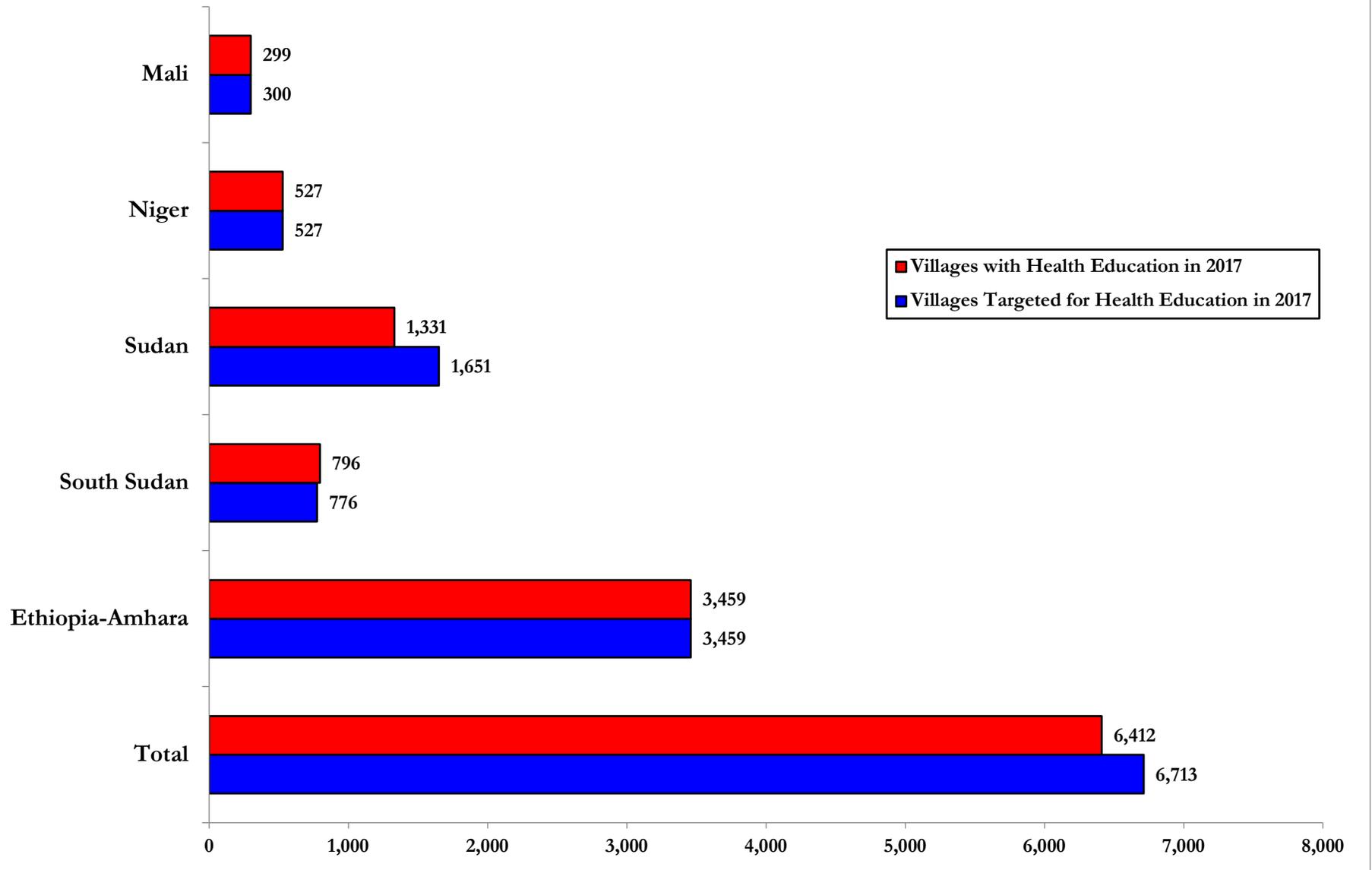


**Figure 2. Azithromycin Distribution, Carter Center-Assisted Countries**  
*National Program data as presented for January - December 2016*



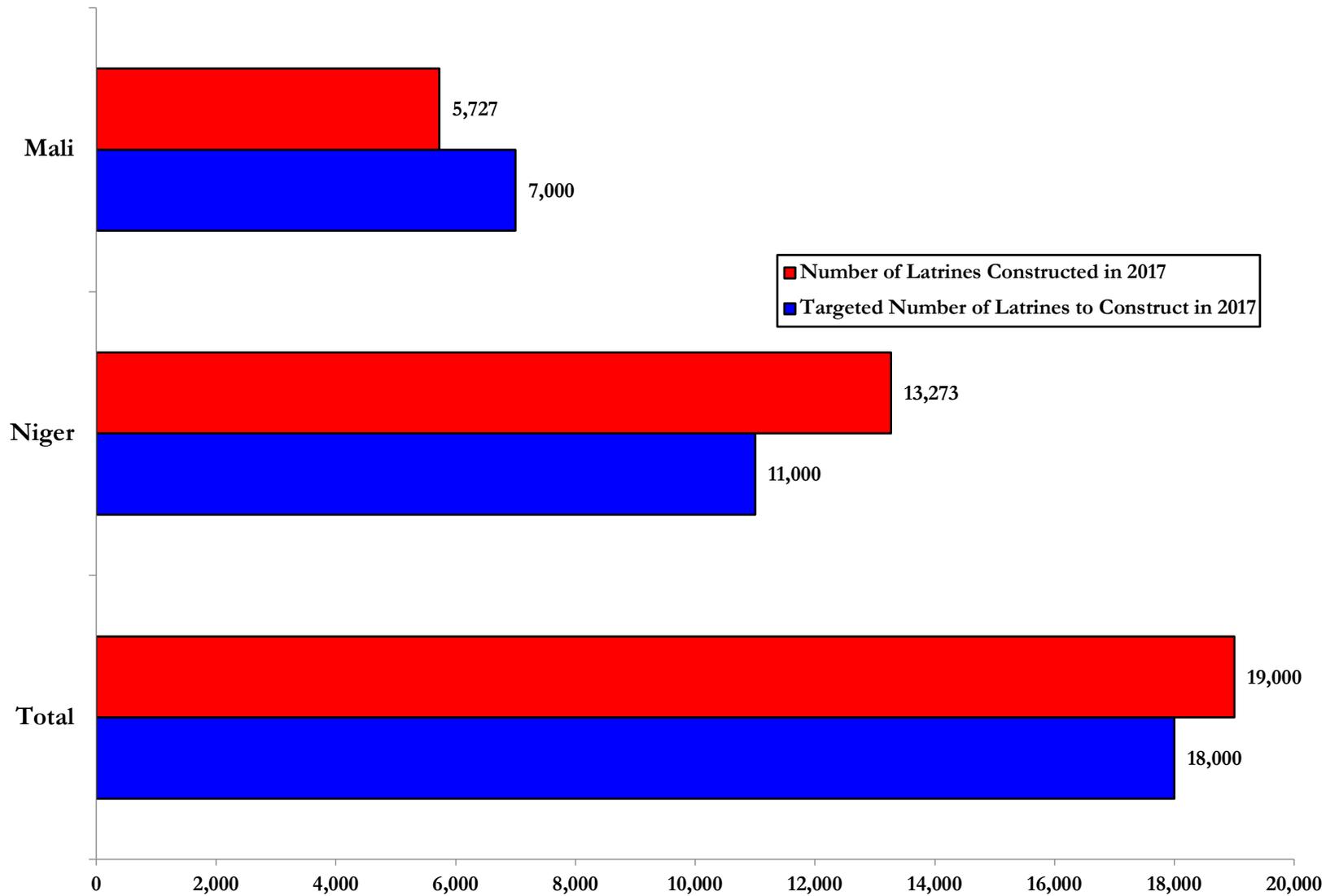
**Figure 3. Health Education, Carter Center-Assisted Countries**

*National Program data as presented for January - December 2017*



**Figure 4. Household Latrines Constructed, Carter Center-Assisted Countries**

*National Program data as presented for January - December 2017*



## Interpreting Coverage Survey Results to Facilitate Decision-Making in NTD Programs

*Presented by Ms. Katie Zoerhoff, Senior Me&E Specialist, NTDs, ENVISION, RTI on behalf of: Kathryn L. Zoerhoff, Pamela S. Mbabazi, Katherine Gass, Brian Fuller, Lynsey Blair, Roland Bongma, Aboulaye Meité, Nebiyu Negussu, Bizuayehu Gasban, Scott D. Nash, Nana-Kwadwo Biritwum, Jean Frantz Lemoine, Ganefa Sitti, Karsor Kollie, Clara Fabienne Rasoamananjana, Lazraus Juzivelo, Square Mkwanda, Pradipt Rimal, Issa Gnanou, Bocar Diop, Ameyo Monique Dorkenoo, Rachel Bronzan, Edridah Muheki Tukabebwa, Fatima Kabole, Violetta Yenstigneyeva, Lauren Courtney, Joseph Koroma, Egide Ndayishimye, Richard Reithinger, Margaret Baker, Fiona Fleming*

### Background

There is frequently a lot of anecdotal concern about the quality of the PCT data that flow through routine pathways. A coverage evaluation survey is a tool that can be used to help address these concerns about reported data quality, by surveying community members to determine whether they were offered and whether they swallowed the medicines, thereby validating (or not) the reported coverage. Coverage surveys can also measure the coverage, overall and disaggregated by gender and age, and the reasons for not participating in the MDA.

### Methods

Across 16 countries, population-based coverage surveys using multi-stage cluster sampling were carried out in order to validate more than 200 reported PC coverage values for lymphatic filariasis (LF; 94 MDAs surveyed), onchocerciasis (3), trachoma (8), schistosomiasis (SCH; 68), and soil transmitted helminthes (STH; 36). Data from these surveys were analyzed with an aim to answer two key questions:

1. What is the best way to interpret data from routine PC reports and surveyed coverage estimates?
2. Are the reported data accurate enough for programmatic decision-making?

Data were included in the analysis if there was less than a 20-percentage point difference between the lower- and upper-bound 95% confidence interval (CI).

### Findings

*Description of Reported and Surveyed Coverage Values.* There was a large range of reported coverage values in the districts surveyed in Africa and the Americas, with a median coverage value of 84% (IQR 73% -94%). On the whole, median surveyed coverage in the districts assessed in Africa and the Americas was very similar to reported coverage, at 83% (IQR 73% -91%). There were a handful of implementation units (IUs) with very low surveyed coverage, less than 50%; of the 8 times this occurred, 6 were in the same country. In the districts assessed in the African and Americas regions, there was both overreporting and underreporting; in fact, most of the time when the reported coverage was low, the surveyed coverage was actually higher. In the IUs surveyed in the Asia region, median reported coverage was similar but a little lower, at 76% (IQR 69%-83%). Surveyed coverage in the IUs assessed in Asia overall was lower than reported coverage (median 62%, IQR 48%-72%), with a district-level comparison showing consistent overreporting across the districts analyzed in this region.

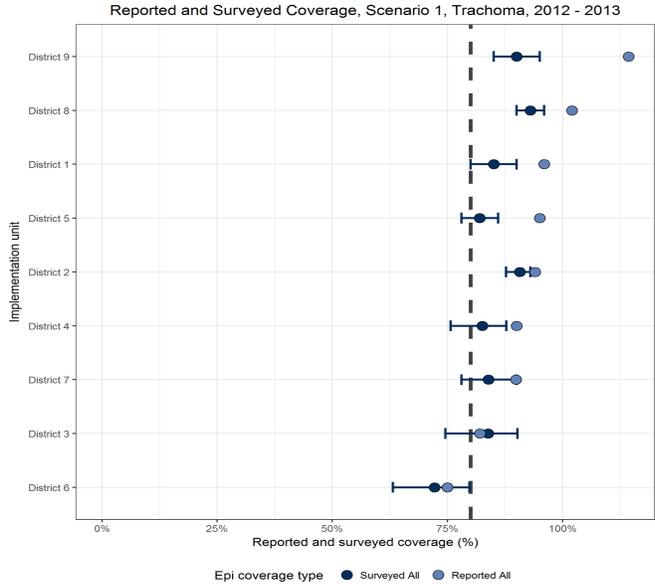
*What is the best way to interpret data from routine PC reports and surveyed coverage estimates?* It is tempting to use a strict definition of “validating reported coverage,” and conclude that reported coverage is accurate only if the value falls within the 95% CI of the surveyed coverage value. However, upon review of the data, it was found that this is too conservative from the perspective of using data for programmatic decision-making. For example,

the reported coverage value may fall outside of the 95% CI, with a difference of 15 percentage points between the reported and surveyed coverage point estimate; however, if both the reported and surveyed coverage values fall above the minimum coverage threshold for the disease (i.e., both values are concordant with respect to the decisions about reaching sufficient coverage), then that reported data value is still good enough to use for decision-making. National program managers should review the reported and surveyed coverage data from various districts, for multiple diseases and over time, to determine whether there is a pattern.

When reviewing data from multiple districts, diseases and years, the study co-authors found that there are three scenarios for reported data accuracy:

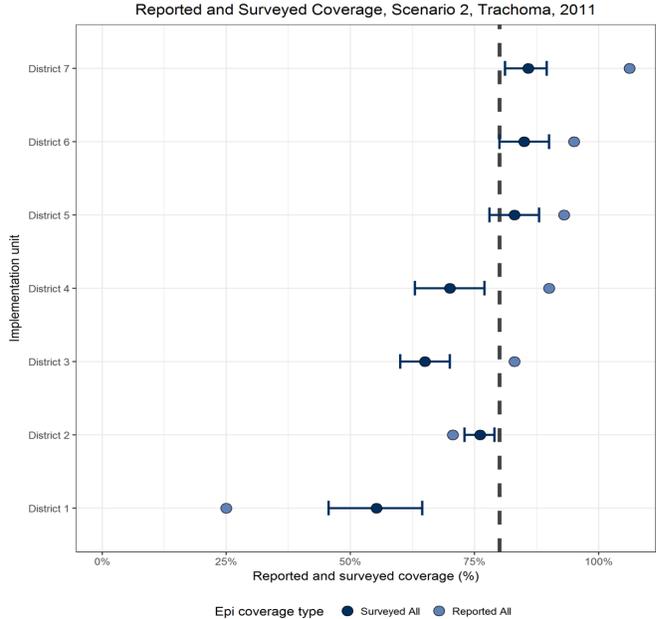
1. **Data are good enough for decision-making and should be used now.** This is the case when there was concordance between the reported and surveyed coverage values, with respect to the minimum coverage threshold for the disease, in the vast majority of the districts surveyed. For example, most of both the reported and surveyed coverage values fall above the minimum coverage threshold, or below the threshold. An example of this scenario can be seen in Figure 1.

**Figure 1.**



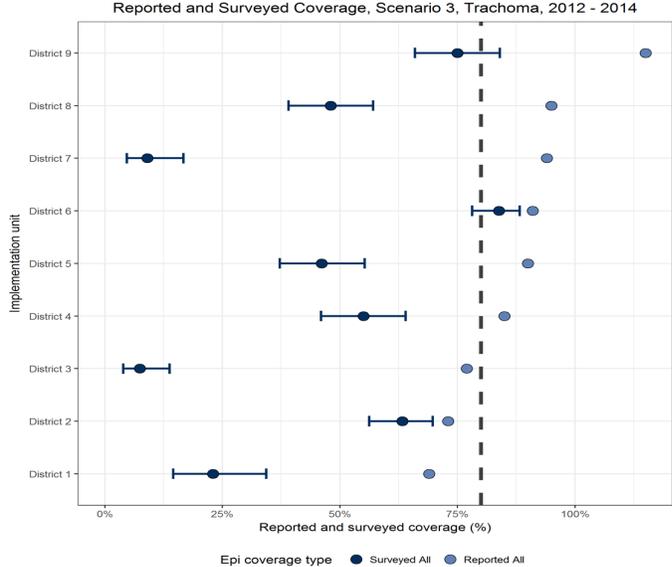
2. **Data are good enough for decision-making and should be used now, but efforts should also be made simultaneously to strengthen the quality of reported data.** In this scenario, while there is concordance with most of the reported and surveyed coverage data, there are some districts where there is a discrepancy between reported and surveyed coverage. An example of this can be seen in Figure 2.

Figure 2.



3. **Data are not good enough to use for decision-making, and efforts should be made immediately to improve the quality of reported data.** In this situation, the reported data are very different from what the survey found in the majority of districts; indeed, the national NTD program would make an incorrect decision in most of the districts based on the reported data. In this case, the national NTD program can't trust that the reported data are accurate, and so should rely more on coverage survey data as opposed to reported coverage to understand what the performance is, at least until the quality of the reported coverage is improved. Figure 3 depicts this scenario.

Figure 3.



*Are the reported data accurate enough for programmatic decision-making?* Based on the co-authors' review of the data, the majority of countries fell into Scenario 1 or 2. This means that most countries data were good enough to use now, with some of them also needing to simultaneously improve the quality of their reported data. However, there were a handful of countries where the reported data were not in concordance with the surveyed coverage value across most of the districts; in these countries, the national NTD program should make strides to strengthen data quality, and implement more frequent coverage surveys until the reported data are found to be more accurate.

## **Conclusions**

In conclusion, the interpretation of coverage survey results should include synthesizing data from multiple districts, diseases and years, and comparing both reported and surveyed coverage data to minimum coverage thresholds to determine concordance. Evidence-based decision-making does not mean making decisions based on perfect evidence, but on the best available evidence. More often than not, national NTD programs can use routinely collected data; it is important that national program managers know the quality of their routinely reported data, and act when it isn't good enough.

## Predictors for MDA Participation

*Presented by Mr. Caleb Ebert, Graduate Student, Rollins School of Public Health, Emory University*

### Background

Trachoma is a painful ocular infection that is the primary infectious cause of blindness. Treatment of trachoma through MDA of antibiotics is one component of the SAFE strategy that has been demonstrated to reduce the reservoir of *C. trachomatis* in a community. MDA programs aim for a minimum of 80% medication coverage. Achieving this high coverage in practice can be difficult in settings like Ethiopia. Reluctant members of the community may undermine the effectiveness of the resource- and labor-intensive MDA campaigns by serving as a source for infection re-entry.

Limited studies from other parts of sub-Saharan African (outside Ethiopia) have quantified factors associated with individuals and households not attending MDA or receiving the medications. To better target MDA-related health messages and design more inclusive campaigns, further research is needed to understand the predictors of MDA participation in this setting. This knowledge will help to improve the success of MDAs and achieve the WHO goal of trachoma elimination as a public health problem.

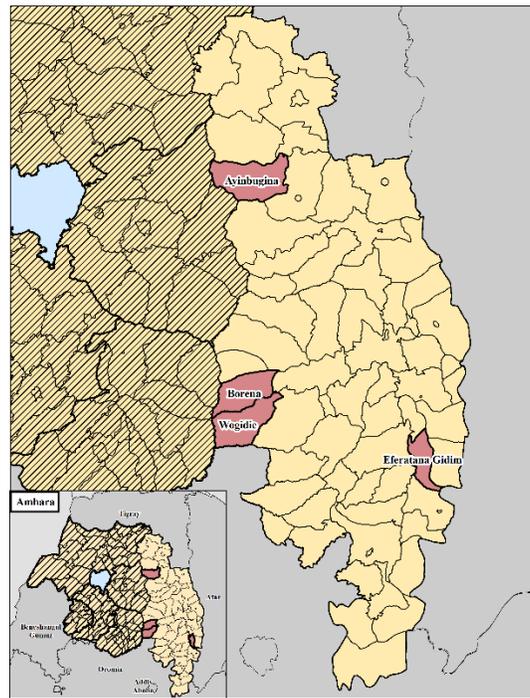
In May 2017, an MDA of azithromycin and tetracycline eye ointment was simultaneously carried out in all eligible districts of East Amhara, Ethiopia over a five-day period. All districts were eligible for the MDA unless the prevalence of TF among children ages 1-9 years was below 5%. A population-based coverage survey was conducted three to five weeks following the MDA to estimate the district prevalence of self-reported MDA coverage. Four districts (Efratana Gidam, Ayinbugina, Borena, and Wogidie) were selected to participate in the survey based on having a continued high TF prevalence level despite repeated years of MDA treatment.

### Methods

Households were selected using multi-stage cluster random sampling design. A total of 25 clusters per district and 15 households per cluster were targeted for the survey. Data were electronically collected and recorded on NEMO, a Carter Center ODK-based survey software. District estimates were weighted based on the inverse of the probability of selection at each level of the survey and confidence intervals were calculated using survey procedures.

Following the calculation of district MDA coverage, random-effects logistic regression modeling was used to identify predictors of MDA participation while adjusting for nesting of individuals within households. Predictors for individual MDA participation at the individual, household, and guardian levels were explored.

**Figure 1. Location of surveyed districts in East Amhara, Ethiopia**



## Results

A total of 6,613 individuals from 1,629 households were enumerated. Over half of the respondents were female (52.5%) and the mean age was 24 years. Children younger than 10 years represented over a quarter (26.3%) of the respondents. The district-level self-reported MDA participation ranged from 78.5% to 86.9%.

Two models were created to identify the factors associated with MDA participation. The first model was inclusive of all study participants ( $n = 6,613$ ) and several positively-associated factors for MDA participation were found: excellent and fair health status (Odds Ratio [OR] = 7.3; 95% CI: 2.6, 20.3; OR = 9.4; 95% CI: 3.1, 28.6), length of household's residency (OR = 2.4; 95% CI: 1.3, 4.2), advanced knowledge of the MDA campaign (OR = 4.3; 95% CI: 2.6, 7.0), and knowledge of trachoma (OR = 1.7; 95% CI: 1.0, 2.7). A second model was run, which excluded heads of household ( $n = 4,969$ ) and included head of household participation in the model. Factors associated with participation were similar to those found in the first model, in addition to the head of household participation (OR = 6.0; 95% CI: 3.9, 9.3).

## Conclusion

These results offer exploratory insight into the factors associated with MDA participation in Amhara, and suggest that heads of households hold a strong influence over their household's participation. To ultimately increase the coverage in Amhara, MDA mobilization strategies – inclusive of comprehensive trachoma and azithromycin messaging and MDA campaign awareness – should target heads of households as well as new residents and those in poorer health and older age.

## **The “F” in SAFE: Why We Measure It and How Reliable Is It**

*Presented by Dr. Sheila West, Vice Chair for Research, Wilmer Eye Institute, Johns Hopkins Hospital*

The reliability trials found good to excellent intra-observer and inter-observer agreement for the assessment of clean faces by trained Tanzania staff who represent a variety of educational backgrounds. As long as training is provided, the estimate of clean faces in children should be reliable, and reflect the effort of families to keep ocular and nasal discharge off the faces. We recommend conducting more interobserver trials in various trachoma settings and that assessing clean faces be added to surveys for trachoma which already measure environmental improvements.

## **Dossier Development: Experiences from the Field**

*Moderated by Ms. Aisha Stewart, Associate Director, The Carter Center*

### *Panel Members:*

*Dr. Agatha Aboe, Global Trachoma Program Advisor, Sightsavers*

*Mr. Aryc Mosher, Senior NTD Technical Advisor, USAID*

*Dr. Jeremiah Ngondi, Regional Technical Advisor, NTDs, RTI*

### **The Trail to Dossier Gold: Getting a head start to documenting elimination efforts Presented by Aryc W. Mosher**

Dossier preparation is an activity that some believe begins shortly after the last endemic districts have demonstrated the breaking of trachoma transmission (e.g., successful passing of trachoma surveillance surveys). However, dossier preparation is actually a process of gathering data, recalling historical context and decision making, assessing for gaps (data, programmatic activities), and writing a country's story of their progress toward elimination. The final goal is to submit a completed dossier for formal review by the World Health Organization and to receive a formal notification that validation has been completed. The entire process can be very time intensive and rather than initiating dossier activities when program activities are wrapping up, national programs should consider a proactive stance and start the process on day one or today, for those already with active programs.

The following are some steps national programs may wish to consider:

1. **Formation of dossier development groups:** National programs might select a small subset of members of the Trachoma Action/Elimination Planning group who will act as principle collaborators with the MOH in pushing forward dossier preparations.
2. **Document progress from the beginning:** Documenting the progress as it happens is easier than trying to recall it 5 or more years later. Capture assumptions made regarding mapping needs (potentially endemic vs not suspected) and any survey methodology, protocols and results.
3. **Establish redundant systems for data storage:** National programs should invest in ways to protect national data from accidental hardware/software failures, lost/stolen/destroyed computer, and purposeful withholding by disgruntled persons.
4. **Early detection of data gaps:** Periodic review of data can help to identify gaps in data (i.e., lost data, incomplete surveys, inconsistent data points). Don't wait until writing the dossier to review data.
5. **When in doubt, consult with WHO Trachoma Focal Person:** The global program for the elimination of trachoma as a public health problem, although 20 years old, is a dynamic effort where today's data and learnings continue to refine the best way forward. On occasion, national programs discover "grey" areas within their programs that aren't clearly addressed by official WHO guidelines or recommendations. National programs are highly encouraged to consult with WHO to get clarity on any issue as the clarification received early on could result in saved time and resources.

The dossier preparation process may not require exhaustive detailing about how the national program will manage the transitioning of activities that will need to be managed post-validation. However, national programs may wish to consider early on how they might best address the following responsibilities as there may be cost implications and planning efforts that require policy and/or budget adoption in the government's fiscal planning.

- 1) Identify cases of on-going incidental TT cases
- 2) Support for a robust TT case referral system
- 3) Ensure strong surgical capacity/supply chain
- 4) Maintain on-going training needs (new/replacement surgeons, retraining)
- 5) Identify type of on-going/periodic surveillance needed to monitor for resurgence.

## **Developing dossiers for validating trachoma elimination: lessons learned from three countries**

### **Presented by Jeremiah Ngondi**

#### **Background**

The World Health Organization advises trachoma endemic countries to prepare a validation dossier documenting implementation of the surgery, antibiotics, facial cleanliness, environmental improvement (SAFE) strategy and achievement of elimination targets. Recently, WHO launched trachoma elimination dossier guidelines alongside data and narrative templates to guide national programs. We present lessons learned in development of trachoma elimination dossiers in three countries supported by the USAID-funded ENVISION project.

#### **Methods**

We reviewed aspects of dossier development including: decisions to start dossier development; process of dossier development; documentation used to complete dossier; completion of the MS Excel data template; and summarized the lessons learned from three countries.

#### **Results**

Decisions to start dossier development varied by country. In two countries, GTMP surveys showed that trachoma was not a public health problem. In the third country, pre-validation surveys had been done in all formerly endemic districts except two. For two countries, the process of dossier development was led by a consultant who supported the Ministries of Health (MOH) to draft the dossier narrative and enter data into the data template. However, in the third country, the process was initiated by the MOH and implementing partners, who completed the data template and drafted the dossier narrative and the consultant provided support to streamline the data and narrative templates. In addition, this third country conducted a half-day meeting with partners to review the dossier standard operating procedures and draft dossier. The range of documentation available to complete the dossier varied by country but generally included reports of documentation of SAFE implementation. The process of data template completion was fairly easy for two countries where GTMP surveys had shown that trachoma was not a public health problem. In the third country the MOH and implementing partners were able to complete the data template since they had systematically documented program activities dating back to its inception in 1996.

#### **Conclusions**

Based on these findings, the dossier templates are easy to complete, especially where data and reports of SAFE implementation are readily available and organized. However, there are concerns that for countries that have had a long history of SAFE implementation where historical data and reports may not be readily available. Overall, it would be best practice for country programs to begin dossier development as early as possible by completing the dossier templates (especially the historical data) and to review and update data templates annually. Aspects of dossier narrative can be completed immediately based on the programmatic reports on surveys, trachomatous trichiasis surgery, MDA and F&E implementation. Ultimately, national

programs should keep the dossier up-to-date so that it is ready for submission to WHO as soon as the last pre-validation surveys are undertaken.

**Financial Disclosures:** This report was developed by RTI international as part of the ENVISION project, led by RTI International with funding from the US Agency for International Development (USAID) under cooperative agreement No. AID-OAA-A-11-00048. For more information, go to [www.NTDenvision.org](http://www.NTDenvision.org).

## **Preparation and Submission of Trachoma Dossier: A case study of the Ghana Trachoma Program Presented by Agatha Aboe**

### **History and timelines of the Ghana National Trachoma Program**

Between 1999 to 2003, baseline epidemiological trachoma prevalence surveys were conducted in all the 18 suspected endemic districts of the Northern and Upper West regions. All 18 districts had various levels of trachoma of public health significance needing interventions with one or more components of the SAFE strategy. About 2.8 million people were estimated to be at risk of trachomatous blindness in Ghana, with an estimated 13,000 people suffering from trichiasis. The program developed various national strategic plans to guide program implementation. The SAFE strategy was implemented over a number of years. Impact surveys were carried out in 2007-2008, revealing that the prevalence of active trachoma (TF) had fallen to less than 5% in all districts in Northern and Upper West Regions but Ghana still had TT cases to be managed to bring the TT prevalence below the elimination threshold. In 2009-2010, with support from WHO and other partners, a surveillance protocol was developed and implemented over a 4-year period. Following the 2015 release of WHO guidelines for pre-validation surveillance, in 2015-2016, the program conducted a series of population-based pre-validation surveillance surveys in districts of the two endemic regions. The results confirmed that the WHO criteria for elimination of trachoma as a public health problem showing TF <5% in children 1-9 years old and TT in adults ≥15 years of less than 0.2% had been achieved in all districts except for Yendi district. In late 2016 and early 2017, an intensive TT case search and provision of surgery campaign was conducted in Yendi district. House-to-house TT case searches were undertaken in all communities of Yendi. Currently, therefore, there are no TT cases unknown to the health system in Yendi District. Further studies conducted using information from the Integrated Disease Surveillance and Response System and the District Health Management Information System in areas thought not to have trachoma confirmed the non-endemicity of trachoma in those areas. It was thus concluded that Ghana has met the criteria for elimination of trachoma as a public health problem and thereby submitted the dossier to WHO for validation in early 2018.

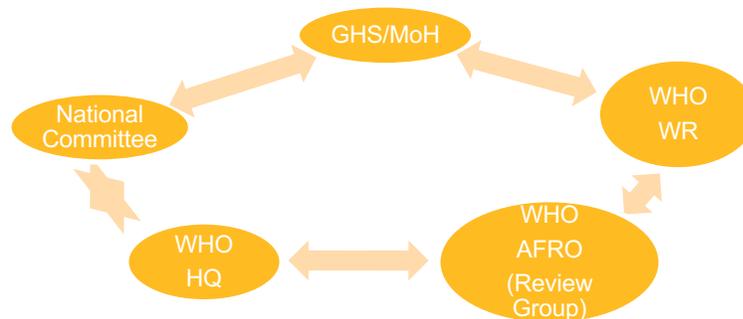
### **SAFE Strategy Implementation Achievements**

- **Surgery:** Over 5,000 people with TT benefitted from the sight-saving lid surgery.
- **Antibiotics:** Over 3.3 million doses of the Pfizer-donated Zithromax® was used to treat about 1.0 million community members.
- **Facial Cleanliness:** Hygiene promotion through electronic and print media as well as direct household and community sessions and school health education activities were conducted.
- **Environmental Improvement:** Over 5,354 safe water sources provided and about 14,000 household latrines were provided.

## Dossier preparation

The Ghana Health Service set up and commissioned a national level committee to oversee the work of the preparation and submission of the dossier. Roles and responsibilities were assigned to various members of the committee. Members helped to gather data and identify gaps. An action plan and budget were developed. Members of the committee working together with two consultants pulled information and data together, shared drafts with each other as well as with key partners for review and inputs. The dossier was then submitted to the WHO Ghana Country Office. The WHO Regional Office for Africa dossier review group which reviewed the Ghana dossier asked for further inputs and clarifications. This was done, and the final dossier was resubmitted and accepted. At the time of writing this summary, WHO has announced the validation of elimination of trachoma as a public health problem in Ghana.

A chart showing the process of dossier submission and validation below:



## Challenges in dossier preparation and some *proposed solutions*

1. Retrieving some old data was difficult and it was not easy to find data stored over a long period. Some key persons had moved on and some old laptops with data had crashed.

*It is very important to start working on the dossier preparation immediately the program has any data and the dossier Excel sheet should be filled as soon as there is data. There may be gaps that may take more time to fill in and country programs should seek for technical direction as and when needed. WHO is willing to provide direction and help in this regard. Programs that have data from GTMP and Tropical Data should use these data. The national program should ensure data is secured in the national database and have multiple storage sources.*

2. Delineation of non-endemic areas could be a challenge if not thought of early and addressed.  
*This should be worked on very early in the program. Funds may be needed to get further data and information to close some gaps in the data.*

3. Leadership and drive is very much needed.

*It must be realized that the process needs a driver. The MOH should be in the driver's seat. However, the MOH may ask a partner or partners to support as needed. Check-in calls and meetings are crucial to keep momentum.*

4. Programs are required to provide a session on post-validation surveillance. A budget may be needed for these activities.

*Programs need clear directions and guidance from WHO. MOH/GHS need to hold a budget line for any eventuality. Partners may need to support when needed.*

5. Budget and funds needed for some unplanned activities.

*Preparing the dossier early will help country programs to plan and budget for activities that would be needed during the surveillance phase as well as the post validation phase*

### **Partners of the Ghana National Trachoma Program**

#### **Surgery and Antibiotics Distribution:**

Ministry of Health/Ghana Health Service; CBM; International Trachoma Initiative/Pfizer Inc; Sightsavers; Operation Eye Sight Universal; RTI/USAID; Swiss Red Cross; World Health Organization (WHO); many others

#### **Facial Cleanliness and Environmental Improvement:**

Community Water & Sanitation Agency (CWSA); Environmental Health Division of the District Assemblies, Ministry of Local Government, Rural Development and Environment (MLGRD&E); Ministry of Education/GES/SHEP; Ministry for Women & Children's Affairs; World Vision, Ghana; WaterAid Ghana; The Carter Center; UNICEF; many others

## The Cost of Trachoma Impact Surveys and Trachoma Surveillance Surveys

*Presented by Mr. Randall Slaven, Senior Associate Director of Development, The Carter Center*

TIS and trachoma surveillance surveys (TSS) provide information to program managers on the impact of the SAFE (surgery, antibiotics, facial cleanliness, and environmental improvement) strategy and current burden of disease, and provide a crucial component of the evidence base necessary for the validation of the elimination of trachoma as a public health problem. The TIS/TSS included in this analysis are multi-level cluster random surveys that provide population-based estimates for program planning. This study conducted an analysis of the cost of eight rounds of TIS/TSS executed in Amhara, Ethiopia, 2013 – 2016, comprising 232,365 people examined over 1,828 clusters in 187 districts.

Cost data were collected retrospectively from accounting and procurement records from the financing organization, The Carter Center, and coded by activity (i.e. training, and field work) and input category (i.e. personnel, transportation, supplies, venue rental, and other). Estimates of staff time were obtained from The Carter Center Ethiopia. Data were analyzed by activity, input category, and location (East or West Amhara). The mean total cost per cluster surveyed was \$752 (standard deviation \$101). Primary drivers of costs were personnel (39.6%) and transportation (49.2%), with costs increasing in the last 3 rounds of TIS/TSS.

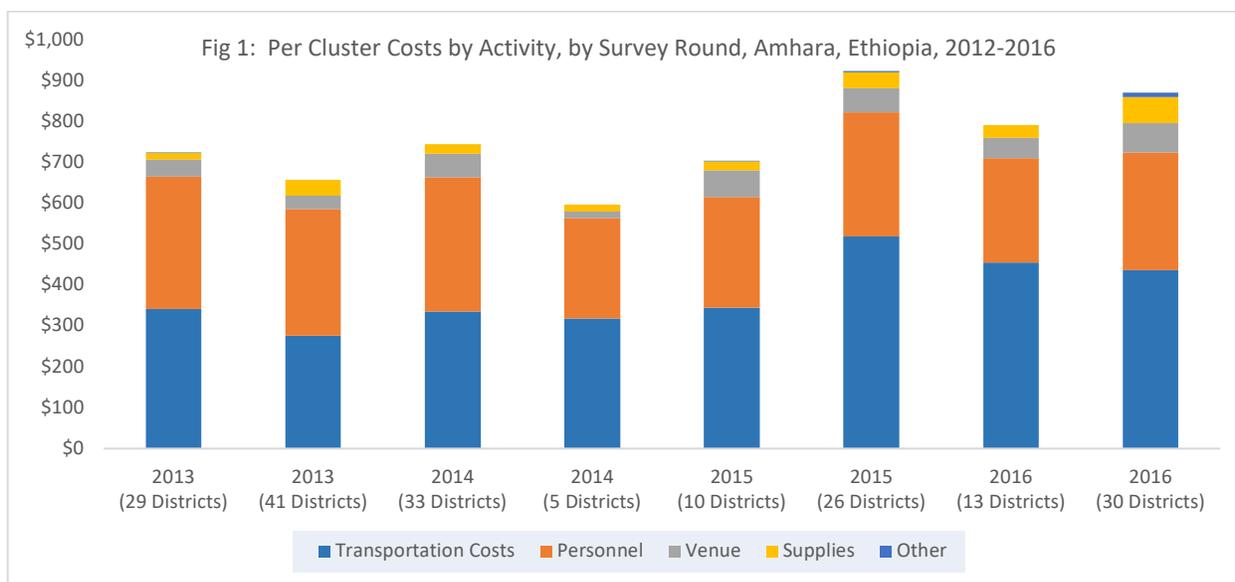
		Activities	
		Training	Field Work
Input Categories	Personnel	Personnel	Personnel
	Transportation	Transportation	Transportation
	Supplies	Supplies	Supplies
	Venue Rental	Other	Other

*Table 1: Activities / Input Categories for TIS/TSS*

Despite their considerable cost, TIS/TSS provide necessary information for program managers. Limited options are available to reduce the costs of TIS/TSS. Surveys must be designed with feasibility in mind, as the need for precision is balanced against the financial and staff resources required to conduct the sight-saving components of the SAFE strategy. Program managers can use these findings to improve estimates of the total cost of a survey and its components to ensure that ample resources are budgeted accordingly.

Mean Total Cost per Cluster	
All 8 TIS Rounds (Jan 2013 – Nov 2016)	\$752 [SD = \$101; median = \$735; IQR = \$670 - \$852]
First 5 TIS Rounds (Jan 2013 – Feb 2015)	\$686 [SD = \$52; median = \$705; IQR \$628 - \$735] *
Last 3 TIS Rounds (Oct 2015 – Nov 2016)	\$863 [SD = \$54; median = \$872; IQR \$792 - \$925] *

Mean Activity Cost per Cluster	
Training	\$103 [SD = \$26; median = \$108; IQR = \$77 - \$123]
Field Work	\$650 [SD = \$92; median = \$623; IQR = \$575 - \$736]



## Determining Characteristics and Perceptions of Patients with Post-operative Trichiasis in Hadiya Zone

*Presented by Dr. Emily Gower, Associate Professor, Department of Epidemiology, UNC Gillings School of Global Public Health*

### Background

The WHO established a goal of eliminating blinding trachoma as a public health problem by the year 2020. One challenge to trachoma elimination is the high rates of post-operative trichiasis (PTT) that occur in some settings. Current WHO guidelines indicate that PTT patients should be treated by the most highly-skilled eye care workers available; however, specifics on who should manage the PTT cases and in what manner is not completely clear. It is believed that poor surgical outcomes affect future surgical uptake and that repeat surgery is less likely to be successful on average than initial surgery. Little systematic information is available regarding the specific characteristics of eyelids with PTT and regarding PTT patient perceptions of their previous trichiasis surgeries and desired PTT management.

Our group is conducting an ongoing study to: 1) characterize eyelids with PTT to determine best practices for PTT management, 2) describe the perceptions of PTT patients regarding their previous trichiasis surgery and how they would like their PTT managed, and 3) develop a PTT image library that would serve as a resource for establishing guidelines for management of PTT. Patients with PTT are being identified during a community-based trichiasis screening program conducted in the Hadiya zone and Yem special *woreda* of SNNPR, Ethiopia. We plan to identify up to 400 adult individuals with post-operative trichiasis. Individuals providing consent complete a structured questionnaire and have an eye examination. The questionnaire collects information on surgical history, feelings regarding prior surgery and results, and opinions on how the participant wants to manage their trichiasis currently. The eye examination specifically focuses on current severity of trichiasis, evidence of prior surgery, and contour abnormalities in the eyelid. Images of each eyelid with PTT are captured using a high-resolution smartphone camera. We will also conduct focus group discussions with a sample of participants to discuss perceptions of past TT surgeries and preferences for future management.

We are currently enrolling participants and collecting data. Of the 184 initial study participants, 82.5% are female and 71.8% are between 40-60 years of age. The most recent TT surgery for a majority of participants was more than three years prior to their involvement in the current study. The primary reason for the prior trichiasis surgery was pain. Most participants reported that vision and pain improved following their first surgery, but that pain was still present. The majority of participants (77%) want additional surgery to manage their current PTT. These data are preliminary and will be updated at the meeting next year. These results should be interpreted with caution because the study only included participants seeking screening or care. Future steps of this study include enrolling additional participants, conducting the focus groups and examining the eyelid images.

## **A Randomized Placebo-Controlled Trial of Doxycycline to Improve Trichiasis Surgery Outcomes; and Ongoing Studies**

*Presented by Dr. Esmael Habtamu Ali, Study Coordinator, London School of Hygiene & Tropical Medicine*

### **Oral doxycycline after surgery for trichomatous trichiasis in Ethiopia: a randomized, double-blind, placebo-controlled trial**

#### **Background**

Trichomatous trichiasis (TT) is treated surgically to prevent sight loss. Unfavorable outcomes after trichiasis surgery are a significant concern for trachoma control programs. These are reported to occur in around a third of cases and include post-operative trichiasis (~20%), eyelid contour abnormalities (ECA, ~10%), and conjunctival granulomas (~5%).<sup>1-5</sup> Based on current surgical activity more than 54,000 operated TT cases develop post-operative trichiasis every year.<sup>6</sup> Progressive conjunctival inflammation and contractile scarring, mediated by matrix metalloproteinase (MMPs) and inflammatory cytokine activity, during early wound healing may lead to postoperative trichiasis and other unfavorable outcomes. To reduce early post-operative TT from contractile scarring it may be beneficial to inhibit MMPs and inflammatory cytokine activity. Doxycycline is a widely available, broad-spectrum, tetracycline-based antibiotic effective against *Ct*, and has anti-inflammatory and anti-MMP properties.<sup>7</sup> In view of the challenge of unfavorable outcomes following TT surgery and doxycycline's anti-MMP and anti-inflammatory properties, we hypothesized that doxycycline might improve outcomes.

#### **Aim**

To determine whether oral doxycycline can reduce post-operative trichiasis and Eyelid Contour Abnormality following TT surgery.

#### **Methods**

A double-masked, individual-randomized, placebo-controlled trial was conducted in Ethiopia. Participants had un-operated upper lid TT with conjunctival scarring with one or more eyelashes touching the eye or evidence of epilation. Participants were randomly allocated to either doxycycline 100mg/day for 28 days or placebo, in a 1:1 ratio, stratified by surgeon immediately after receiving trichiasis surgery following WHO guidelines. The randomization sequences were computer-generated by an independent statistician for each surgeon and were concealed in sealed, opaque envelopes. Participants were examined at 10 days, and 1, 6, and 12 months after surgery by assessors masked to allocation. The primary outcome was the cumulative proportion of individuals who developed post-operative trichiasis by 12 months. Primary analyses were by modified intention-to-treat. The intervention effect was estimated by logistic regression model, controlled for surgeon and preoperative trichiasis severity.

#### **Results**

Presented orally in the review meeting.

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## **Ongoing Studies: a collaboration projects between The Carter Center, Amhara Regional Health Bureau and The London School of Hygiene and Tropical Medicine**

### **Background**

The Carter Center and the Amhara Regional Health Bureau, in collaboration with the London School of Hygiene & Tropical Medicine, planned to conduct the following three observational studies in 2018, which are supported by a grant from DFID through NTD Support Center, a program of The Task Force for Global Health.

The results of these studies would have major implications on the identification and management trichiasis cases and will be fed directly to guide policy and help program planners and funders to secure resources for prompt trachoma control interventions.

### **1) Field testing the use of 3D photographs of trachomatous trichiasis to train trachoma field graders**

#### **Project Description**

Trachoma remains the commonest infectious cause of blindness globally. It is projected that TT will continue to be a significant cause of blindness even if active trachoma is eliminated and detecting these individuals and treating them surgically is a key principle of trachoma control. However, as the number of cases of TT reduces, there will be few patients with un-operated TT who can be called upon to assist in the training and assessment of “trachoma graders”, necessitating alternative methods of training.

A recent trial comparing two alternative trichiasis surgery procedures used two dimensional (2D) clinical photographs to address the presence of trichiasis following surgery.<sup>1</sup> In this trial the photographic grading result was highly concordant with the field grading. However, TT was slightly “over-called” in these photographs compared to the field-grading; this was thought to be due to the two-dimensional nature of the photographs, which can give the impression that lashes over the globe are touching when there is in fact a small gap.

Three-dimensional (3D) photographs may be able to partly overcome this limitation of 2D images by providing an additional perspective on whether the eyelashes close to the eye are touching the eye. We recently conducted a study, in Amhara Region Ethiopia, comparing the field grading to the grading of 2D and 3D photographs of the same eyes, some of which had TT, to assess whether this might be a useful tool in the training and assessment of graders within a trachoma control program. We found that 3D photo grading had a sensitivity of 88% and a specificity of 60%. This was 33.0% more specific than the 2D photo grading ( $p=0.0002$ ), suggesting that using standardized 3D photographs of TT may be a useful tool in training trachoma graders to identify TT.

In this current project, we proposed to use the 3D photographs to train and assess a cohort of trachoma graders. The aim of this study is to evaluate 3D eye images as dual training and testing tool for trachoma field graders in identifying TT.

### **Progress Update**

One of the objectives of this project is to train candidate IECWs or here after Trichiasis Graders (TGs) on how to identify TT using 3D pictures. Thus, 25 Health Officers and Clinical Nurses with no prior training or experience on TT cases identification were recruited from 17 districts of West Gojam zone, Amhara region, and were enrolled in a four-day training on TT case identification using previously collected 3D pictures using a Nikon D90 digital SLR camera with Loreo 3D macro lens. The training was structured based on the Amhara Region IECWs training and was designed to incorporate all the components of candidate IECWs training, except components on trichiasis cases identification on live subjects, and the surgical procedures.

Inter-grader agreement (IGA) assessment was conducted on a set of 3D photographs of 50 eyes with and without trichiasis printed at A4 were provided to the trainees. The trainees were asked to grade the presence or absence of trichiasis, and then to count the number of lashes touching the eye if there is trichiasis based on two primary and up gaze 3D photographs.

After the IGA assessment the trichiasis graders were asked to fill an evaluation form on the 3D training. The evaluation form questions included the ease in using 3D glasses, comparison between the 2D and 3D images, future applications of the 3D based trichiasis graders training, and any suggestions for improvements.

After the completion of the 3D training, the trichiasis graders then were taken to the field to grade 50 live cases with a mix of trichiasis and non-trichiasis cases using 2.5x magnifying loupes and a torch. The trichiasis graders were asked to record presence and absence trichiasis, and count the number of lashes touching the eye, if present for one selected eye.

Similarly, after the trichiasis graders grading of the live cases was completed, 27 experienced IECWs, recruited from 17 districts of Wet Gojam zone, Amhara region were called to grade the same set of 50 live cases. This is mainly to compare the grading success rate of trichiasis graders trained using 3D to the grading success rate of experienced IECWs on the same set of patients.

The data from this study is currently being analysed.

## **2) Long term outcome of the two most commonly used surgical procedures to treat trichomatous trichiasis (TT): PLTR vs BLTR**

### **Project Description**

There is currently no data on the long-term outcome of the two most commonly used surgical procedures to treat trichomatous trichiasis: Posterior Lamellar Tarsal Rotation (PLTR), and Bilamellar Tarsal Rotation (BLTR). About four years ago, one thousand individuals who had upper lid trichomatous trichiasis were enrolled into a trial, and received surgical management either using BLTR or PLTR surgery; while another 200 non-trichiatric controls matched to every 5<sup>th</sup> trichiasis case (enrolled into the trial) were recruited for an impact study.<sup>1-3</sup> There is currently much international interest to see the long-term outcome of the two surgical procedures compared in this trial. Therefore, the participants of the above trial will be followed and re-examined 4 years after enrollment to determine if the results of PLTR and BLTR surgical procedures are different 4 years after surgery and give different results from what has been found at 1 year. In addition, there is no data on the impact of postoperative trichiasis on mental health. We plan to measure this using standard quantitative tools.

The primary outcome is the rate of PTT at four years, while secondary outcomes include rate and regression of eyelid contour abnormality, risk factors for PTT, change in corneal opacity and vision, the impact of postoperative TT on mental health. The mental health status of the trichiasis cases will be assessed using two mental health assessment tools (Patient Health Questionnaire - 9 (PHQ – 9), and Self Reporting Questionnaire (SRQ-20)).

### **Progress Update**

The 4<sup>th</sup> year follow-up for the trial participants started on February 1, 2018. The follow-up activities involved taking informed consent, collecting demographic details, collecting mental health data using standard SRQ-20, and PHQ-9, collecting visual acuity data, and collecting ocular photographs, and clinical data on postoperative trichiasis and eyelid contour abnormality. In addition, the matched controls with every fifth trial participants which were enrolled 4 years ago in the impact study were accessed at their homes and interviewed using the mental health measuring tools. In February, 327 trial participants and 41 matched controls were traced and followed. It is anticipated that this project will be completed by December 2018.

## **3) Observational cohort study of post-epilation lashes in un-operated and postoperative trichiasis cases in Ethiopia**

### **Project Description**

Despite the endorsement of the WHO to use epilation<sup>4</sup>, the repeated plucking of lashes, as an alternative treatment for the management of both un-operated and postoperative minor trichiasis, some trachoma programs have been hesitant in implementation for reasons such as newly growing lashes after epilation may be more “stiff” and damaging to the cornea than the original trichiatric lashes, and that epilation could promote the re-growing of larger numbers of TT lashes. In addition, there is a thought that offering epilation as second line treatment to surgery would hamper surgical acceptance, as individuals may tend to choose the less invasive and painful epilation over surgery. However, there is no evidence either to support or challenge these assumptions. Furthermore, the role of epilation in treating minor postoperative trichiasis cases, and the impact of epilation on quality of life (QoL) has never been studied before. The need to use epilation as an alternative trichiasis treatment strategy to surgery is growing in relation to the anticipated decline in the

backlog of major trichomatous trichiasis; and increasing backlog of postoperative TT cases as the result of high volume surgery.

There is no clear strategy on how to manage cases with few postoperative lashes who would not need repeat surgical management or are likely to decline repeat surgery. The current practice is usually to repeat the same operation, which failed to fully correct the TT on the first occasion. There is some evidence that repeating the same surgery leads to more unfavorable outcomes than the initial surgery.<sup>4</sup> Postoperative TT tends to be mild; and so, can probably be safely managed with epilation.

The aim of this prospective observational cohort study is to investigate the nature (quality and quantity) of post epilation lashes and their visual significance; and the role of epilation in treating cases with few postoperative trichiasis lashes. About (1) 170 people with un-operated minor trichiasis (<6 lashes touching the eye) who have declined surgery and routinely practice epilation and (2) 170 people with minor postoperative trichiasis lashes will be enrolled. They will be examined every month for six months. The quality and quantity of post epilation lashes will be documented and photographed at each follow-up time points. Data on QoL will be collected. We anticipate the result of this study would provide a concrete answer to the uncertainties raised by program managers and community members.

### **Progress Update**

Study participant enrollment for this study has been completed within a month period, between February 7 and March 5, 2018. The one-month follow-up of these study participants has started on March 12, 2018. It is anticipated that this project will be completed by December 2018.

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## WASH Working Group Update

*Presented by Ms. Angelia Sanders, Associate Director, Trachoma Control Program, The Carter Center - on behalf of the WASH Working Group*

The Neglected Tropical Disease NGDO Network (NNN) was established in October 2009 to create a global forum for NGDOs working to control onchocerciasis, lymphatic filariasis, schistosomiasis, soil transmitted helminths, trachoma, leprosy and podoconiosis. NNN is governed by an Executive Committee, comprised of representation of various NGDO disease-specific groups and cross-cutting working groups that enable the network to successfully meet its objectives. Membership is open to any NGDO or academic institution that is engaged in NTDs. ICTC was established independently of the NNN but acts as the representative voice of the trachoma NGDO community within the NNN. Cross cutting groups focus on common concerns among the NTD community. The WASH Working Group (WG) is one of these cross-cutting working groups. The WASH WG currently has three task teams: (1) Communications, (2) Joint Indicators and (3) WASH/ NTDs Toolkit.

Task Team One is currently compiling WASH/ NTD resources for wider circulation, including French resource translations where necessary. They are creating a one-pager about WASH WG achievements and plans, and are continuing to collect case studies from countries and NGOs on work that has been conducted which focuses on WASH and NTDs. It is important for partners and ministries to document their work and share lessons learned. Case studies can be sent to [bruck@nalafoundation.org](mailto:bruck@nalafoundation.org).

Task Team Two has been working to create an agreed set of indicators that can be used by the WASH and NTD sectors to streamline reporting processes and monitoring and evaluation. A Delphi consultation was conducted from April 2015 to June 2016. Participating WASH and NTDs experts represented a diversity of interest groups, including NTD and WASH field staff and government stakeholders from endemic countries, bilateral and multilateral development agencies, non-governmental development organizations, and academic institutions. Seven core measurable indicators emerged as priorities for inclusion in joint monitoring for the NTD sector. This Task Team is currently working on updating the disease specific WASH and NTD indicators and have engaged relevant experts within each disease.

Task Team Three is creating a WASH and NTDs Planning Toolkit in partnership with WHO, which will be published as a WHO resource targeted primarily at NTD program managers seeking to develop cross-sectoral partnerships for NTD control and elimination. The Toolkit will provide a clear rationale for collaboration between sectors and is built on the NTD Roadmap and WASH/NTD Strategy, F&E Toolkit, the experience of funded programs, and the BEST framework (Behavior, Environment, Social inclusion, Treatment and care). Its purpose is to support stakeholders working to tackle NTDs through a comprehensive, inter-sectoral approach, to:

- Build multi-sectoral partnerships with key stakeholders: ministries, national and local WASH agencies, corporates, local health groups, behaviour change and communication experts, etc.
- Shape smart program structures focused on accountability and shared goals
- Build an adaptive and flexible approach to programming
- Ensure sustainability by building local capacity at every level
- Support and complement clinical and public health interventions for NTD control

The Toolkit will contain an overarching narrative and over 20 tools. The draft is nearly finalized and its materials will be tested through existing programs and initiatives before publication (in print and as an online interactive resource) at the end of 2018.

## WASH Upgrades for Health in Amhara (WUHA) Update

Presented by Ms. Dionna Fry, Study Coordinator, University of California at San Francisco Francis I. Proctor Foundation

**General study design.** WUHA (WASH Upgrades for Health in Amhara) is an ongoing cluster-randomized trial designed to determine the effectiveness of a comprehensive WASH package for ocular chlamydia infection. WUHA is one of the two trials that comprise the Sanitation, Water, and Instruction in Face-Washing for Trachoma (SWIFT) study, which is sponsored by the National Eye Institute (grant number U10EY023939, PI Keenan). Forty WUHA communities, which had received 8 rounds of mass azithromycin distributions before the study started, were randomized in a 1:1 ratio to the WASH arm or a control arm. The WASH package includes a community water point, community-based hygiene promotion workers, household wash stations, household WASH education books, household soap distribution, and a hygiene curriculum for primary schools. Annual monitoring visits are conducted in each community, with the final 3-year study visit scheduled for February 2019. The primary outcome is ocular chlamydia infection among 0-5 year-old children at months 12, 24, and 36. A secondary outcome is the load of ocular chlamydia among infected children, assessed at the same time points. We aim to determine the efficacy of non-antibiotic measures for trachoma control, and we hypothesize the prevalence of ocular chlamydia will be lower in clusters randomized to a WASH package compared to clusters not receiving this intervention.

**Study area.** WUHA is being conducted in three woredas of the WagHimra zone of Amhara, Ethiopia: Gazgibella, Sekota, and Sekota Town.

**Sampling units.** The primary school district is the randomization unit for this trial. We chose the school district because school-aged children in Ethiopia have a considerable burden of trachoma, so units smaller than a school could be subject to contamination. We also wished to incorporate school-based hygiene promotion in the intervention, which requires a randomization unit of school district or larger. Within each school district, collaborators from Catholic Relief Services (CRS) identified the best site for water point development via geohydrologic survey in the spring of 2015, and the cluster of households within 1.5km of this potential water point was designated to receive the full package of WASH interventions as well as annual monitoring visits for trachoma. We call the households within the 1.5km-radius circle a *study cluster*.

**Census.** We performed a house-to-house census of the study area in December 2015, approximately one month before the baseline exams (Table 1). We hired local workers to perform the census and performed all data collection using a custom-built mobile application. Census workers recorded the name, sex, and age of each household member, the primary school(s) that any children attend, and the GPS coordinates of the house. In a random one-third of households, workers performed a household survey to gauge self-reported socioeconomic status, access to water, and hygiene behaviors, and also perform observations of household latrines and wash stations. Data was uploaded to a secure server on Salesforce, where it was monitored on customizable dashboards. Census updates have been performed annually since the initial census.

**Table 1.** Baseline census characteristics, WUHA.

Characteristic	Median (Interquartile range)	
	WASH N=20	Control N=20
Households	79 (54-119)	88 (68-133)
Individuals		
0-5y	59 (41-80)	68 (51-84)
6-9y	44 (26-58)	52 (34-69)
≥10y	229 (150-282)	276 (210-407)

**Randomization.** We randomized communities to the WASH arm or control arm after the baseline examinations in order to limit the possibility of differential outcome assessment at the baseline visit.

**Mass azithromycin distribution during WUHA I.** The WagHemra zone received 8 annual rounds of mass azithromycin before the start of the trial, with the most recent treatment 6 months before the baseline visit. No mass azithromycin distributions were planned during WUHA I. The rationale for this design decision was that concurrent mass azithromycin distributions would likely have overpowered any effect of WASH, making it impossible to determine a difference between the two treatment arms.

**WASH Interventions.** A comprehensive WASH package was rolled out over the first year of the study. The Carter Center Ethiopia was the principal implementing partner. The interventions were informed by focus group discussions held in the study area as well as nearby areas. A hygiene cluster coordinator is responsible for ensuring the fidelity of the intervention. Each element of the package is described below:

## **WATER**

- **Community water point.** CRS performed a geohydrologic survey and coordinated water point construction in each of the 20 WASH communities with the help of the local Ethiopian nongovernmental organization Water Action. Of the 20 water points, 13 were spring developments, 4 were hand dug wells, and 3 were shallow boreholes. The Carter Center study coordinator and Catholic Relief Services worked with *kebele* leaders to identify a 5-person water committee for each water point, with at least 2 female members. This committee developed a plan for maintenance of the water point, including a payment system to subsidize repairs.
- **Household wash station.** During the initial focus group discussions conducted before the study, community members pointed out that one barrier to good face hygiene was the lack of a dedicated wash basin near the household. The ideal household wash station was identified as a jerry can with a faucet, similar to the types of facilities available in larger towns. Based on this information, we provided all households in the intervention communities with such a jerry can, along with a mirror. Households were responsible for building a base for the jerry can out of locally available materials.

## **SANITATION**

- **Latrine promotion.** Current government policies do not allow the provision of building materials or direct assistance for building latrines, so study activities are limited to latrine promotion at present. Study staff known as hygiene promoters (see below) are responsible for promoting latrine construction and use through door-to-door visits.

## **HYGIENE**

- **Targeted behaviors.** Although the WASH package could have a positive impact on many health outcomes (e.g., diarrhea, soil-transmitted helminths, respiratory infections), we focus on two behaviors likely to have the greatest impact on trachoma: (1) using soap and water to wash a child's face twice per day, and (2) consistently using latrines for defecation. Our messaging (e.g., times of day to wash the face, inclusion of soap, promotion of simple pit latrine, etc.) was based both on our initial focus group discussions and local government policies.
- **Community-based hygiene promotion.**
  - **Household WASH book.** During our initial focus group discussions in the study area, local government health extension workers recommended that we create something similar to the

illustrated family planning pamphlets they use. What resulted was a 66-page full-color book that provided a roadmap for hygiene education for hygiene promotion workers and health development army members. The content of the book was based on many focus groups held with local educators, health officials, and water officials. Local artists provided the illustrations. The book was translated into the two languages spoken in the study area. A book was delivered to each household in the intervention clusters, to be kept for the duration of the study.

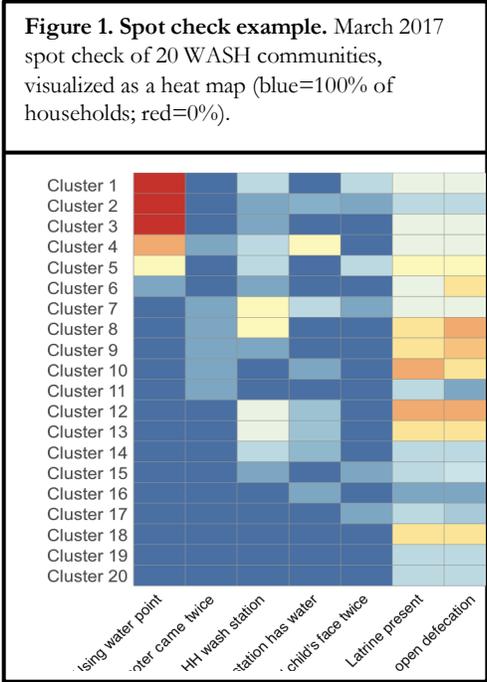
- **Soap distribution.** The importance of soap was evident from the baseline focus group discussions. An American soap manufacturer (SoapBox Soaps, Washington, DC) donated funds to purchase 4 bars of locally produced soap per household per month. The soap is delivered to the clusters each month.
- **Hygiene promotion workers (HPWs).** Twelve people were hired as HPWs to live in the study communities and perform door-to-door education activities. The HPWs use the WUHA household WASH book as a basis for interactive teaching, with the goal of covering all topics of the book with each household over the study period. The HPWs also use a standardized form to make hygiene observations at each household (e.g., the presence and use of latrines and wash stations, and the presence of dirty faces), and use the results to focus their activities. HPWs report to the study hygiene officers.
- **Non-study personnel.** We are also utilizing currently existing community infrastructure in the form of government-appointed health extension workers, health development army members, and local priests to help facilitate hygiene improvements.
- **School-based hygiene promotion.** Schools provide a convenient site for hygiene promotion and dissemination for several reasons. First, ocular chlamydia is primarily transmitted by children. Second, hygiene behaviors and habits are established in childhood. Third, parents identified school children as a potential vehicle for hygiene education during focus group discussions.
  - **Curriculum.** We developed a primary school hygiene curriculum in collaboration with The Carter Center and Ethiopian Department of Education that was based off a series of key informant interviews with teachers, principals, and health officials. The curriculum consists of 5 to 6 age-appropriate lesson plans per year for grades 1 through 4. Curriculum development was highly iterative, with many rounds of feedback from all stakeholders as well as thorough pilot-testing in our study area. The curriculum was designed to be interactive and student-centered, and to integrate well with the existing government curriculum. A 3-day training was held before the school year in the fall of 2016 and 2017. The trainings were interactive, with teachers performing the activities in each lesson plan.
  - **WASH clubs.** In this part of Ethiopia, children are required to participate in at least one extracurricular activity, and many schools have health or hygiene clubs. For WUHA, we provided training materials for WASH activities (songs, dances, dramas, community engagement activities) to existing WASH club leaders, and worked with principals of all intervention schools to help ensure that WASH clubs were formed if they did not exist.

**Intervention progress.** The baseline exams took place in February 2016. We successfully built a functional water point in 19 of the 20 communities over the first year of the study. The twentieth water point site could not be accessed so a new road was constructed; this final water point was completed at month 20. Ten hygiene promotion workers started working in the study communities at month 5, with each worker

responsible for 1-3 clusters. Hygiene promotion workers were universally identified as one of the strengths of the WASH intervention during focus group discussions in June 2017 and we therefore recently hired two additional workers. We delivered jerry cans and mirrors to all 1,710 households identified at the initial census, and to an additional 662 new households identified at the second annual census. Distribution of 4 bars of soap per household started during the 11<sup>th</sup> month of the study; we have distributed an average of 10,500 bars of soap per month since that time. We rolled out the school curriculum and provided educational aids to all 20 schools before the 2016-17 school year and trained 166 educators in June 2016 and 216 educators in September 2017. We worked to start or strengthen WASH clubs, which now exist at 18 of the schools.

**Process indicators.** We designed several ways to monitor the fidelity of the intervention.

- Spot checks.** The study hygiene officers conduct several annual rounds of spot checks in intervention clusters. At each spot check, the hygiene officer assesses the usability of the well and checks in with the cluster’s school teachers to review their hygiene curriculum implementation. The hygiene officer also visits a random sample of 10 households with pre-school children to document the presence and functionality of a wash station and latrine as well as evidence of latrine use (e.g., trodden latrine path, fresh feces in the pit). As shown in Figure 1, the spot check data are visualized as a heat map in order to easily identify the hygiene gaps in each community. The hygiene officer conveys this information to the hygiene promotion workers and the two brainstorm ways to improve on hygiene gaps.
- Household survey at annual census.** We perform a household survey in a random sample of 33% of households during the census. The survey questions capture both self-reported hygiene behaviors as well as objective observations of latrines and wash stations, and has been crucial for understanding the uptake of the intervention and for guiding remediation efforts. Figure 2 shows the results from key survey items from the first three censuses. The month 24 results show that communities randomized to the WASH intervention are more likely to have a household WASH station and latrine, and household members from WASH communities are more likely to report having washed their face and used the latrine in the past day. Behavior changes in the WASH arm were most evident



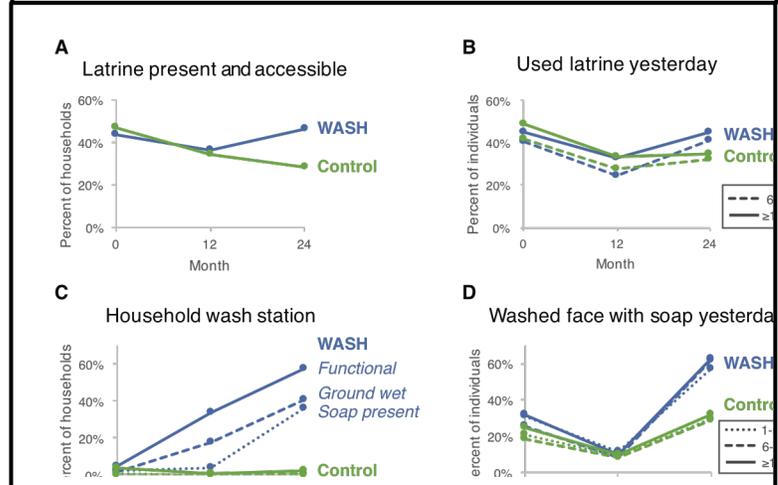
between the month 12 and 24 visits. Hygiene behaviors are notoriously difficult to change, and hygiene interventions are thought to require long periods of time before they can influence behavior. Our WASH intervention also has many components, and was not fully implemented until the month 12 visit, meaning that the period of time between month 12 and 24 is likely a more accurate reflection of its impact.

- Structured Observations.** We performed structured observations in 5 randomly selected households from each of the 20 intervention and 20 control communities in September 2017. Workers slept overnight at the observed household in order to observe face-washing and latrine behaviors when they are most likely to occur. The data is currently being double data-entered in Ethiopia. We tried to limit reactivity by first performing a nutrition survey in 20 households per community.
- Focus Group Discussions.** We performed a round of focus group discussions in 5 intervention communities in June 2017 to assess the impact of the intervention and also to help guide our intervention moving forward. We learned that community members highly valued the hygiene promotion workers and soap distribution.

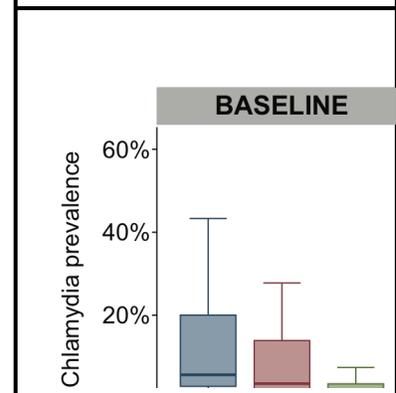
**Baseline trachoma results.** We monitored a stratified random sample from each cluster at baseline (February 2016) and month 12 (February 2017), with 30 children aged 0-5 years (N=1466 at baseline, N=1329 at month 12), 30 children aged 6-9 years (N=1183 at baseline and N=1087 at month 12), and 30 individuals  $\geq 10$  years (N=1245 at baseline) in each stratum. Figure 3 shows aggregated results for the primary outcome, ocular chlamydia infection. The mean prevalence of ocular chlamydia at the baseline visit (i.e., after 8 annual rounds of mass azithromycin treatment before the study started) was 12.2% (95%CI 7.9-16.4%) among 0-5 year-olds and 7.8% (95%CI 4.8-10.8%) among 6-9 year-olds.

**Other outcomes.** In addition to the outcomes mentioned above, we successfully collected data for a variety of other secondary outcomes. Conjunctival photographs were taken on all individuals who received conjunctival swabs. Face photographs were taken on all 0-5 year-old children to be used as a process indicator for facial cleanliness. Nasopharyngeal swabs were taken on a random sample of 15 children aged 0-5 years per community at month 0 (N=701 swabs). Exam workers also grade for TF and TI in the field. We used supplemental COR-NTD funding to collect dried blood spots (DBS) and stool samples. DBS was collected

**Figure 2. Household survey at month 0, 12, and 24.** The survey was performed on a random 33% of households from 20 WASH clusters and 20 control clusters during the annual census. Panel A and shows latrine observations and panel B shows self-reported latrine use. Panel C shows wash station observations, and panel D shows self-reported face-washing behavior.



**Figure 3.** Distribution of ocular chlamydia in all 40 WUHA communities at baseline



on a random sample of 30 children aged 0-5 years and 30 children aged 6-9 years from each study community at the baseline visit of WUHA (N=2366 total dried blood spots). Stool samples were collected on the 0-5 year-old and 6-9 year-old samples at the month 0 and month 12 study visits (N=1938 specimens at baseline and N=2120 specimens at month 12). Two stool specimens were collected per child: one in sodium acetate-acetic acid-formalin (SAF) and another in potassium dichromate. Note that all swabs and specimens mentioned in this report will also be collected at the final month 36 visit.

## MORDOR and Trachoma

*Presented by Mr. Ahmed Arzika, Study Coordinator, The Carter Center, Niger*

### Introduction

Every year, nearly 7.7 million infants die, predominately due to infectious diseases. Studies have shown that the MDA of azithromycin, used to combat Trachoma, may present the unforeseen benefit of reducing infant mortality. This result has been observed in several studies conducted in zones endemic for trachoma, and other diseases, in Ethiopia and Niger. Other studies, conducted in Nepal and The Gambia, have found that MDA has an impact on certain health concerns, such as diarrhea, respiratory infections, and malaria.

These studies have been conducted in trachoma-endemic zones. It is necessary to verify these hypotheses in areas that are hypo endemic for trachoma. It is within this framework that the MORDOR study was established.

### 2. MORDOR Hypothesis and Objectives

#### 2.1 Hypothesis

The MORDOR study aims to verify the following hypothesis:

The oral administration of azithromycin to children between the ages of 1 month through 60 months reduces infant mortality, within the framework of a random selection clinical trial

#### 2.2 Objectives:

Objective 1: To evaluate the cost-effectiveness of utilizing MDA of azithromycin to reduce infant mortality.

Objective 2: To determine the most plausible factors that would explain one of the effects on infant mortality of using MDA of azithromycin.

Objective 3: To evaluate the emergence of infants' resistance to macrolides following azithromycin treatment.

Objective 4: To collect and store specimens of nasopharynx, nostrils, oropharynx, conjunctivitis, blood, and stool after administration of azithromycin in order to assess the weight of treatment and resistance to infectious diseases.

Objective 6: To determine if the prevalence of macrolide resistance after a third and fourth year of mass distribution of azithromycin is greater than that from the first two years of treatment.

### 3. Methodology

MORDOR is a randomized clinical trial involving three African countries (Niger, Tanzania, and Malawi) that were selected for their geographic diversity, comorbidity factors, the existence of an azithromycin distribution program already in place, and research work having been done beforehand.

- **West Africa:** Health Districts of Loga and Boboye, Niger (The Carter Center-Niger, MOH Niger, UCSF)
- **Southern Africa:** District of Kilosa, Tanzania (Trachoma project in Kongwa, JHU)
- **Southern Africa:** District of Mangochi, Malawi (MOH Mali, University of Malawi, Bianture, LSHTM)

## Population

The study will include children from ages 1 month to 59 months for the mortality portion and children from 1 to 72 months for the morbidity portion.

## Sampling

### Choice of communities

Based on the document of the general census of the concerned countries' populations, we applied the criterion of clusters having a population between 200 and 2000 persons. Within the level for each country, we did a simple random drawing to determine the clusters that would be included in this study.

In total, for the three countries, we pulled:

- Mortality: ~1500 villages
- Morbidity: ~90 villages

Of the villages selected for the MORDOR study, 630 were in Niger.

It should be noted that MORDOR has two main sections:

- Mortality and
- Morbidity.

### I- MORTALITY

This section involves 594 clusters in Niger, randomized 1:1. It consists of biannually treating children who are between 1 month and 59 months old. Half of the selected clusters or villages (**“Azithro”**) receive Zithromax® twice a year and the other half (**“Control”**) receives a placebo twice a year.

The procedure of this portion consists of evaluation of mortality. This included the following: census every 6 months, verbal autopsy, and treatment with either Zithromax® or placebo.

### Descriptions

#### Census and treatment

It is semiannual and consists of passing through each cluster or village involved in the study. For each cluster, the census takers go to each home to count the number of household members, (head of the household, mother/guardian, children under 5 years old).

The census is conducted on tablets with the “Wuha” application.





After the census, all of the children under 5 years old are automatically treated with azithromycin or the placebo, depending on the group assignment for the village or cluster. The dosage is determined based on either weight or measurement.

After determining the appropriate dose, the medicine is administered according to the child's age as either a liquid to be consumed orally or via a syringe.

### **Verbal Autopsy**

This portion of the mortality section that is conducted by health workers and two agents trained by MORDOR for this specific activity. It consists of investigating all deaths in the MORDOR study area. In order to ensure that all deaths are accounted for, we set up an information mechanism at the level of each village staked out by a key informant. This informant directly communicates to the health manager of the area containing the cluster of each death,

regardless of the cause. The health worker in turn takes the necessary equipment to the village where the death occurred to interview the parents of the deceased.

## **II- MORBIDITY**

This is the second primary section of the study and involves 30 villages in Niger.

The census-taking and treatment are conducted using the same procedures as in the mortality section.

Sample Size:

- 15 clusters ("Azithro")
- 15 clusters ("Control")
- Sample of 40 children between 1 month and 59 months old in each cluster.

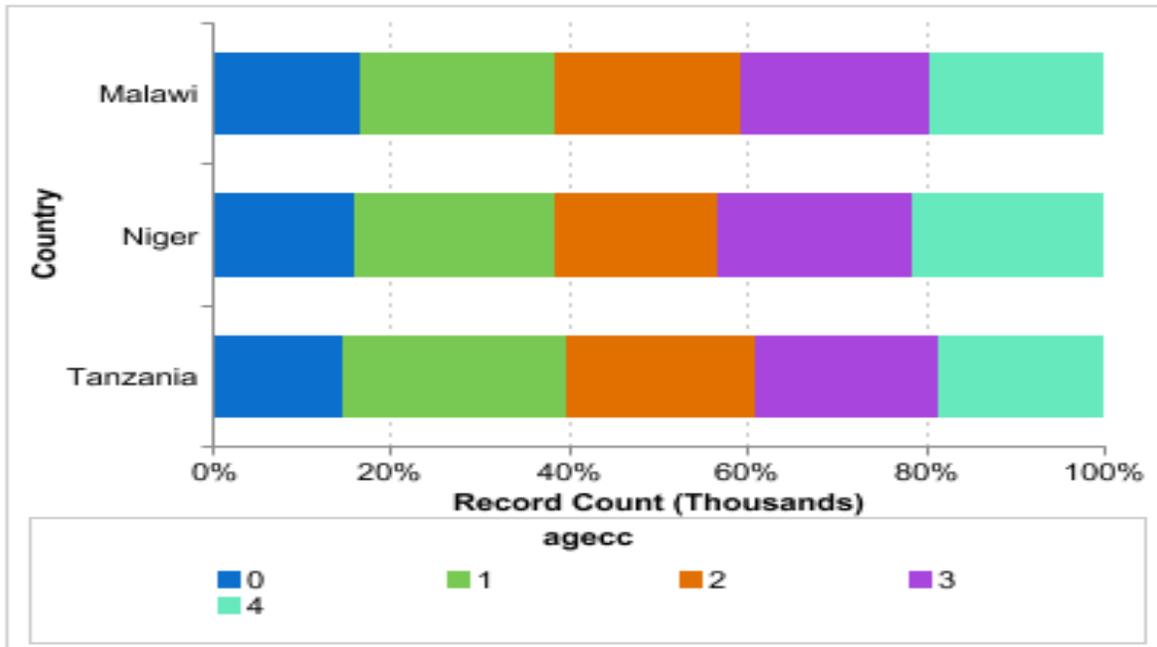
At each village level, 40 children are randomly selected. These children are the object of the samples.

- Activities:
  - Sampling to evaluate:
    - Malaria and anemia
    - Trachoma (swabs and photographs)
    - Weight, height, and mid-upper arm circumference
    - Macrolide resistance (nasal, nasopharyngeal, rectal)

### **Data Management Center**

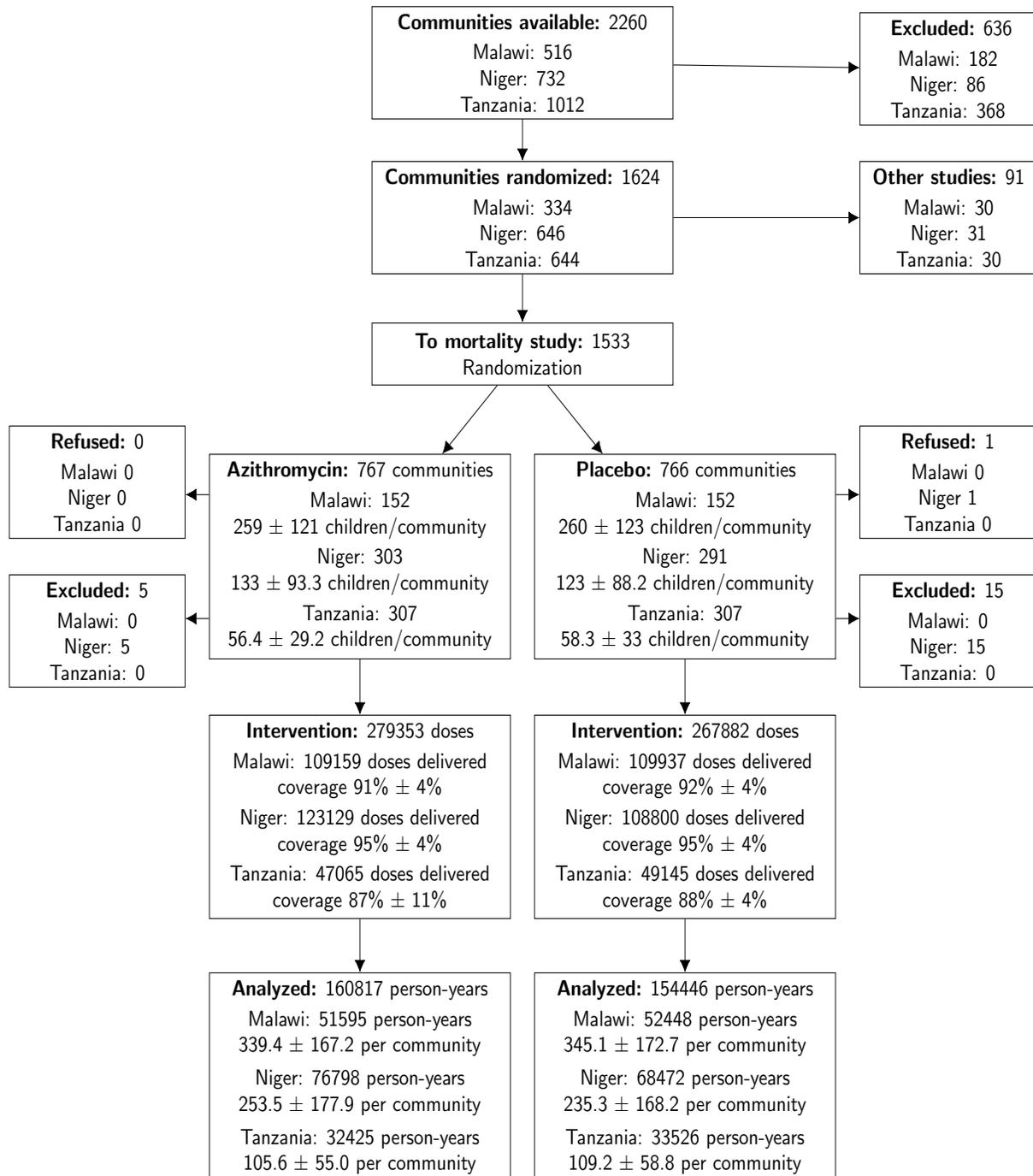
We collect the data via tablets. The data are completely synchronized to our database, which is Salesforce. A follow-up on the quality of work from the database is conducted.

## AGE DISTRIBUTION



The monitoring can be done by country, by agent, by child treated, by *ratissage*.

## VI- Preliminary Results



For the monitoring of person-year by country, we have:

- Niger: 145,291 py
- Tanzania: 65,951 py
- Malawi: 104,043 py

**Mortality rate in placebo section**

- Niger: 27.6/1000 py
- Tanzania: 5.5/1000 py
- Malawi: 10.3/1000 py

**Conclusion**

MORDOR is a randomized clinical trial still in progress in Niger. The results are not published, which limits our ability to discuss them here. It should be noted that there is very interesting information, regarding passive surveillance, resistance, and efficiency that was not discussed in this document. Data are collected on all of these aspects of the project and will appear in future publications. Some of the results from the mortality section of MORDOR will be published at the end of April 2018.

**III- Trachoma MORDOR-Niger**

We aimed to answer three additional questions:

- 1) Can we conduct a study using only smartphone photography?
- 2) Does azithromycin make a difference in hypo-endemic areas?
- 3) Have we completely eliminated ocular chlamydial infection?

We compared photographs of conjunctiva taken with a Nikon camera in Ethiopia. The results are still in the process.

## Role of Surveillance in the Trachoma End-Game: Investigation of “Hot Spots”

Presented by Dr. Jeremiah Ngondi, Regional Technical Advisor, NTDs, RTI

Trachoma is a leading cause of avoidable blindness that can be eliminated as a public health problem through the WHO-endorsed SAFE strategy that comprises: surgery for trichiasis; antibiotics to treat ocular *Chlamydia trachomatis* infection; facial cleanliness and environmental improvement to minimize risk of ocular chlamydia infection. During implementation of SAFE, WHO recommends baseline surveys to plan interventions, impact surveys to inform stopping MDA and pre-validation (surveillance) surveys to inform if reduction in TF has been sustained at <5.0%.

WHO defines trachoma surveillance as monitoring and evaluation activities that assess the outcome of a trachoma elimination program, conducted after elimination prevalence targets appear to have been achieved, in a defined trachoma endemic area.[1] Evidence from countries that have eliminated trachoma (USA, Oman, Mexico, Morocco) suggest that a number of methods were employed for purposes of trachoma surveillance, including: border screening for trachoma (USA); house-to-house case search; school-based case search; health facility register; population based surveys; school-based surveys; sentinel sites; and health facility-based case notification.

Recent guidelines from WHO classify trachoma surveillance activities to include (a) those that occur up to the time that preparation of a dossier for validation of elimination (of trachoma as a public health problem) is justified (“**pre-validation trachoma surveillance**”), and (b) those that occur after the time that preparation of a dossier is justified (“**post-validation trachoma surveillance**”).[1] The pre-validation (surveillance) survey is routinely undertaken through a population based prevalence survey done at least 24 months after the last impact survey showed a TF of <5%.[1,2] However, at present, there are no firm guidelines on post-validation trachoma surveillance.

Recent studies suggest that laboratory testing of ocular chlamydia infection (NAATs) and antibodies (pgp3 and CT694) may be a valuable addition to clinical signs for purposes of trachoma surveillance. Despite their strengths, there a number of limitations that may hinder widespread application of these tests (Table 1).

**Table 1: Potential Tools to provide enhanced surveillance information**

Test Type	Examples	Strengths	Limitations
Test for infection	Nucleic acid amplification test (NAATs)	<ul style="list-style-type: none"> <li>High specificity and sensitivity</li> <li>Commercially available</li> <li>Data suggest at least 2 years post MDA where TF is &lt;5%, infection is &lt;2% and no re-emergence*</li> </ul>	<ul style="list-style-type: none"> <li>Expensive</li> <li>Require laboratory settings</li> <li>Even with 0% infection, resurgence is high if TF is high</li> </ul>
Serology	Antibody test (pgp3, CT694)	<ul style="list-style-type: none"> <li>Multiplex platform</li> <li>Test for interruption of transmission</li> <li>Models suggest that TF&lt;5% approximates 7% sero-positivity**</li> </ul>	<ul style="list-style-type: none"> <li>Cannot distinguish between ocular and genital chlamydia</li> <li>No elimination threshold</li> <li>No international reference</li> </ul>

Sources: \*COR-NTD 2017 and \*\*66<sup>th</sup> ASTMH meetings

As trachoma disappears following implementation of the SAFE strategy, there are a number of unique scenarios that have been observed by national programs that may not fit the routine trajectory for trachoma surveillance, monitoring and evaluation:

**1. Trachoma “Hot Spots” – unusually high percentage of children with TF in some clusters in a district where TF prevalence is <5%.**

In some settings, clusters with unusually high percentage of TF in children aged 1-9 years have been identified in settings where survey findings had shown district level TF prevalence of <5%. For example, in recent surveillance surveys Vietnam, a single village (cluster) was found where percent of children with TF was >10% while district level TF was 1.5%. Subsequent longitudinal spot checks in 6 neighboring villages showed there also numerous cases of TF. The number of children with TF doubled within a year and the WHO recommended MDA in the 7 affected villages. Impact surveys following MDA showed that TF had declined to <5%.

While a single cluster had more than one in ten children with TF, it may not necessarily be a focus of disease of public health significance. We can expect to see this “hot spot” pattern in formerly endemic areas where trachoma is disappearing[3,4]. Occasional higher prevalence communities are expected with a geometric distribution. These do not necessarily represent persistent outliers. Selecting a community in the tail of the geometric distribution with a high prevalence is a predictable event. These outliers do not necessarily have more transmission potential in the future, and may regress towards the mean on future visits.[5]

**2. Rebound of TF to >5% during surveillance surveys.**

Some national programs have experienced districts where TF was observed to rebound to >5% at surveillance survey. The standard recommendation is to re-start MDA in such scenarios. However, tests for chlamydia infection and antibodies may help inform programmatic action to monitor MDA and further progression to elimination of disease. An operational research in districts where TF has rebounded at surveillance survey is planned in Tanzania.

**3. Persistent TF prevalence of 5.0-9.9% in districts receiving MDA.**

While this scenario does not strictly fall under post-MDA surveillance, a number of countries have experienced districts that had TF prevalence of 5.0-9.9% at initial impact survey and continued to have this level of prevalence even after subsequent annual round of repeat MDA followed by annual impact surveys. There are concerns if this low level TF prevalence is due to ocular chlamydia or other conjunctival infections. Thus in scenarios where TF (5.0-9.9%) remains persistent after at least 2 impact surveys, there is value in undertaking tests for chlamydial infection and antibodies to inform programmatic decisions. An operation research in districts where TF has remained persistent at 5.0-9.9% is planned in Tanzania.

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## **Providing Trachoma Services to Refugees/IDPs**

*Moderated by Ms. Angelia Sanders, Associate Director, The Carter Center*

### *Panel Members:*

*Ms. Zeinab Abdalla, Senior Trachoma Program Officer, The Carter Center, Sudan*

*Ms. Maha Adam, Trachoma Program Officer, The Carter Center, Sudan*

*Dr. Kadri Boubacar, Deputy National Coordinator, PNSO, Ministry of Health, Niger*

*Mr. Scott McPherson, Senior Program Manager, RTI*

### **Background**

According to the United Nations High Commissioner for Refugees (UNHCR) we are “witnessing the highest levels of displacement on record”, with 65.6 million people being forced from their homes. Of this, 22.5 million are refugees. Fifty-five percent of refugees worldwide come from just three countries: Syria (5.5 million), Afghanistan (2.5 million) and South Sudan (1.4 million). Receiving countries must not only work to address the basic needs of the refugees, but determine how to combat the infectious diseases they bring with them. In Africa, national ministries of health have worked for the last few decades to eradicate and eliminate various NTDs. Substantial gains have been made; however, the recent increased influx of refugees may impact this progress and is forcing countries, supporting non-governmental organizations and donors to determine how best to provide NTD related services to these populations.

In South Sudan, violent conflict, man-made famine and drought have caused displacement of nearly 4 million South Sudanese, with nearly 2 million of these as refugees in neighboring Ethiopia, Kenya, Sudan and Uganda. The UN Office for the Coordination of Humanitarian Affairs said that it expects an additional 200,000 South Sudanese refugees to arrive in Sudan in 2018. In Nigeria, since the start of the Boko Haram conflict in 2009, more than 20,000 people have been killed, thousands of women and girls abducted and children drafted as so-called "suicide" bombers into the insurgency. Up to 2.1 million people fled their homes at the height of the conflict, 1.7 million of whom are still currently internally displaced. Close to 200,000 refugees are still in Cameroon, Chad and Niger.

### **Baseline Survey in South Sudanese Refugee Camps, White Nile State, Sudan – Zeinab Abdalla**

In November 2017, a trachoma baseline prevalence survey was conducted by the Federal Ministry of Health and The Carter Center in eight South Sudanese refugee camps in White Nile state, Sudan. Camps were divided into two enumeration units (EUs) based on their location within the locality. One EU (El Salam locality) included six camps, while the second EU (El Jalabain locality) included two camps. Multi-level sampling was used in both enumeration units, with sample size dependent on population size. In the locality with six camps, 18 blocks of 35 households were randomly selected. In the second locality with two camps, six blocks of 105 households were visited. Both EUs showed a greater than 10% prevalence of trachomatous inflammation-follicular (TF) in children 1-9 years and greater than 1% prevalence of trichiasis in those 15 years and above. The percentage of children 1-9 years with a clean face was approximately 72% in each EU. Access to latrines was 71% in El Jabalain EU and 99% in El Salam EU. Results show that at least three rounds of MDA, surgical camps and health education interventions are required.

### **TT surgery in South Sudanese Refugee Camps, White Nile State, Sudan – Maha Adam**

Baseline survey results conducted in November 2017 in South Sudanese refugee camps in White Nile state showed that in El Jalabain EU TT in those 15 years and above was 5.0% resulting in approximately 1,168

patients. In El Salam, the TT prevalence was 2.9% resulting in approximately 2,082 patients. For this reason, the Federal Ministry of Health, with support from The Carter Center, conducted surgical campaigns in February 2018. To ensure the campaigns success, there was coordination with the Commission of Refugees (COR), State Ministry of Health, security officials and NGOs in the camp. Surgeries were conducted in schools and health centers located within the camp. Of the 4,063 people screened for TT, 298 (7%) needed surgery, with 97% (290) accepting to be operated. Some of the challenges of conducting surveys in the camps included movement of refugees out of the camp to work and cultivate farms, lack of community awareness about trachoma, suspicion about TT surgery and language difficulties. It should be noted at least four TT cases were children under the age of ten – which are a special group and could not be afforded surgical services. Recommendations to other national programs when conducting surgical camps include: coordinating with other relevant ministries, UN organizations and NGOs; involve health workers, community leaders such as chiefs within the camps to help mobilize and counsel patients; and distribution of health education materials in the camps to assist with increasing awareness about trachoma and TT.

### **Integrated Mapping of 5 NTDs in the Refugee Camps of Ethiopia – Scott McPherson**

In Ethiopia, a country endemic for all five PC-NTDs, over 760,000 refugees lived in camps within the country's borders as of 2016. To better understand if there were refugees suffering from NTDs, the Federal Ministry of Health of Ethiopia, RTI International, and the UNHCR, supported by the USAID ENVISION project, mapped ten refugee camps for trachoma, lymphatic filariasis, onchocerciasis (OV), STH, and SCH in the regions of Gambella and Beneshangul-Gumuz. RTI used an integrated mapping methodology to map for all five diseases concurrently. In each household, all persons above 1 year old were screened for trachoma, children aged 5-14 were screened for STH/SCH, and children 9-14 were screened for lymphatic filariasis and OV. Though the results of the STH/SCH mapping component revealed prevalence below the treatment threshold, the trachoma results showed several of the camps have a prevalence over 10% TF and will require at least three years of Zithromax® MDA. In 2017, the ENVISION project supported Zithromax® MDA to treat these camps for the first time, resulting in over 250,000 refugees treated. In February of 2018, impact surveys were conducted in three of the camps with final results pending. Given the wide prevalence variance between camps, the mapping exercise demonstrated the importance of clustering camps to form EUs in such a way that take into account important variables such as the predominant place of origin of the refugees and the number of years on average refugees had been in the camps. The integrated mapping approach proved feasible within the refugee camps because of the tightly organized housing system but may require too much of a logistical demand to be applicable in a standard community setting.

### **Situation of Trachoma in Refugee Camps in Diffa Region, Niger – Dr. Kadri Boubacar**

For over 4 years, refugees from Nigeria have crossed in the Diffa region of Niger because of on-going insecurity in northern Nigeria, an area suspected to be endemic for trachoma. SAFE interventions for trachoma were warranted throughout the Diffa region, and those activities were extended to refugee camps in 2016 based on survey estimates that evidenced a need. Since 2016, the PNSO has conducted trachoma prevalence surveys in 17 refugee camps in the Diffa region in collaboration with UNHCR and the regional health authorities. The results from the surveys indicated that the prevalence of TF among children ages 1-9 years was 5.0% or higher in the 17 refugee camps, ranging from 5.0% to 23%. The prevalence of TT among adults ages 15 years and above ranged from 0.0 to 4.0%. Based on these results, all refugee camps were eligible to receive MDA with azithromycin. In 2017, the PNSO accessed 16 of the 17 camps with MDA, treating 21,317 persons and achieving coverages by camp ranging from 71.6% to 93.8%. One camp was not treated due to insecurity. Although insecurity remains a challenge in the region of Diffa, disrupting routine

SAFE activities, the PNSO, in collaboration with partners including the UN, realized the possibility of both surveying and treating refugees living in established camps to reduce the prevalence of trachoma. The Niger PNSO cites this collaboration as the driver behind the success of this activity, which would not have been possible with strong planning and communication with the local administration and stakeholders.

### **Conclusion**

The refugee situation is not going away and is expected to continue impacting country programs as they work to eliminate trachoma as a public health problem. It is important for implementing agencies and government ministries to provide services to these groups and share their experiences. Focusing on displaced populations within one's country provides an *opportunity* to help decrease the surgical backlog and TF prevalence among the displaced population so that when they return to their home they return with healthy eyes and education about how to prevent trachoma.

## GET2020 Update

*Presented by Dr. Anthony Solomon, Medical Officer, Trachoma; and Chief Scientist, Global Trachoma Mapping Project, Department of Control of NTDs, World Health Organization*

We are making good progress against trachoma globally. Mapping of suspected trachoma-endemic districts is nearly complete, there has been considerable scale-up of SAFE strategy interventions, the worldwide population needing interventions is progressively falling, and a number of countries have been officially validated as having eliminated trachoma as a public health problem. Many challenges remain, however, and we would be wise to avoid premature celebration of success.

To address some technical points arising from interactions with national programs or their partners, or that have been raised during the 2018 The Carter Center review:

1. Work is ongoing to better understand the relative contributions and blinding potential of different causes of trichiasis, as well as how these different pathologies might best be distinguished during prevalence surveys. Formal WHO processes to evaluate that work are planned for later in 2018.
2. The term “ultimate intervention goal” has been used to mean many different things, to the point that it always requires clarification and has become nearly valueless as a label. Its use should now be avoided. The targets for trachoma programs are the three criteria for elimination of trachoma as a public health problem, which are: (i) a prevalence of TT “unknown to the health system” of < 0.2% in people aged  $\geq 15$  years, and (ii) a prevalence of TF of < 5% in children aged 1–9 years (measured twice, at least two years apart), in each formerly endemic district, plus (iii) evidence that the health system can continue to identify and manage incident cases of TT.
3. There are no targets for prevalence of clean faces, prevalence of access to water, or prevalence of access to sanitation within the criteria for elimination of trachoma as a public health problem. We do not have sufficient evidence to establish any such targets. National programs and their partners are strongly encouraged to contribute to research to establish what is needed for the F and E components of SAFE; lists of current research priorities and studies that are already underway appear in the publication, *Network of WHO Collaborating Centres for Trachoma: 2nd meeting report, Decatur, GA, USA, 26 June 2016 (WHO/HTM/NTD/PCT/2017.06)*, Geneva: World Health Organization; 2017.

## **International Coalition for Trachoma Control Update**

*Presented by Mr. Scott McPherson, Vice Chair, International Coalition for Trachoma Control*

### **ICTC Governance Review:**

Our coalition structure aims for flexibility and inclusiveness and remains responsive to our evolving needs over time:

- Our governance platform includes an Executive Group comprising of a Chair, Vice Chair and Immediate Past Chair.
- These are voluntary roles with the Vice-Chair elected from membership representatives.

ICTC initiatives are supported by:

- Thematic leads and temporary task teams that support the ICTC strategic work plan, including developing evidence based technical tools and resources or contributing to key messages and influencing materials.
- Grant Managers manage the contracts with funders and implementers for specific initiatives undertaken in partnership with ICTC, on behalf of the ICTC. Grant Managers are appointed from member organizations and the associated activities undertaken by these members are funded from within the donor-funded projects.
- A Program Advisory Committee that provides quality assurance, advice to the Grant Manager and reviews the technical aspects of capacity-building tools/resources developed by the Coalition. Representatives work according to terms of reference and contribute their time and expertise voluntarily.
- Focal points represent ICTC in external meetings and groups that have been identified as of strategic significance by ICTC. They play an instrumental role in creating and strengthening cross sector linkages and building collaboration that supports progress towards the elimination of trachoma. These representatives are appointed by the Executive Group from members based on their expertise, interest and capacity to contribute to a specific area.
- Support staff provide operational and administrative support to the Executive Group for coordination of member engagement and implementation of ICTC strategy. These dedicated positions are funded, employed and hosted by members.

### **ICTC Updates and Planned Activities:**

While significant progress has been made in recent years, with year on year progress in the number of districts reaching elimination, challenges remain in order for us to sustain progress made so far and accelerate progress to global elimination. We need to build current momentum while engaging new partners to ensure the remaining gaps are closed and the hard-won progress of recent years is sustained.

2018 presents a series of exciting opportunities for us as a community to engage national leaders in all geographic regions on trachoma, and to showcase and share lessons learned to support the elimination of other NTDs, strengthen health systems and service delivery of SAFE, in order to achieve UHC. In addition, as more and more districts reach elimination we must have critical discussions on transitioning elimination programs in to routine public service delivery to ensure progress is sustained. Planned 2018 activities include:

- Tropical Data training in the Pacific, Columbia, Ethiopia and Tanzania
- Launch of the TT surgeons training, preferred practice guidelines
- ICTC Trachoma Transition workshop, post-elimination sustainability preferred practices, London, UK (23 – 24 April 2018)
- Global Disability Summit, July 2018
- 20<sup>th</sup> anniversary of WHA resolution and ITI donation program

The 2018 Commonwealth Heads of Government Summit Meeting (CHOAGM) will bring together 53 Commonwealth nations from across the Americas, Africa, Europe, Asia and the Pacific to reaffirm common values, address shared global challenges and agree on how to work to create a better future for all Commonwealth citizens. With this forum of heads of government, a unique opportunity presents itself to showcase the impact of investments made by The Queen Elizabeth Diamond Jubilee Trust's Trachoma Initiative, supporting 12 countries towards elimination.

Since autumn 2017, ICTC has been a core member of the Vision for the Commonwealth platform, alongside The Queen Elizabeth Diamond Jubilee Trust, Sightsavers, Fred Hollows Foundation, Clearly and Peek Vision. Vision for the Commonwealth partners are advocating for Commonwealth leaders to commit to one goal to support access to universal eye health, including the goal of trachoma elimination. By doing this we have the opportunity to mobilise endemic country political will and investment needed to move towards elimination.

## 2018 Trachoma Control Program Review Recommendations

### General Recommendations:

1. National Trachoma Control Programs should consider repeating the facial cleanliness “*Reliability around Measuring F*” study and share results in peer reviewed – published forums.
2. National Trachoma Control Programs should consider collecting data on clean face during surveys to report prevalence estimates and use as warranted for targeted health education.
3. WHO GET2020 Alliance should set dates for a Global Scientific Meeting as soon as possible to ensure it can take place in 2018.
4. National Trachoma Control Programs should publish quantitative and qualitative data documenting success, lessons learned and their experiences building the validation dossier.
5. National Trachoma Control Programs should consider publishing levels of trichomatous follicular (TF), stopping mass drug administration (MDA), surveillance surveys, and the number of districts and the sum of the population that were formerly endemic and now have  $TF_{1-9} < 5\%$  as well as trichomatous trichiasis (TT) surgeries performed as success stories.
6. National Trachoma Control Programs should assess refugee and internally displaced camps to understand if trachoma is a problem. If prevalence data indicate that treatments are warranted, the National Program should identify funding and implementing partner(s) and work with the International Trachoma Initiative in applying for MDA.

### Country-Specific Recommendations:

#### Ethiopia

1. The Ethiopia National Trachoma Control Program should seek to ensure 100% SAFE strategy coverage in all geographic areas.
2. The Federal Ministry of Health should consider training nurses, not only Integrated Eye Care Workers, to serve as graders during trachoma impact and surveillance surveys.
3. The Federal Ministry of Health should review the merits of WASH indicators as part of the Tropical Data platform and work closely with WHO and Tropical Data as warranted for inclusion

#### Amhara, Ethiopia

1. The Amhara Region Trachoma Control Program should leverage the School Trachoma Health Program (STHP) data with partners responsible for provision of latrine and hand-washing facilities in schools to advocate for 100% coverage. STHP should provide monitoring data to the responsible organizations for advocacy.

2. The Amhara Regional Health Bureau should focus efforts to clear the TT backlog by 2019 by maintaining the momentum created by the Fast Track Initiative through enhanced community mobilization and case search teams.

### **Mali**

1. The Mali Trachoma Control Program should immediately start preparing the dossier for the validation of the elimination of trachoma as a public health problem.
2. The Mali Program should ensure all 20-planned surveillance surveys are conducted in 2018 while simultaneously implementing TT surgical activities to clear the TT backlog by the target date for elimination, 2018.
3. The Mali Program should aggressively plan to clear the TT backlog, using detailed planning and simultaneous activities, by 2018.
4. The Mali Program should consider, when and where possible, working with the National Guinea Worm Eradication Program to promote awareness creation and knowledge of cash rewards.
5. The Mali Program should consider pursuing experience exchange with the Niger Trachoma Control Program.

### **Niger**

1. The Niger Trachoma Control Program should review and possibly revise the current elimination target given the planned MDA schedule.
2. The Niger Program should consider a strategic planning meeting (in conjunction with their Program Review) during calendar year 2018 to include all stakeholders (including World Bank).
3. The Niger Program should increase the number of surgeons to clear the TT backlog through surgical campaigns as soon as possible.
4. The Niger Program should seek support of all stakeholders and partners to ensure planned and needed activities in Agadez are completed.
5. The Niger Program should consider implementing *ratisage*, with priority given to districts or evaluation units with the highest known TT backlog.
6. The Niger Program should investigate options for cross border exchange with Nigeria.
7. The Niger Program should consider pursuing experience exchange with the Mali Trachoma Control Program.

**South Sudan**

1. The South Sudan Trachoma Control Program should consider a strategic review in 2018 to develop a trachoma action plan for Kapoeta, a stepped approach for expansion and a plan for future peace.
2. The South Sudan Program should prioritize the training of national TT surgeons and the training should include the use of HEAD START. Additionally, the Program should consider hiring surgeons full time to work in Kapoeta.
3. The South Sudan Program should consider, when and where possible, working with the National Guinea Worm Eradication Program to promote awareness creation and knowledge of cash rewards.

**Sudan**

1. The Sudan Trachoma Control Program should aggressively implement activities that were previously planned in the trachoma action plan to clear the TT backlog, using detailed planning and simultaneous activities, by 2020.
2. The Sudan Trachoma Control Program should aggressively train the new approved cadre of mid-level health workers (medical doctors and medical assistants) to be TT surgeons in 2018.
3. The Sudan Trachoma Control Program should implement the trachoma school curriculum in trachoma endemic localities in Darfur.

**Uganda**

1. The Uganda Trachoma Control Program should ensure all case search activities are well documented and reviewed to ensure elimination thresholds are met.
2. The Uganda Program should start preparing the dossier for the validation of the elimination of trachoma as a public health problem.
3. The Uganda Program should complete baseline surveys in all suspect refugee settlements and depending on the results, request for Zithromax® and carry out MDA.
4. The Uganda Program should develop transition plans with each district that have met elimination thresholds to ensure sustainability.
5. The Uganda Program should mobilize resources for TT only surveys in districts and refugee settlements that do not qualify for baseline surveys.

### Trachoma: The Disease

Trachoma, the world's leading cause of preventable blindness, can be found in over 40 countries. More than 190 million people are at risk for trachoma, and approximately 3.2 million are at immediate risk for blindness from trichiasis. 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 by contact with hands, towels and clothing, or by flies, which are attracted to ocular and nasal discharge. As trachoma patients' eyelids are repeatedly infected with *Chlamydia trachomatis*, 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, but also rapidly leads to blindness.

Recent developments have brought new hope that we can effectively eliminate this disease as a public health problem. In 1987, eye care experts and the WHO developed a simplified trachoma grading scale, which facilitated and standardized the diagnosis and identification of all stages of trachoma. In 1997, the WHO established the GET 2020 Alliance, which brought international non-governmental development organizations, donors and researchers together to work collectively in controlling trachoma. The World Health Assembly adopted resolution WHA51.11 in 1998, targeting the global elimination of trachoma as a public health problem. In addition, with support from the Edna McConnell Clark Foundation and WHO, the *SAFE strategy* was created to control trachoma through community-based interventions. In 2004, ICTC, a coalition of NGOs, donors, academic institutions, and other partners, was created to support GET2020 and to advocate for the implementation of the SAFE strategy.

Another important development was the finding that the oral antibiotic azithromycin, taken once or twice annually, is as effective in preventing chronic trachoma as 6 weeks of daily treatment with TEO, the previously recommended therapy. In 2009, Pfizer Inc, manufacturer of Zithromax<sup>®</sup>, recommitted to supporting the WHO GET2020 goal of eliminating blinding trachoma by the year 2020. Since the beginning of the donation in 1998, approximately 770 million doses of Zithromax<sup>®</sup> have been donated by Pfizer Inc and managed by ITI. The existence of the donation program has served to invigorate national trachoma programs and global support for the elimination of blinding trachoma. In 2016, WHO published the dossier for the validation of the elimination of trachoma as a public health problem. In 2017 and 2018, 7 countries had fulfilled the criteria to be validated by WHO as meeting criteria to declare the elimination of trachoma as a public health problem. In 2018, the global trachoma community celebrates three 20th anniversary milestones: The Carter Center begin their pioneering work in 1998; WHA 51.11 called for the elimination of blinding trachoma; and Pfizer created the ITI to lead the drug donation program.

*“Celebrating 20 Years of Impact”*

The Nineteenth Annual Trachoma Control Program Review

The Carter Center

March 19-20, 2018

**Monday, March 19**

<b>7:30</b>	<i>~Depart the Sheraton Hotel for The Carter Center~</i>	
<b>7:45 – 8:15</b>	<u>Breakfast</u>	
<b>8:15 – 8:30</b>	Welcome, Opening Remarks, & Introductions	Dr. Dean Sienko Vice President, Health Programs The Carter Center
<b>8:30 – 9:00</b>	Program Review Overview & Chairperson Announcements	Ms. Kelly Callahan (Chairperson) Director, Trachoma Control Program The Carter Center
<b>9:00 – 9:45</b>	Ethiopia SAFE Update	Mr. Nebiyu Negussu NTD Team Leader Federal Ministry of Health - Ethiopia
<b>9:45 – 10:30</b>	Amhara SAFE Update	Dr. Abebaw Gebeyehu Head, Regional Health Bureau Amhara Regional Health Bureau
<b>10:30 – 11:00</b>	<u>Coffee Break</u>	
<b>11:00 – 11:30</b>	Interpreting Coverage Survey Results to Facilitate Decision-Making in NTD Programs	Ms. Katie Zoerhoff Senior M&E Specialist, NTDs, ENVISION RTI
<b>11:30 – 12:00</b>	Predictors for MDA Participation	Mr. Caleb Ebert Graduate Student Rollins School of Public Health, Emory University
<b>12:00 – 12:45</b>	Niger SAFE Update	Dr. Kadri Boubacar Deputy National Coordinator, Trachoma Control Program Ministry of Health - Niger
<b>12:45 – 1:45</b>	<u>Lunch</u>	
<b>1:45 – 1:50</b>	<u>Chairperson Announcements</u>	
<b>1:50 – 2:20</b>	The “F” in SAFE: Why We Measure It and How Reliable is It	Dr. Sheila West Vice Chair for Research Wilmer Eye Institute, Johns Hopkins Hospital
<b>2:20 – 3:05</b>	Uganda SAFE Update	Mr. Gilbert Baayenda Trachoma Program Officer Ministry of Health - Uganda
<b>3:05 – 3:35</b>	<u>Coffee Break – Group Photo</u>	
<b>3:35 – 4:35</b>	Dossier Development: Experiences from the field <ul style="list-style-type: none"> <li>• Dr. Agatha Aboe (Sightsavers)</li> <li>• Mr. Aryc Mosher (USAID)</li> <li>• Dr. Jeremiah Ngondi (RTI)</li> </ul>	Moderated by Ms. Aisha Stewart Associate Director, Trachoma Control Program The Carter Center
<b>4:35 – 5:05</b>	The Cost of Trachoma Impact Surveys	Mr. Randall Slaven Senior Associate Director of Development The Carter Center
<b>5:05 – 5:35</b>	Characteristics of Patients Presenting with Post-operative Trichiasis (PTI) and Opinions on PTT Management	Dr. Emily Gower Associate Professor, Department of Epidemiology UNC Gillings School of Global Public Health
<b>5:35 – 7:30</b>	<u>Reception</u> (The Carter Center Library and Museum Lobby)	
<b>7:30</b>	<i>~Shuttle Departure to Sheraton Hotel~</i>	

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The Nineteenth Annual Trachoma Control Program Review

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March 19-20, 2018

**Tuesday, March 20**

7:30	<i>~Depart the Sheraton Hotel for The Carter Center~</i>	
7:45 – 8:15	<u>Breakfast</u>	
8:15 – 8:25	<u>Chairperson Announcements</u>	
8:25 – 9:10	South Sudan SAFE Update	Mr. Makoy Samuel Director of PC-NTDs Ministry of Health - South Sudan
9:10 – 9:55	Sudan SAFE Update	Dr. Balgesa Elshafie National Trachoma Program Coordinator Federal Ministry of Health - Sudan
9:55 – 10:25	A Randomized Placebo-Controlled Trial of Doxycycline to Improve Trichiasis Surgery Outcomes; and Ongoing Studies	Dr. Esmael Habtamu Ali Study Coordinator London School of Hygiene & Tropical Medicine
10:25 – 10:55	<u>Coffee Break</u>	
10:55 – 11:25	WASH Working Group Update	Ms. Angelia Sanders Associate Director, Trachoma Control Program The Carter Center
11:25 – 11:55	WASH Upgrades for Health in Amhara (WUHA) Update	Ms. Dionna Fry Study Coordinator Francis I. Proctor Foundation, University of California at San Francisco
11:55 – 12:25	MORDOR and Trachoma	Mr. Ahmed Mamane Arzika MORDOR Study Coordinator The Carter Center - Niger
12:25 – 1:30	<u>Lunch</u>	
1:30 – 1:35	<u>Chairperson Announcements</u>	
1:35 – 2:20	Mali SAFE Update	Prof. Lamine Traoré National Coordinator, National Eye Health Program Ministry of Health - Mali
2:20 – 2:50	Role of Surveillance in the Trachoma End-Game: Investigation of “Hot Spots”	Dr. Jeremiah Ngondi Regional Technical Advisor, NTDs RTI
2:50 – 3:20	<u>Coffee Break</u>	
3:20 – 4:20	Providing Trachoma Services to Refugees/IDPs <ul style="list-style-type: none"> <li>• Ms. Zeinab Abdalla (The Carter Center-Sudan)</li> <li>• Ms. Maha Adam (The Carter Center-Sudan)</li> <li>• Dr. Kadri Boubacar (Ministry of Health-Niger)</li> <li>• Mr. Scott McPherson (RTI)</li> </ul>	Moderated by Ms. Angelia Sanders Associate Director, Trachoma Control Program The Carter Center
4:20 – 5:20	Global Program Update <ul style="list-style-type: none"> <li>• GET2020</li> <li>• ICTC</li> <li>• Pfizer</li> <li>• ITI</li> </ul>	<b>Dr. Anthony Solomon</b> , World Health Organization <b>Mr. Scott McPherson</b> , International Coalition for Trachoma Control <b>Ms. Julie Jensen</b> , Pfizer <b>Dr. Paul Emerson</b> , International Trachoma Initiative
5:20 – 5:40	Closing Remarks	
5:40	<i>~Shuttle Departure to Sheraton Hotel~ (Shuttle will depart immediately following meeting)</i>	
6:30	<i>~Shuttle Departure from Sheraton Hotel to Atlantic Station Shopping Center~ (6:30-9:00)</i>	

**Ethiopia**

Mr. Nebiyu Negussu (FMOH)  
 Dr. Abebaw Gebeyehu (ARHB)  
 Dr. Zerihun Tadesse (The Carter Center)  
 Mr. Eshetu Sata (The Carter Center)  
 Mr. Mulat Zerihun (The Carter Center)  
 Mr. Berhanu Melak (The Carter Center)

**Mali**

Prof. Lamine Traoré (MOH)  
 Mr. Sadi Moussa (The Carter Center)  
 Mr. Yaya Kamissoko (The Carter Center)

**Niger**

Dr. Kadri Boubacar (MOH)  
 Mr. Salissou Kane (The Carter Center)  
 Mr. Barmou Moudi (The Carter Center)  
 Mr. Ahmed Mamane Arzika (The Carter Center)

**South Sudan**

Mr. Makoy Samuel (MOH)  
 Ms. Aja Isaac Kuol (MOH)  
 Ms. Sarah Yerian (The Carter Center)  
 Mr. Matthew Kraus (The Carter Center)

**Sudan**

Dr. Balgesa Elshafie (FMOH)  
 Dr. Nabil Aziz Awad Alla (The Carter Center)  
 Ms. Zeinab Abdalla (The Carter Center)  
 Ms. Maha Adam (The Carter Center)  
 Ms. Maymoona Eltayeb (The Carter Center)

**Uganda**

Dr. Edridah Muheki Tukahebwa (MOH)  
 Mr. Gilbert Baayenda (MOH)  
 Ms. Peace Habomugisha (The Carter Center)  
 Ms. Stella Kanyesigye (The Carter Center)

**Abbott Laboratories**

Mr. Al Reid

**Emory University**

Dr. Jacquelyn O'Banion

**The END Fund**

Mr. Warren Lancaster

**Helen Keller International**

Ms. Whitney Goldman

**Coleman Family Trust**

Mr. Joe Coleman  
 Mrs. Teresa Coleman

**Bill & Melinda Gates Foundation**

Mr. Jordan Tappero

**Conrad N. Hilton Foundation**

Mr. Robert Miyashiro

**International Coalition for Trachoma Control**

Ms. Virginia Sarah

**International Trachoma Initiative**

Ms. Birgit Bolton  
 Dr. Paul Emerson  
 Ms. PJ Hooper  
 Ms. Genevieve Lacon  
 Ms. Girija Sankar  
 Ms. N. Saman Wijesooriya

**Johns Hopkins University School of Medicine**

Dr. Sheila West

**Lions Clubs International Foundation**

Hon. Dr. Tebebe Y. Berhan  
 Mr. Elhadhi Boube Abdoukadi  
 Dr. Michael Kakinda  
 Ms. Karen Kilberg  
 Mr. Mama Tapo

**London School of Hygiene and Tropical Medicine**

Mr. Esmael Habtamu Ali  
 Dr. Emma Harding-Esch

**Noor Dubai Foundation**

Dr. Mansur Rabiou  
 Mr. Omar Ba

**Pfizer Inc**

Ms. Julie Jenson

**Francis I. Proctor Foundation, UCSF**

Ms. Catherine Cook  
 Ms. Dionna Fry  
 Ms. Elodie Lebas  
 Ms. Catherine Oldenburg

**The Queen Elizabeth Diamond Jubilee Trust**

Dr. Andrew Cooper

**Rollins School of Public Health, Emory University**

Mr. Caleb Ebert

Mr. Paul Weiss

**RTI International**

Mr. Scott McPherson

Dr. Jeremiah Ngondi

Ms. Stephanie Palmer

Ms. Lisa Rotondo

Ms. Katie Zoerhoff

**Sightsavers**

Dr. Agatha Aboe

Mr. Colin Beckwith

Dr. Johnson Ngorok

Ms. Michaela Kelly

**The Task Force for Global Health**

Dr. Pat Lammie

Mr. Bill Nichols

**Trachoma Expert Committee**

Dr. Joseph Feczko

**University of North Carolina at Chapel Hill**

Dr. Emily Gower

**U.S. Agency for International Development**

Mrs. Juno Lawrence Jaffer

Mr. Aryc Mosher

**The U.S. Centers for Disease Control and Prevention**

Dr. Diana Martin

**WaterAid**

Yael Velleman

**World Health Organization**

Dr. Gautam Biswas

Mr. Ashok Moloo

Dr. Anthony Solomon

**The Carter Center**

Ms. Laurie Baxley

Ms. Nina Bloch Benard

Dr. Kathryn Cade

Ms. Kelly Callahan

Ms. Kenya Casey

Mr. Yohannes Dawd

Mr. Don Denard

Mr. Frederic Deycard

Ms. Janie French

Ms. Julia Gallini

Ms. Emily Griswold

Ms. Madelle Hatch

Mr. Andrew Heacox

Dr. Moses Katarbarwa

Mr. Curtis Kohlhaas

Ms. Nicole Kruse

Ms. Colleen Leonard

Ms. Jayanthi Narain

Dr. Scott Nash

Mr. Andrew Nute

Ambassador Mary Ann Peters

Ms. Brianna Poovey

Dr. Frank Richards

Ms. Christina Roberts

Ms. Angelia Sanders

Ms. Janet Shin

Dr. Dean Sienko

Mr. Randy Slaven

Ms. Aisha Stewart

Mr. Marc Tewari

Mr. Craig Withers