Summary Proceedings

Trachoma Control Program

Summary of 2019 Activities

THE
CARTER CENTER

Waging Peace. Fighting Disease. Building Hope.

Acknowledgements

The Carter Center's Trachoma Control Program would like to acknowledge the support of numerous partners and donors who have made the 2019 activities reviewed in this document possible:

Abbott

Al Ansari Exchange, LLC

Alwaleed Philanthropies

Margaret A. Cargill Foundation

Thalia & Michael C. Carlos Foundation, Inc.

The William H. Donner Foundation, Inc.

The END Fund

Conrad N. Hilton Foundation

The John P. Hussman Foundation, Inc.

International Trachoma Initiative

Lions Clubs International Foundation

Lions Clubs of Ethiopia and Dr. Tebebe Y. Berhan

Lions Clubs of Mali

Lions Clubs of Niger

Lions Clubs of Uganda

London School of Hygiene and Tropical Medicine

Manaaki Foundation

Noor Dubai Foundation

The OPEC Fund for International Development (OFID)

Pfizer Inc

The Francis I. Proctor Foundation at the University of California at San Francisco

The Queen Elizabeth Diamond Jubilee Trust

Sightsavers

SoapBox Soaps

Government of the Republic of Sudan

The Task Force for Global Health/COR-NTD

United Kingdom Department for International Development

Walton Family Foundation, Inc.

And to many others who may not be listed, our sincere gratitude.

Acknowledgements

The Carter Center's Trachoma Control Program celebrated another successful year of life-altering surgeries, mass drug administration, and community health education across Ethiopia, Mali, Niger, South Sudan, Sudan, and Uganda, in a concerted effort to control the transmission and debilitating effects of trachoma. Notably this past year, the Center's initiative with the Queen Elizabeth Diamond Jubilee Trust and Sightsavers concluded after five successful years of scaling up the SAFE strategy in Uganda, positioning the country closer to eliminating the disease as a public health problem. Further, the Center, in partnership with Sightsavers and support from the United Kingdom's Department for International Development (DFID), concluded an impactful five-year initiative, enhancing key SAFE interventions in the Amhara region of Ethiopia and contributing to a significant multi-country effort.

The Carter Center's work would not be possible year after year without the critical support and committed advocacy of its partners, such as the generosity and enthusiasm of the Lions Clubs International Foundation, the Noor Dubai Foundation, and the OPEC Fund for International Development, together with other crucial partners who continue to support academic research and laboratory work to advance the Center's mission to control the world's leading cause of preventable blindness.

The Trachoma Control Program is ever grateful for our steadfast partners who made major new commitments of support in 2019, including the Conrad N. Hilton Foundation's renewed commitment to the Center's work in Mali and Niger. The END Fund restated its commitment in support of trachomatous trichiasis surgeries in the Amhara region, Ethiopia. Further, in 2019, Pfizer Inc made a key announcement for the global trachoma effort, by generously extending beyond 2020 its crucial in-kind donation of Zithromax®. The Carter Center is deeply appreciative of its partners' shared passion for and longstanding devotion to controlling the transmission of this blinding disease.

Table of Contents

Acronyms

ARHB	Amhara Regional Health Bureau
CCCM	Camp Coordination and Camp Management
Ct	Chlamydia trachomatis
DBS	Dried blood spots
DFID	UK Department for International Development
ESPEN	Expanded Special Project for the Elimination of Neglected Tropical Diseases
FMOH	Federal Ministry of Health
GET2020 Alliance	WHO Alliance for the Global Elimination of Trachoma by 2020
GTMP	Global Trachoma Mapping Project
GWEP	Guinea Worm Eradication Program
IDP	Internally displaced people
IECW	Integrated Eye Care Worker
IMC	International Medical Corps
IOM	United Nations International Organization for Migration
ITI	International Trachoma Initiative
MDA	Mass Drug Administration
MOH	Ministry of Health
MOU	Memorandum of Understanding
NPPB	National Program for the Prevention of Blindness
NTD	Neglected Tropical Disease
NTTF	National Trachoma Task Force
OASS	Ophthalmic Association of South Sudan
PNLC	Programme National de Lutte contre la Cecité (National Blindness Prevention Program)
PNSO	Programme National de Soins Oculaire (National Eye Health Program)
PoC	Protection of Civilians
PTT	Postoperative Trachomatous Trichiasis
RRP	Relief, Reintegration, and Protection
SAFE	Surgery, Antibiotics, Facial Cleanliness, and Environmental Improvement
STP	School Trachoma Program
SWIFT II	Sanitation, Water, and Instruction in Face-Washing for Trachoma II
TAP	Trachoma Action Plan
TEO	Tetracycline Eye Ointment
TESFA	Trachoma Elimination by Focused Antibiotics
TIS	Trachoma Impact Survey
TSS	Trachoma Surveillance Survey
TF	Trachomatous Inflammation-Follicular
TI	Trachomatous Inflammation-Intense
TT	Trachomatous Trichiasis
UNICEF	United Nations Children's Fund (formerly United Nations Children's Education Fund)
UNMISS	United Nations Mission in South Sudan
WASH	Water, Sanitation, and Hygiene
WHO	World Health Organization

Executive Summary

The annual Trachoma Program Review was scheduled to be held in Atlanta, Georgia, on March 19-20, 2020, but, unfortunately, was canceled due to the global COVID-19 pandemic. In an effort to document and celebrate achievements completed, these proceedings summarize activities conducted in 2019 in Ethiopia, Mali, Niger, South Sudan, and Sudan. The proceedings serve as a record of annual accomplishments and progress toward the elimination of trachoma as a public health problem in these countries. In 2019, The Carter Center continued its support of SAFE strategy interventions in Amhara, Mali, Niger, South Sudan, and Sudan. Approximately 22,500 trachomatous trichiasis (TT) surgeries were completed, 13.7 million doses of azithromycin were distributed through mass drug administration (MDA), health education activities were carried out in nearly 6,000 villages, and just over 10,000 latrines were constructed in Mali and Niger. Insecurity affected SAFE interventions in several countries in 2019, but the National Programs remained prepared to continue activities as security permitted. In Mali, the program is working towards elimination in 2020, and is focused on completing the *dossier* and finishing all activities. In South Sudan, the National Program successfully completed the first trachoma MDA to be carried out in an internally displaced people (IDP) camp and restarted surgical activities in 2 counties that had not conducted surgeries since 2016. Despite challenges and delays, programs saw success in 2019, and made progress towards trachoma elimination. In addition to the country reports, summaries of several special topic presentations are included for record and reference. These presentations were conducted virtually in March 2020. The Carter Center is proud and honored to assist the ministries of health in working towards the elimination of trachoma as a public health problem and will continue to support this critical work in the years to come.

SAFE in Amhara, Ethiopia

Submitted by Dr. Melkamu Abate, 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 trachomatous trichiasis (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 2007. 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 3 to 5 years implementation of the World Health Organization (WHO)-endorsed SAFE strategy, the WHO requires a trachoma impact survey (TIS) be conducted to assess progress towards meeting the elimination targets. Impact surveys were conducted in all 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 166 districts had met the elimination criteria for trachomatous inflammation follicular (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. As of March 2020, 48 out of 166 districts in the Amhara region have reached the elimination threshold for TF and are exempt from MDA. The program remains focused on intensifying TT outreach and is looking at new strategies for understanding and reaching the remaining backlog in the region. In 2019 the program revised its elimination target to 2025.

Timeline of Events

2001: Phase I agreement (4 districts); first 5-year Trachoma Action Plan (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 (166 districts)
2006-2007: Amhara zonal-level baseline survey
2008: Trachoma Campaign, formerly MalTra, launched
2015: All districts completed 1st impact survey after 5 years of SAFE; Fast Track TT Clearing Initiative piloted in East Gojjam zone
2016: Fast Track Initiative scaled up to all zones; region-wide school trachoma program (STP) launched
2017: The number of districts exempted from MDA reached 36, with 22 new districts exempted in 2017
2019: First year of implementation of integrated MDA training
2025: Target date for elimination

Table 1. Program Achievements in 2019

Indicator	Goal	Amhara Region (Carter Center-Assisted)	
		Target	Achieved
# of persons operated	169,413	54,070	16,104 (30%)
# of women operated			10,669 (66%)
# of surgeons trained		38	10 (26%)
Doses of azithromycin distributed during MDA	14,977,993	14,977,993	13,317,156 (89%)
Doses of TEO distributed during MDA	305,673	305,673	311,077 (102%)
# of villages with health education		3,871	3,871 (100%)

Surgery (S)

In 2019, 16,014 people received TT surgery across the region. Of those operated, 10,699, or 66%, were women, who are twice as likely as men to suffer from TT. The program also supported training for 10 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 2019, it is estimated 162,400 patients require surgical services to clear the backlog.

In order to identify TT patients requiring surgery, intensive house-to-house case searches were conducted in 22 districts by trained case finders. These districts were selected based on the high backlog and commitment and ownership by district officials. The case finders are recruited within the selected communities. Those recruited must be literate, part of the health development army, and previously participated in health campaigns. They receive training on case finding methods, registration, and mobilization. Each case finder in these districts visited 350 to 300 houses over a 5 to 7-day period. All households in the district were targeted for case finding and all individuals 15 years and above were targeted. In these 22 districts, more than 1.6 million people were screened for TT, and 70,413 persons were suspected to have TT. Of those suspected cases, 20%, or 14,293, had confirmed TT. Among those who had confirmed TT, 80% accepted surgical services and 14% refused to have TT surgery. The TT case-finding pilot will be analyzed to understand the discrepancy between the estimated TT prevalence and the actual case counts.

The program also carried out surgical validation activities in all zones in 2019. A total of 2,068 patients who received TT surgery were randomly selected from the health center patient registers and were interviewed. Of those interviewed, 2,066, or 99.9%, were confirmed to have received TT surgery. Additionally, 28 integrated eye care workers (IECW) received a surgical audit and 76 IECW were supervised by the trained supervisors in 47 campaign sites.

Antibiotic Therapy (A)

As of March 2020, 48 of the 166 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 2019, with 2 Trachoma Campaigns carried out. Through the Trachoma Campaigns, 13,317,156 doses of azithromycin and 311,077 doses of tetracycline eye ointment (TEO) were distributed. The majority of districts achieved over 80% coverage during the campaigns.

Nationwide integrated MDA of 5 preventive chemotherapy neglected tropical diseases (NTDs); trachoma, onchocerciasis, lymphatic filariasis, schistosomiasis, soil-transmitted helminths) was rolled out in 2019. This new training method requires that all distributors be trained together prior to MDAs scheduled to begin in November 2019. The training is tailored to each district, meaning that the length of the trainings is adjusted based on the number of NTDs that required MDA. Drug supply chain management and distribution have also been integrated at the national level through the Ethiopian Pharmaceutical Supply Agency. Following the MDA integrated training, MDA would sequentially take place, with one to two weeks in between treatments.

The program completed surveys in 73 districts in 2019. Of those completed, 52 were trachoma impact surveys (TIS) and 20 were trachoma surveillance surveys (TSS). A total of 12 districts that completed TSS remained below 5% TF, which brings the total number of districts that have passed TSS to 28 districts. TIS and TSS are planned for 46 districts in 2020, 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 3 more rounds of MDA.

Facial Cleanliness (F) & Environmental Improvement (E)

The School Trachoma Program (STP) training was conducted in 2019. A total of 17,409 school principals and teachers and 376 zonal and district education office staff participated in the training. Teaching aids (anti-trachoma club guide, posters, and trachoma curriculum guide) were distributed to all schools. A Parents Day celebration was conducted in all primary schools in the region with the theme "Let's eliminate trachoma through facial cleanliness". During the celebration, anti-trachoma clubs shared trachoma messages through songs, drama, and other performances, as well as conducted question and answer sessions on trachoma knowledge among parents and students. To measure the progress of STP, supportive supervision visits were conducted in 1,009 schools.

The program also supported health education activities in all villages in the region in 2019. Trainings on hygiene, environmental, and F&E activities were given to 368 Environmental Health Officers and Health Extension Program Officers. Additionally, quarterly meetings were conducted by the water, sanitation, and hygiene (WASH)/NTD Technical Working Group. With support from NTD Advocacy, Learning, Action (NALA) through the Sightsavers/DFID SAFE Programme a WASH/NTD coordination toolkit training was conducted in Waghemra and North Wollo zones. Finally, Global Hand Washing Day was celebrated across the region, with a launch celebration in Debre Markos.

Operational Research

The University of California at San Francisco Francis I. Proctor Foundation, in partnership with The Carter Center and ARHB, is conducting Sanitation, Water & Instruction in Face Washing for Trachoma (SWIFT II) a study focused on F&E. Trachoma Elimination by Focused Antibiotics (TESFA), a study that will be conducted by The Carter Center in partnership with ARHB, received ethical approval and is planned to begin in 2020.

Programmatic Challenges

The program had some challenges in 2019. First, insecurity in some parts of the region affected program implementation. Difficulty in finding remaining cases—low TT surgery output without active house-to-house case finding and the instability of TT prevalence estimates are major challenges related to TT surgery.

Status of 2019 Program Review Meeting Recommendations

Recommendation 1: The ARHB Trachoma Control Program should investigate the TT backlog overestimation while continuing efforts to provide TT case management as needed.

Status: House-to-house case finding is being conducted. Data are being assessed and some findings are noted

above.

Recommendation 2: The ARHB Trachoma Control Program under the standard operating procedures of the National Trachoma Task Force (NTTF) should consider an epilation pilot for minor TT, postoperative trachomatous trichiasis (PTT), and refusals.

Status: A pilot has not been completed, however, the NTTF is developing national guidelines to address epilation as a treatment strategy for PTT. Distribution is expected in 2020.

Recommendation 3: The ARHB Trachoma Control Program should consider using the latest survey data to select districts with high TF and lower MDA coverage and conduct qualitative assessments to determine whether there are barriers to MDA.

Status: Assessment(s) have not been completed. Community discussions were conducted to increase community participation in MDA. In 2018, 10 districts had coverage below 80%; in 2019, only 3 districts were below 80%.

Recommendation 4: The ARHB Trachoma Control Program should support and participate in longitudinal studies to 1) understand the nature and source of reinfection in persistently high districts, and 2) set up enhanced surveillance for recrudescence in districts that were formerly high TF but are now below TF threshold.

Status: 1) TESFA study approved – RCT assessing the impact of multiple rounds of MDA in quick succession to children 2-9 years of age. 2) The longitudinal study protocol has been submitted to FMOH and ARHB to assess the incidence of Chlamydia trachomatis (Ct) of children ages 6 months to 5 years 1-year post-MDA**.**

Targets for 2020

Surgery (S)

- Operate 33,872 TT patients, all with Carter Center assistance
- Train 23 new TT surgeons

Antibiotic Therapy (A)

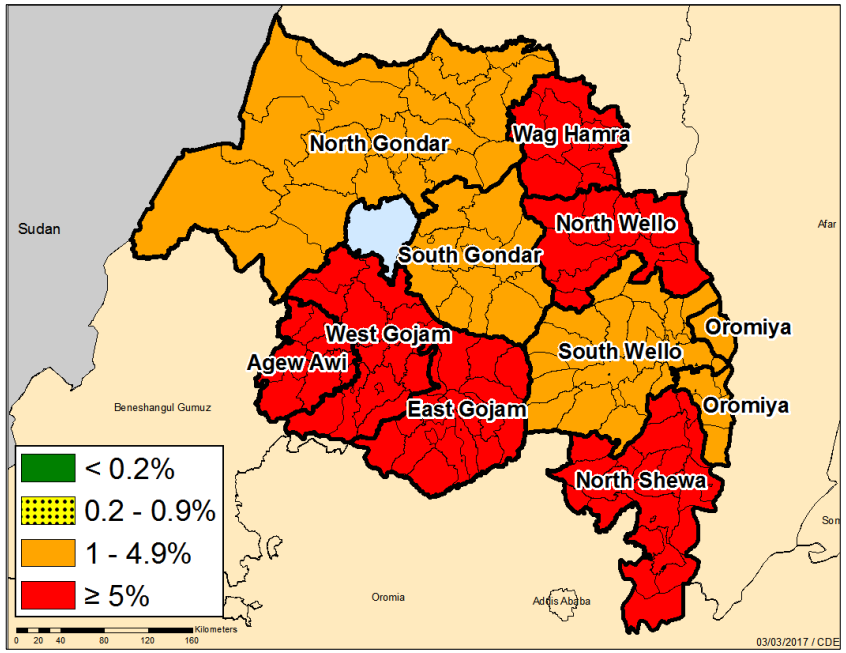
- Distribute 15,310,025 doses of azithromycin, all with Carter Center assistance
- Distribute 312,449 doses of TEO, all with Carter Center assistance
- Conduct 46 TIS and 14 TSS

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

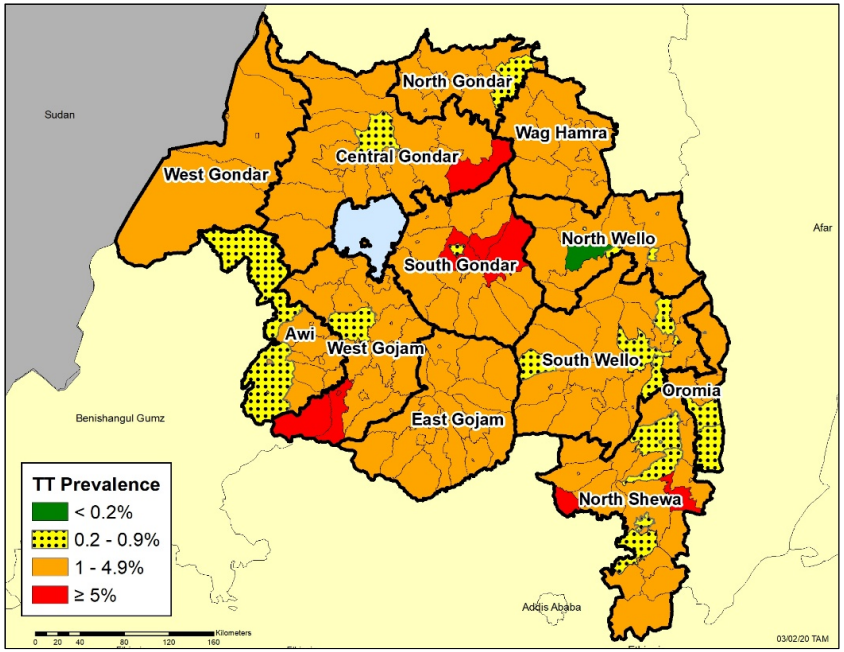
- Conduct health education in 3,871 villages, all with Carter Center assistance
- Conduct monthly STP supportive supervision

Amhara, Ethiopia: TT Prevalence among Adults ≥ 15 years

Baseline, 2007

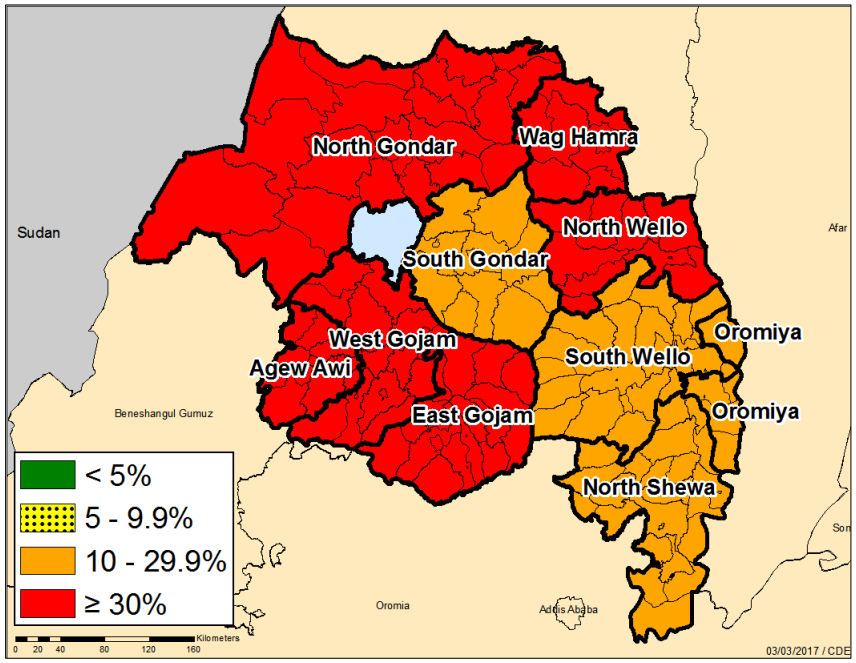


March 2020

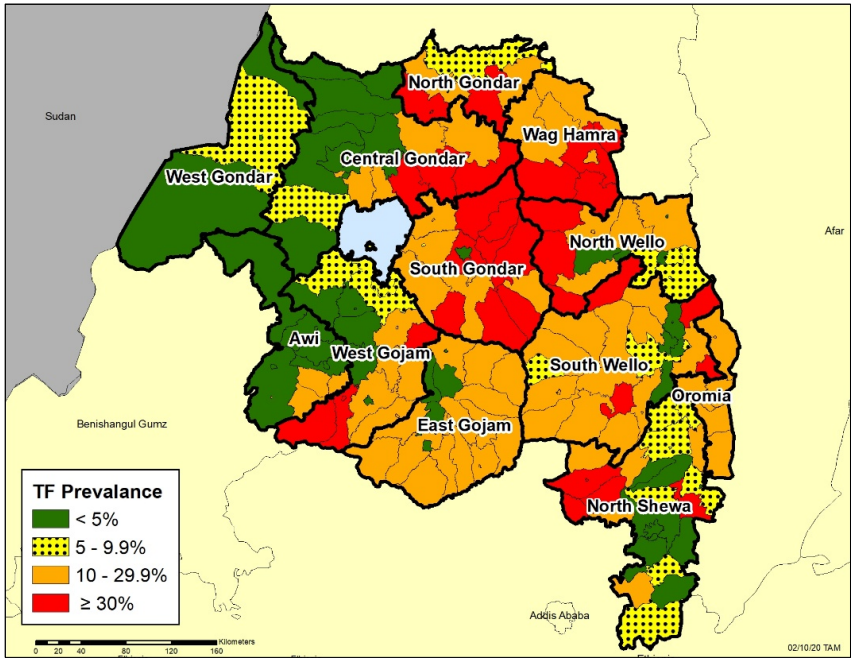


Amhara, Ethiopia: TF Prevalence among Children 1-9 years

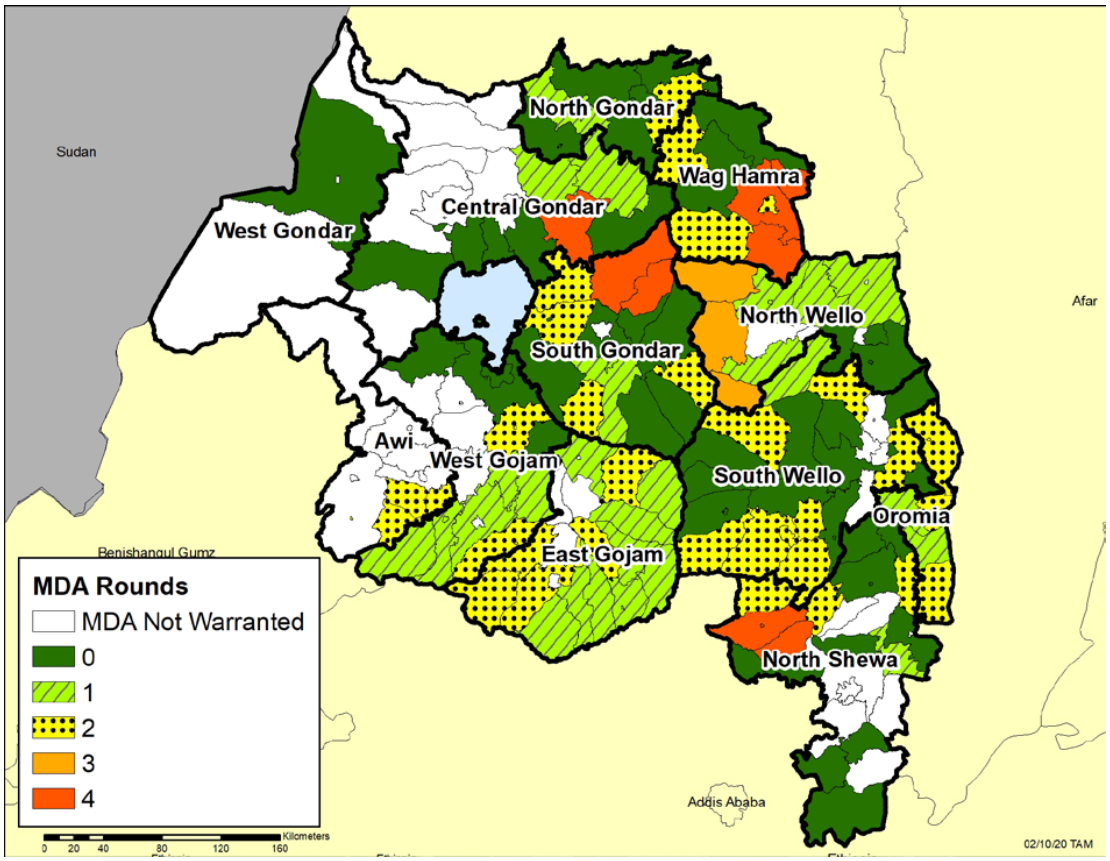
Baseline, 2007



March 2020



Amhara, Ethiopia: MDA Rounds Remaining, 2020



Destination Elimination: 20 Years of Trachoma Programming in Mali

Submitted 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 and initiated TT surgical services. The full SAFE strategy was rolled out across Mali, with MDA activities launching in 2001 and F&E activities in 2003. Critically, impact surveys began in 2005 to map the progress towards elimination. By the end of 2016, all districts in Mali had reached the elimination threshold for TF and no further MDA was required. To address the TT backlog, the program adopted the *ratissage* strategy, moving house-to-house in villages to ensure every TT case was identified and offered surgical services. The 1996-1997 survey showed the backlog in Mali was approximately 85,000. By the end of 2019, the program estimates only 769 cases remained. The National Trachoma Control Program has made tremendous progress since its commencement in 1999 and hopes to achieve elimination in 2020 and be the second sub-Saharan African country to submit the WHO dossier to the validation committee. Insecurity remains the greatest challenge and limits the program's access to districts with the remaining TT cases. The program remains prepared to send teams into those districts when security permits.

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
2005-2019: Impact and surveillance surveys conducted
2014-2019: PNLC becomes PNSO; National Program adopts *ratissage* as TT case management strategy
2020: Target date for elimination of trachoma in Mali

Table 1. Program Achievements, 1999-2019

Indicator	National Program	Carter Center-Assisted
# of persons operated	**89,398**	**30,930***
# of women operated	**53,639**	**18,558**
# of surgeons trained	**179**	**30**
# of surgeons retrained	**105**	**20**
Doses of azithromycin distributed during MDA	**29,126,964**	**698,083**
Doses of tetracycline distributed during MDA	**582,539**	**120,795**
# of villages with health education	**7,503**	**3,886**
# of household latrines built	**154,830**	**116,230**

*Support began in 2008

Surgery (S)

The 1996 baseline survey in Mali revealed that 75% of districts surveyed were endemic for trachoma. The National Trachoma Control Program has made tremendous progress towards the elimination of trachoma as a public health problem. From 1999 through 2019, the National Program conducted 89,398 TT surgeries, 30,930 of which were assisted by The Carter Center. Women received 60% of surgical services. A total of 179 TT surgeons were trained, and 105 surgeons received refresher training. The 1996 survey revealed that the TT backlog was approximately 85,000. By the end of 2019, an estimated 769 people remain to be operated. These cases are located in districts in Mopti and Segou regions, which are insecure and currently inaccessible to surgical teams.

The National Program has implemented the *ratissage* strategy since 2014 to locate and operate on the remaining TT cases in the country. Prior to this, TT patients received surgery during TT camps and at community health centers. It became difficult to locate remaining cases using these methods, and therefore the program moved to *ratissage,* in which teams move house-to-house to identify TT cases and provide surgical services on site. The strategy is time consuming but has been successful in identifying cases. At least 8 districts used *ratissage* to clear their full backlog and demonstrated that the elimination threshold was reached.

Antibiotic Therapy (A)

The National Program conducted MDA from 2001 to 2016, at which point all districts in Mali had reached the TF threshold for elimination and therefore no longer require MDA. The number of doses distributed peaked in 2009. Nearly 30 million doses of antibiotics were distributed through MDA for trachoma in Mali. Most distribution stopped in 2012 and 2013, with only some districts treated since 2013, and all activities were completed by 2016. Impact surveys were conducted beginning in 2005, and surveillance surveys were conducted through 2019.

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

F&E activities have been critical to the success of the program in Mali. Community and school-based initiatives have been ongoing since 2003. Collaboration with other official programs, such as the National Directorate of Hydraulics and the National Directorate of Pedagogy, has been key. A total of 7,503 villages have had access to health education related to trachoma. To carry out activities, training was provided to community and religious leaders, women's groups, and masons. Leaders and women's groups are able to

conduct activities and dialogues within their communities to teach others how to prevent transmission of trachoma. Masons are trained to lead latrine construction within villages. The Carter Center and other organizations assist in providing materials required for construction.

Trachoma activities are also carried out in primary schools in Mali. Trachoma-specific activities and information have been added to the primary school curriculum. Teachers and mothers of students have been trained on the revised curriculum to ensure it is carried out in classrooms and in the students' homes. Students can also act as agents of change in their communities and share the lessons learned with siblings, neighbors, and other community members.

Transition Planning and Dossier

Work on Mali's dossier to validate the elimination of trachoma as a public health problem is well underway. A task force was established in July 2018 to coordinate work on the dossier, and both the data and narrative portions of the dossier are in process. The National Committee for the Validation of the Elimination of Trachoma as a Public Health Problem in Mali was established in June 2018, and records from meetings held by this committee are on file. A workshop was held in October 2018 to review the validation process. Finally, a workshop was held in January 2020 to review the draft dossier. While the dossier is not yet complete, some lessons learned have already been noted, including the importance of organizing data and engaging a data manager to assist, having a plan in place for drafting the dossier prior to the end of activities, and collaboration between all stakeholders.

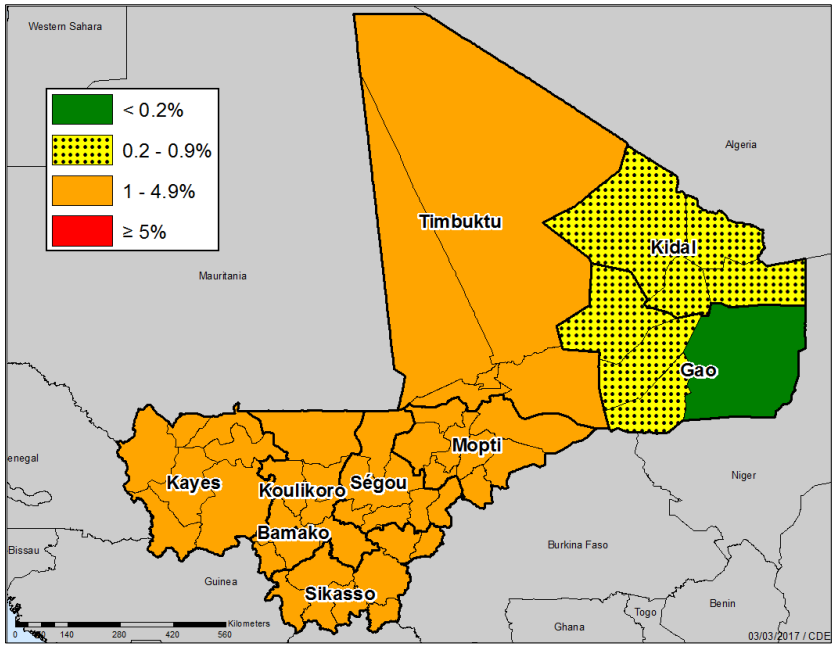
The program has been preparing for post-elimination transition. A total of 69 eye care units have been established in almost all districts in the country. The eye care units are managed by individuals who have been trained to manage incident cases of TT that may present at the district level. The National Program will continue to support training of ophthalmic assistants annually and will continue to provide TT kits and consumables to the eye care units. Additionally, the program continues to coordinatecollaboration between national authorities and the WASH sector to ensure WASH activities continue in villages. Finally, the National Program will ensure that all data is formatted and included in the national health information system, which is managed by the MOH.

Activities Remaining in 2020 to Achieve Elimination

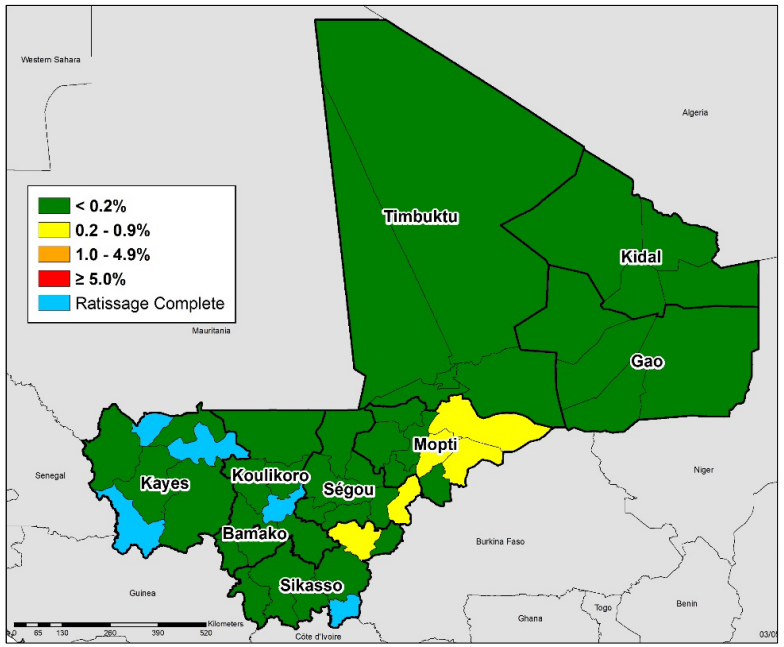
While the program plans to complete all activities and submit their completed dossier in 2020, some activities remain in order to achieve elimination. Districts in Mopti and Segou remain inaccessible and contain the remaining TT cases to be operated. Security has been a challenge for the National Program for many years and has delayed activities in the past. The program remains prepared to get surgical teams into these districts as soon as security permits. Several districts still require surveillance surveys and targeted *ratissage*. The program continues to work towards the integration of trachoma-related activities into the routine health system, as well as determining how to support the provision of TT kits and consumables to the district-level eye care units. Finally, the program is in the process of completing the dossier so that it can be submitted as soon as these final activities are completed and data collection is complete.

Mali: TT Prevalence among Adults ≥ 15 years

Baseline, 1996

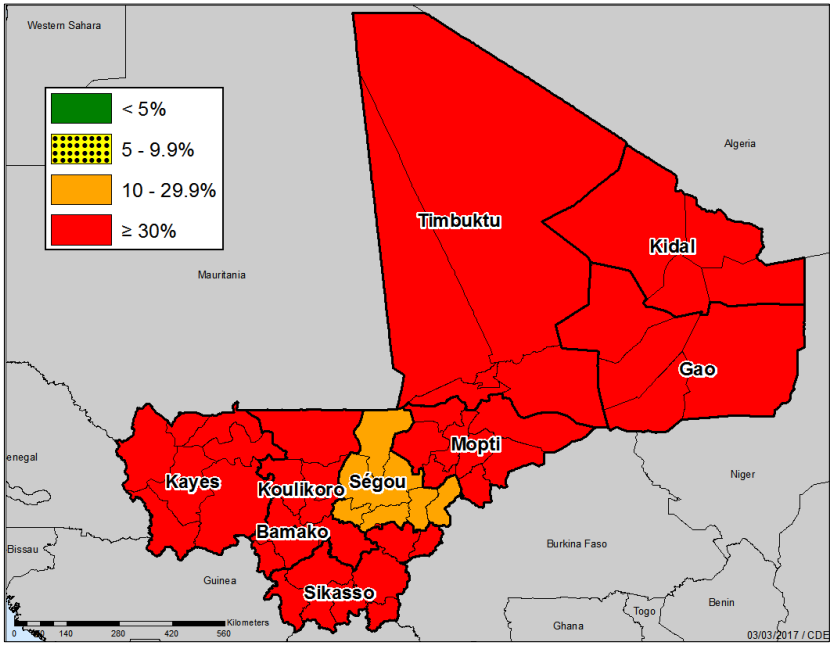


March 2020

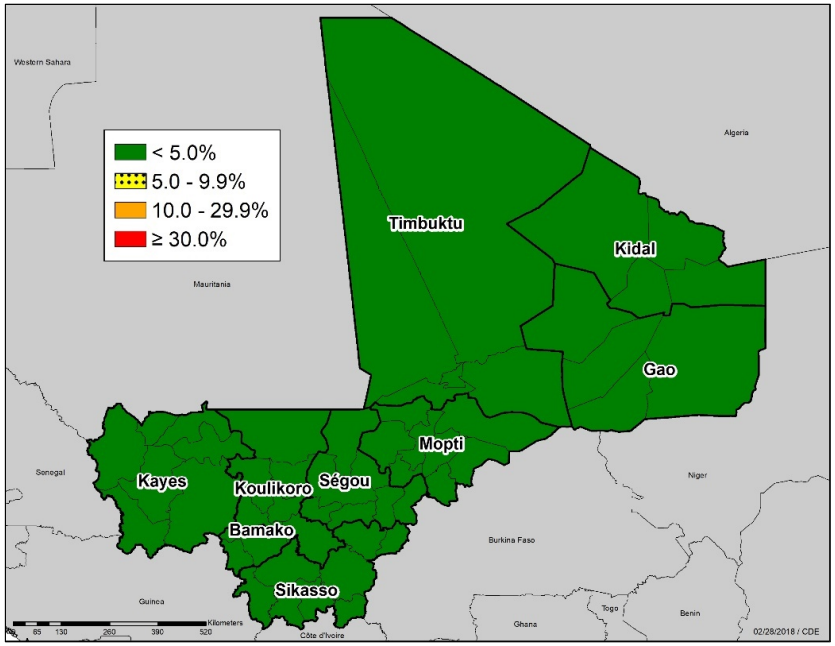


Mali: TF Prevalence among Children 1-9 years

Baseline, 1996



2019



SAFE in Niger

Submitted by Dr. Kadri Boubacar, 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 trachomatous inflammation-intense and 1.7% of women over 15 years of age had trichiasis. In 1999, the PNLC formed the NTTF, and beginning in 2001, prevalence surveys were conducted at the district level. 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. These statements were made during a TT surgical outreach week in March 2013. Also, in 2013, the program changed its name from PNLC to PNSO. Trachoma impact surveys have been conducted per WHO guidelines since 2006, with the most recent surveys conducted in 2018. In 2019, based on remaining SAFE activities, the program revised the target for elimination from 2020 to 2025.

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: Impact surveys conducted
2007: NTD Program launched
2010 and 2012: TIS conducted
2013: PNLC becomes PNSO
2015-2016: Impact surveys conducted
2018: Impact surveys conducted
2025: Target date for the elimination of trachoma

Table 1. Program Achievements in 2019

Indicator	Goal	National		Carter Center-Assisted	
		Target	Achieved	Target	Achieved
# of persons operated	18,244	15,000	8,149 (54%)	7,000	5,316 (76%)
# of women operated			5,052		3,246
# of surgeons trained		38	51 (134%)	10	24 (240%)
Doses of azithromycin distributed during MDA	3,541,627	3,541,627	3,152,048 (89%)	N/A[1]	N/A
Doses of tetracycline distributed during MDA	100,000	100,000	100,000 (100%)	100,000	100,000 (100%)
# of villages with health education		600	600 (100%)	600	600 (100%)
# of household latrines built		20,000	18,635 (93%)	10,000	10,043 (100%)

Surgery (S)

The PNSO has been supporting TT surgical activities since 1999. The number of patients operated per year increased steadily with a peak from 2011 through 2015. In 2019, 8,148 people received TT surgery, which represents 54% of the annual target of 15,000. The Carter Center planned to operate 7,000 TT patients in 2019 and reached 5,316 surgeries, or 76%. A total of 51 new TT surgeons were trained in 2019, including 24 with support from The Carter Center. At the end of 2019, the estimated surgical backlog in Niger was 8,540, which the program hopes to complete in 2020.

The program conducted TT case finding activities in 2019. A total of 209,269 people were screened for TT, and 2,730, or 1.3%, were found to have TT. Of those cases, 88%, or 2,407 received TT surgery. The remaining 12% of cases refused surgery.

A surgical audit completed in 2011 showed a recurrence rate of approximately 30%. Since then, the PNSO has focused on this issue and conducts annual audits on the post-operative follow-up of TT patients after 6 months. The quality of surgery has improved and in 2019, the audit showed the recurrence rate at less than 10% in all districts.

Antibiotic Therapy (A)

The National Program reports that 52 out of the 72 districts in Niger have a TF prevalence of less than 5%. A total of 34 districts have reached the elimination threshold for both TF and TT. In 2019, 15 districts with a population of 3,541,627 were targeted for MDA, and 3,149,215 people, or 89%, were treated with azithromycin. In 2020, 9 districts will conduct MDA and 11 districts will conduct TIS. Finally, 2 TSS will be conducted.

Facial Cleanliness (F) & Environmental Improvement (E)

In 2019, health education activities were conducted in 600 villages across Niger. The National Program supports the training of masons and provides materials for latrine construction. A total of 18,635 latrines were constructed, with 10,043 supported by The Carter Center. Significant progress has been made on the collection of latrine data, due to the involvement of the regional hydraulic services. The program also

[1] The Carter Center does not currently assist MDA in Niger.

continues to support health education in primary schools, specifically ensuring the trachoma curriculum is included in teaching plans.

Transition Planning & Dossier

The PNSO is currently focused on organizing data to be used to complete the dossier. This includes updating data, restitution of data to newly created districts, and ensuring that each region is sharing data and information with its districts.

Programmatic Challenges

Status of 2019 Program Review Meeting Recommendations

Recommendation 1: The Niger Trachoma Control Program should consider all possible initiatives to clear the TT surgery backlog including increasing the number of TT surgeons, camps, campaigns, ratissage, and case finders, especially and immediately in Zinder.

Status: Significant progress was made in 2019. A total of 8,159 TT cases were operated, and 8,540 cases remain. Also, 51 new TT surgeons were trained.

Recommendation 2: If ratissage is used, the PNSO should establish clear criteria and data needed to properly document and ensure the strategy is implemented with surety that population and or geographic coverage is attained.

Status: A training of trainers for *ratissage* is scheduled for April 2020, with assistance from the National Program in Mali.

Recommendation 3: The Niger Trachoma Control Program should consider training women to conduct case searching and perform TT surgery, especially in areas where reaching women is a challenge.

Status: There are not many areas where women's access to care is limited, therefore there was no need to train women's groups.

Recommendation 4: The Niger Trachoma Control Program should strive to improve MDA treatment coverage in districts not achieving at least 80% reported coverage.

Status: Several International Trachoma Initiative (ITI) support missions took place in 2019 to audit the MDA and propose possible solutions to improve treatment coverage. Currently, these reforms are being implemented for MDA in 2020.

Recommendation 5: The Niger and Nigeria Trachoma Control Programs should consider cross-border exchange of information in 2019 with the support of partners.

Status: Cross-border exchange with Nigeria took place with support from ITI, however, the agreed-upon training was not conducted due to a lack of additional funds.

Recommendation 6: The Niger Trachoma Control Program should consider operational research supported by The Carter Center to collect dried blood spots (DBS) for long-term recrudescence monitoring in formerly high endemic areas.

Status: The PNSO and The Carter Center have agreed to conduct this research.

Targets for 2020

Surgery (S)

- Operate 8,540 TT patients, 5,316 with Carter Center assistance
- Train 45 TT surgeons, 16 with Carter Center assistance

Antibiotic Therapy (A)

- Distribute 1,755,283 doses of azithromycin
- Distribute 150,000 doses of TEO; all doses of TEO will be provided by The Carter Center
- Conduct 11 TIS and 2 TSS

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

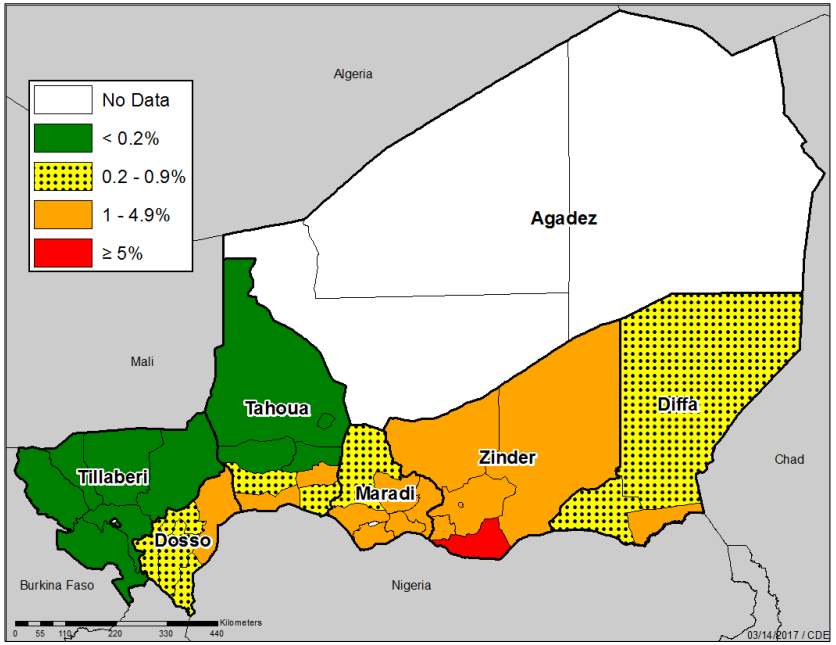
- Conduct health education in 600 villages, all with Carter Center assistance
- Construct 20,000 latrines, 10,000 with Carter Center assistance

Operational Research

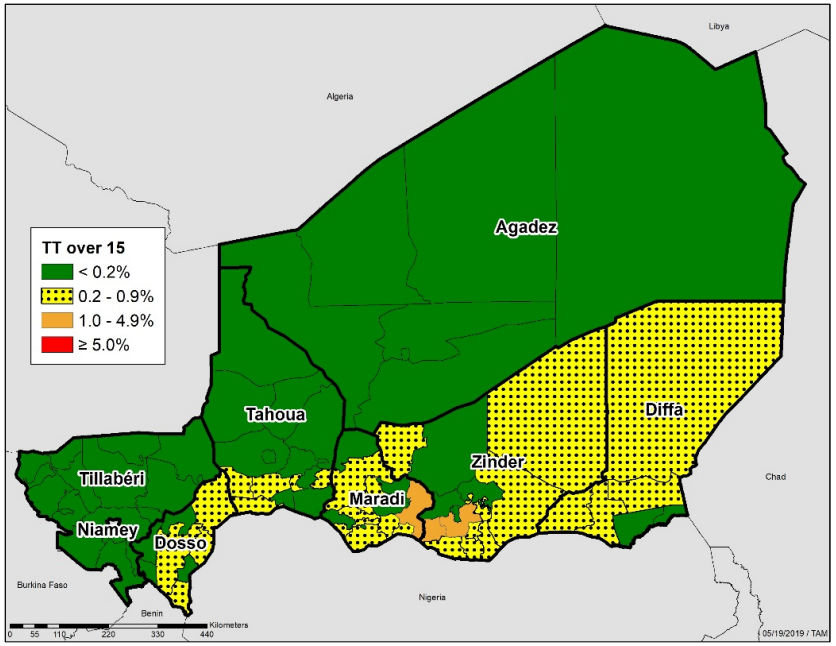
- Proposed: Asses the opportunities for long-term surveillance of recrudescence in formerly highly endemic areas, with support from The Carter Center

Niger: TT Prevalence among Adults ≥ 15 years

Baseline, 2000-2007

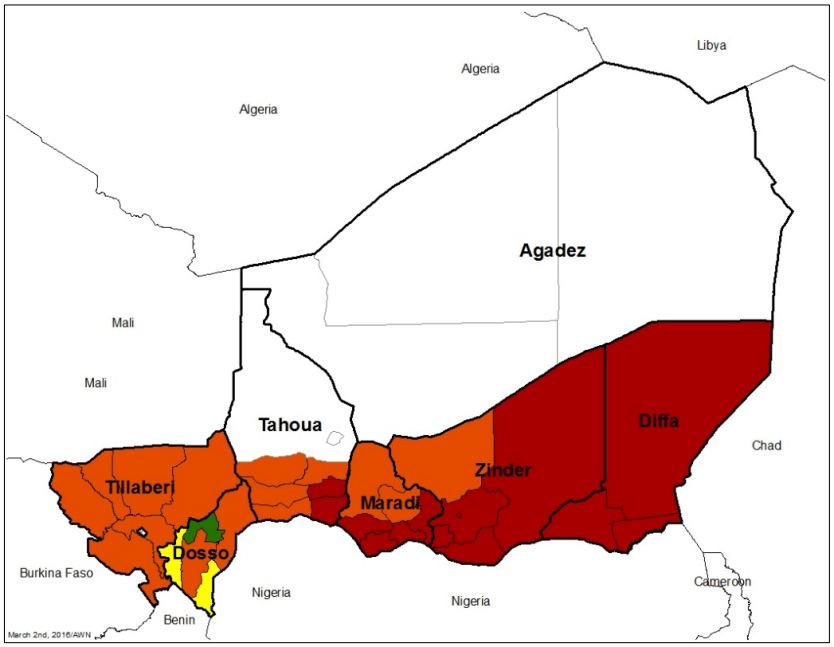


2019

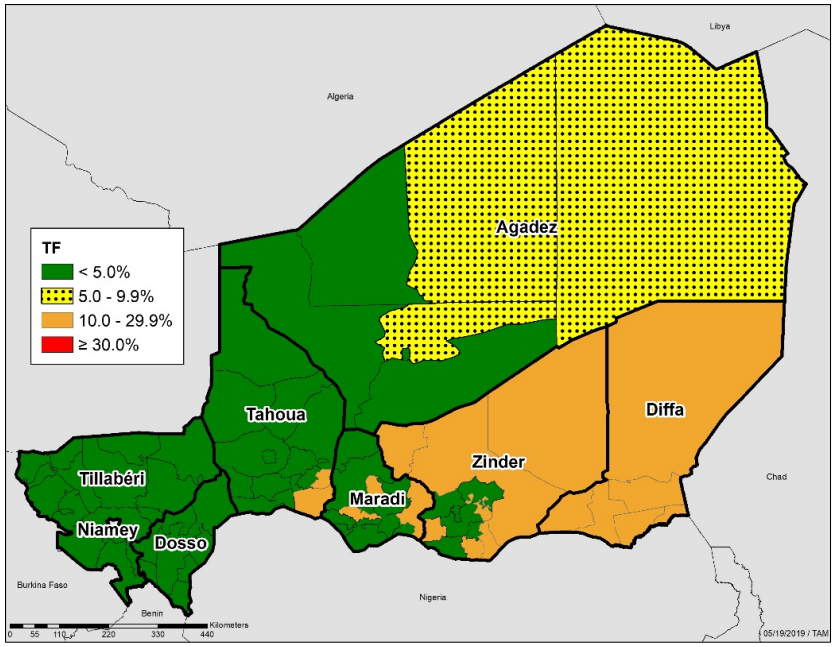


Niger: TF Prevalence among Children 1-9 years

Baseline, 2000-2007



2019



SAFE in South Sudan

Submitted by Mr. Makoy Samuel, Director for Guinea Worm Eradication Program and PC-NTDs, Ministry of Health, South Sudan

Background

Prevalence surveys conducted between 2001 and 2006 showed TF prevalence as high as 77.2% among children ages 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 Global Trachoma Mapping Project (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. Activities were suspended again from May 2016 through August 2017. Following this, MDA was conducted in Kapoeta East, Kapoeta South, and Kapoeta North. In July 2018, TT surgical services restarted in Kapoeta state, following several years of no activity. In January 2019, a workshop was held to develop a TAP for Kapoeta and Torit states. Highlights of 2019 and early 2020 trachoma activities include the first ever trachoma MDA in an IDP camp in South Sudan as well as the return of MDA and surgery in two counties that had not been reached since 2016. Furthermore, close collaboration with the Guinea Worm Eradication Program (GWEP) led to a Guinea worm case sweep during the MDA in Eastern Equatoria.

Timeline of Events

1999-2010: Baseline mapping
2005: Comprehensive Peace Agreement signed
2007: MOH Government of Southern Sudan Trachoma Control Program established
2011: South Sudan gains independence
2012: National TAP finalized
2015: First TIS conducted in Budi, Lopa/Lafon, Kapoeta East, Kapoeta North, and Kapoeta South
2017: MDAs begin in Kapoeta East, Kapoeta South, and Kapoeta North
2018: TT surgeon training in HEADSTART in Kapoeta state
2019: TAP developed for Kapoeta and Torit states
2020: First round of MDA conducted in Budi and second round in Lafon
2030: Trachoma elimination goal

Table 1. Program Achievements in 2019

Indicator	Goal	National		Carter Center-Assisted	
		Target	Achieved	Target	Achieved
# of persons operated	2,650	2,650	1,625 (61%)	530	517 (98%)
# of women operated			1,306		461
# of surgeons trained/retrained		15	0	N/A	N/A
Doses of azithromycin distributed during MDA	501,582	303,030	265,145 (87.5%)	303,030	265,145 (87.5%)
Doses of tetracycline distributed during MDA	15,575	15,575	18,154 (116%)	15,575	18,154 (116%)
# of villages with health education		1,000	1,202 (120%)	1,000	1,202 (120%)
# of household latrines built		N/A	N/A	N/A	N/A

Surgery (S)

At the national level, 61% of the annual target for surgeries was met in 2019. This includes TT surgeries carried out by The Carter Center as well as through national eye outreach campaigns (Buluk Eye Clinic) and in certain health facilities. Women still constitute the largest caseload, with over 80% of patients being female. The current backlog for Eastern Equatoria State stands at 2,655 TT patients.

Although no surgeon training was carried out in 2019, a surgeon audit is planned for 2020 to provide ongoing support to the Carter Center TT surgeons in Kapoeta, Eastern Equatoria State. An approved protocol has been established and a preliminary Memorandum of Understanding (MOU) is in place with the Ophthalmic Association of South Sudan (OASS), who will carry out the audit.

TT case finding has been improved through increased supportive supervision of TT case finders. Experienced case finders are paired with new, local case finders after training, to ensure that cases are accurately identified when searching house-to-house during a campaign. This approach focuses on TT case finding quality, whose positive results are seen when considering that of the 751 suspected TT patients identified by case finders, 603, or 80%, were confirmed with entropion by the TT surgeons.

After identification and screening, patients are transported by vehicle and brought to the selected health facility before being treated, and then returned home the following morning. Case studies to validate this overnight surgery approach and consequent patient follow-up after 1 night, 10 days, and 3 to 6 months are anticipated in 2020.

Antibiotic Therapy (A)

The 2019 MDA cycle in South Sudan began in August with a pilot round of MDA in two United Nations Protection of Civilians (PoC) camps in Juba. A total of 25,035 IDPs from known hyperendemic areas were treated with either azithromycin tablets, azithromycin syrup, or TEO across both camps. From September to December, 3 Kapoeta counties in Eastern Equatoria received the fourth of 5 rounds of MDA, while February and March 2020 saw a first round of MDA in Budi county, and a return of MDA to Lopa-Lafon county (second of 5 rounds; Budi and Lopa-Lafon results not included in 2019 cycle). These counties were previously mapped for trachoma prevalence in 2015.

Of the annual MDA target for 2019, 283,307 people were reached with azithromycin or TEO, or 87.5% of national target, across 3 counties and 2 PoCs. Through MDA, 283,307 people were treated, including

approximately 168,000 doses of azithromycin tablets, 97,000 doses of azithromycin syrup, and 18,000 doses of TEO.

An indirect form of cascade training is used to train all supervisors and distributors. County health supervisors are initially consulted for planning purposes and are later responsible for recruiting supervisors and distributors. The supervisors are trained together by Carter Center Program Officers and are then involved in the training of distributors, with support from the Program Officers. This ensures that high-quality training is provided throughout, notably in terms of drug management and dosage, data recording, and adverse event management. Over the course of the 2019 MDA cycle, over 311 drug distributors were trained and deployed.

Facial Cleanliness (F) & Environmental Improvement (E)

Health education on the F&E components of the SAFE strategy is continuous throughout surgery and MDA campaigns. Drug distributors, TT case finders, supervisors, county authorities, and local chiefs are all trained on the use of the trachoma flipchart. During any distribution, an emphasis is placed on providing health education in schools. Increased integration of WASH partners for trachoma – and NTDs in general – is critical for increased collaboration between WASH and NTD partners.

Programmatic Challenges

Despite the endurance of the Trachoma Control Program, certain challenges remain, including a largely incomplete baseline mapping of trachoma prevalence outside of Eastern Equatoria, a lack of partner support to implement the SAFE strategy in known endemic areas, an incomplete centralization of data from different partners, and finally, a lack of funding for potential expansion of activities and their reach.

Status of 2019 Program Review Meeting Recommendations:

Recommendation 1: The South Sudan Trachoma Control Program should convene a group of TT technical and programmatic experts to develop best practices for TT surgery in South Sudan.

Status: This activity is planned for June 2020.

Recommendation 2: The South Sudan Trachoma Control Program should conduct a surgeon audit.

Status: An audit protocol was finalized and approved in 2019. An MOU was established between The Carter Center and OASS to be used when a surgeon audit is feasible (based on sample size reached per surgeon per campaign)

Recommendation 3: The South Sudan Trachoma Control Program should consider, where possible, working with the National GWEP to promote awareness creating and knowledge of cash reward.

Status: The National Program team integrated into the existing structures of the GWEP during the Kapoeta State MDA to promote awareness of the cash reward offered by the GWEP. Through this integrated activity 111 rumors and 67 suspected cases were reported and treated.

Targets for 2020

Surgery (S)

- Operate 1,200 TT patients, 530 with Carter Center assistance
- Train 5 TT surgeons

Antibiotic Therapy (A)

- Distribute 506,651 doses of azithromycin, 303,030 doses with Carter Center assistance
- Distribute 16,043 doses of TEO, all with Carter Center assistance
- Conduct 29 baseline surveys

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

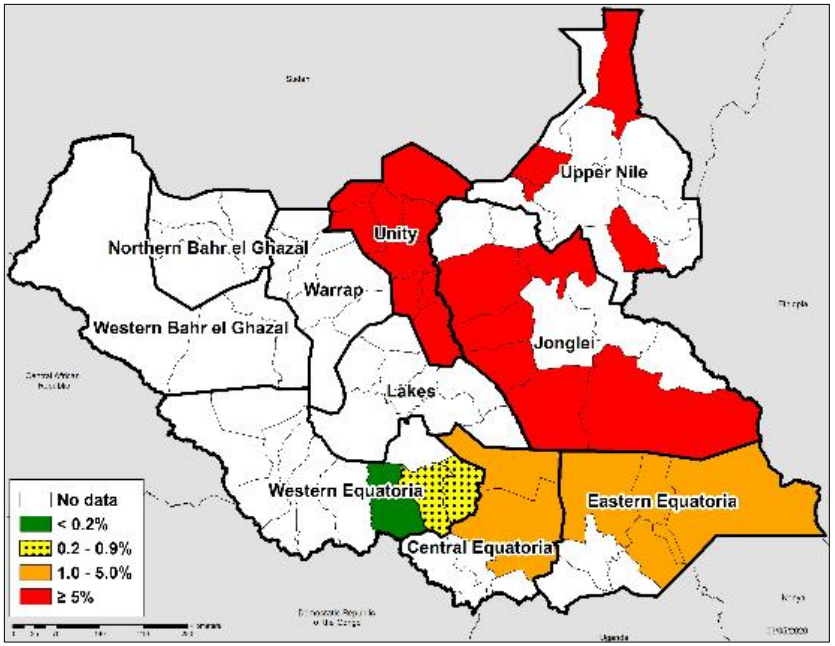
- Conduct health education in 1,000 villages, all with Carter Center assistance
- Construct 80 latrines

Operational Research

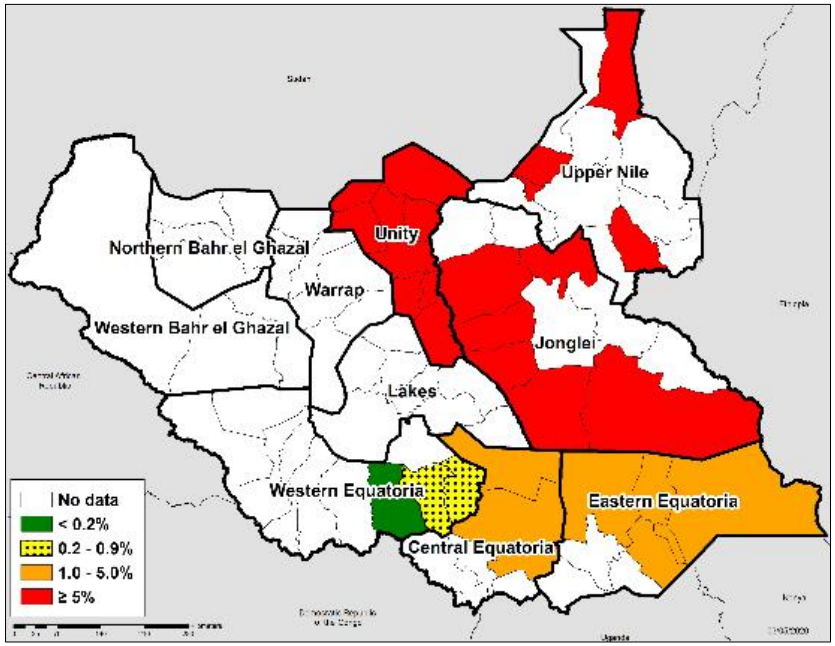
- Proposed Study: F&E qualitative study among Toposa mothers

South Sudan: TT Prevalence among Adults ≥15 years

Baseline, 2001-2010

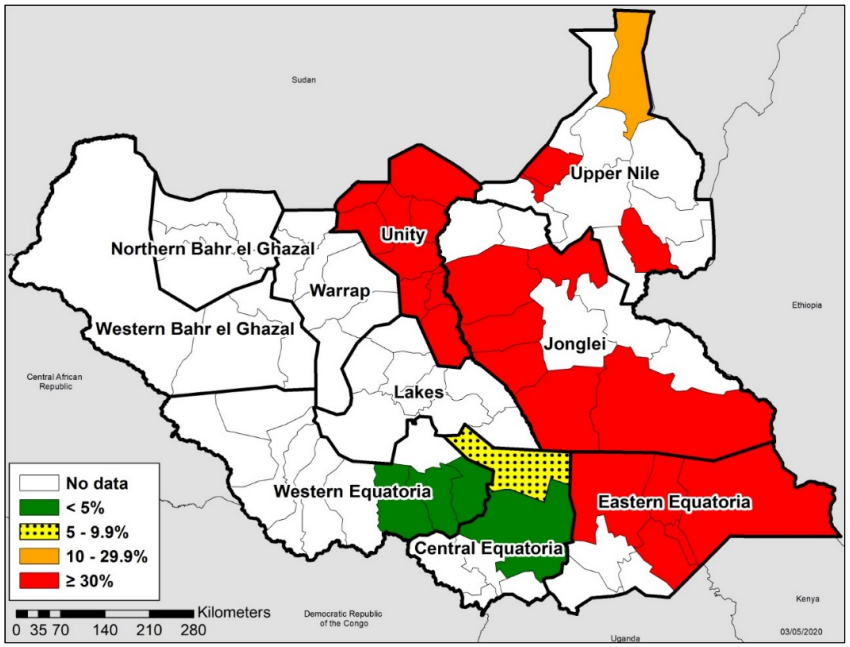


2019

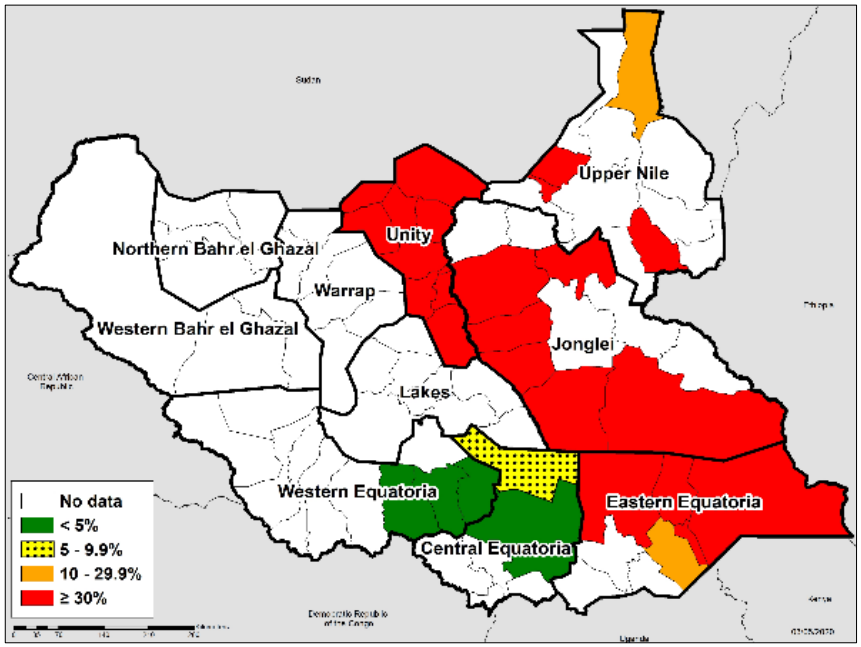


South Sudan: TF Prevalence among Children 1-9 years

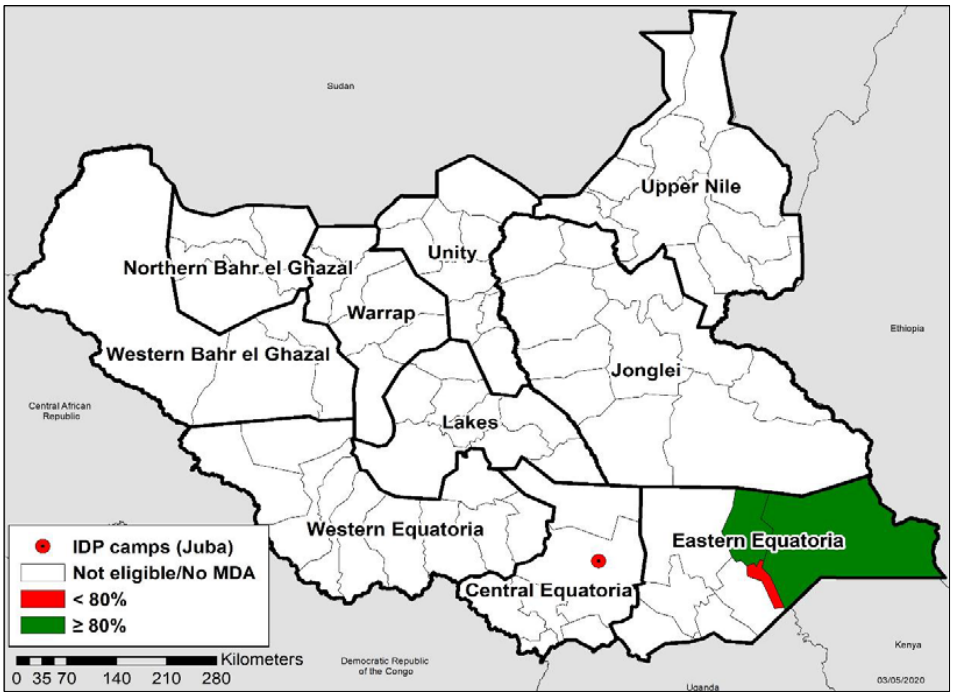
Baseline, 2001-2010



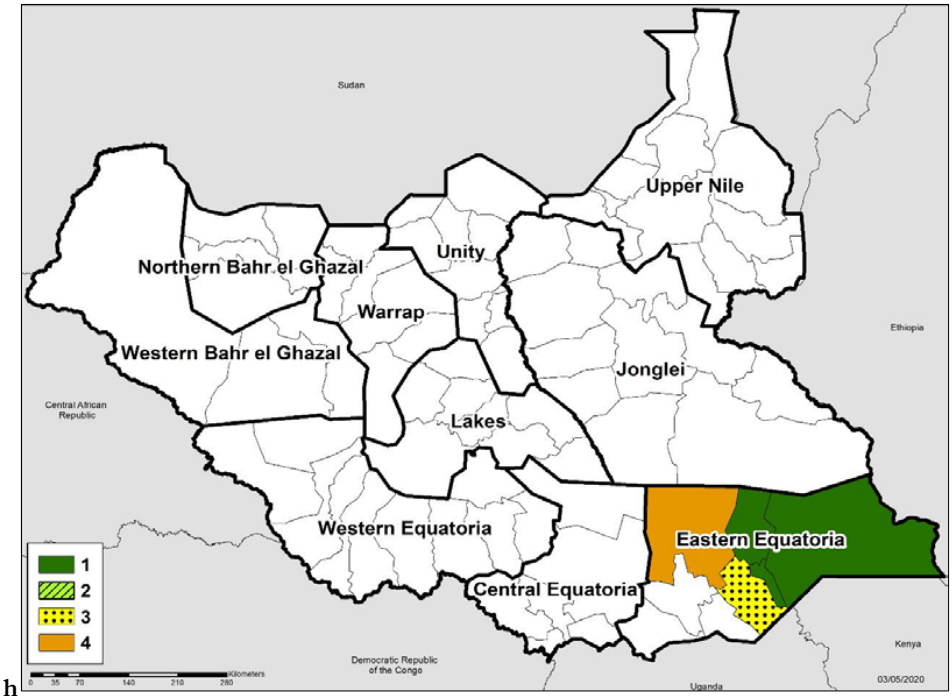
2019



South Sudan: MDA Coverage by District, 2019



South Sudan: MDA Rounds Remaining, 2019



h

SAFE in Sudan

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

Background

The Federal Ministry of Health 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 in all areas except Darfur. Mapping was almost completed in Darfur in 2015 through the coordination of the FMOH, GTMP, Sightsavers, and The Carter Center; although 14 localities remain to be mapped. In 2017 and 2018, the first surveillance surveys were conducted in El Jabalain and Dongola localities. Additionally, in 2018, SAFE activities were implemented in South Sudanese refugee camps, after a baseline survey conducted in 2017 showed that full SAFE intervention is warranted. 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 the United Nations Children's Fund (UNICEF) and other organizations. Though The Carter Center does not directly fund E activities, it supports advocacy for this component. In 2019, based on activities remaining in Sudan, the elimination target was revised from 2020 to 2025.

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 trachoma control program, targeting Khartoum state and Darfur region
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 survey conducted in El Jabalain locality and TT only pilot surveys conducted; F&E workshop completed; baseline survey conducted in South Sudanese refugee camps
2018: Surveillance survey conducted in Dongola locality; impact surveys started in Darfur states; SAFE interventions implemented in South Sudanese refugee camps; ESPEN begins supporting trachoma control program targeting Darfur region
2019: Conducted serological monitoring of Ct antigens in 2 localities in North Darfur state
2025: Target date for elimination of trachoma

Table 1. Program Achievements in 2019

Indicator	Goal	National		Carter Center-Assisted	
		Target	Achieved	Target	Achieved
# of persons operated	36,145	7,500	1,347 (26.9%)	2,100	230 (10.9%)
# of women operated			768		134
# of surgeons trained		30	43 (143%)	N/A	N/A
Doses of azithromycin distributed during MDA	2,290,233	1,952,631	1,948,156 (99.8%)	337,602	122,651 (36%)
Doses of tetracycline distributed during MDA	45,805	39,053	32,970 (84.4%)	6,752	3,809 (56.4%)
# of villages with health education		1,583	1,575 (99.4%)	131	123(93.8%)
# of household latrines built		N/A	N/A	N/A	N/A

Surgery (S)

In 2019 the National Program provided 1,347 TT surgeries, reaching 26.9% of its annual target. The Carter Center assisted 230 of the total surgeries, achieving 10.9% of it is annual targets. The total number of women operated by the National Program was 768. The Carter Center supported 134 surgeries for women. The estimated surgical backlog in Sudan is now 36,145.

To increase uptake of TT surgery, 12 new Medical Assistants from 6 states were trained to diagnose TT cases during case finding activities. The training included theoretical and practical training on the case finding strategy. Of those trained, 14 participated in the practical training. Additionally, the program supported TT active search findings prior to each TT surgery camp. The case finding was implemented in 24 villages in Port Sudan locality, where 121 case finders and team leaders were selected from the communities. Over 3 days, 23,093 people were screened for TT through the case finding strategy. A total of 81 TT cases were confirmed, which is 0.35%. TT surgery was provided to 58 patients, epilation was provided to 4 patients, 4 patients were referred to the hospital for more advanced treatment, and 8 patients refused surgery. An additional 7 patients were given appointments for surgery but did not present for surgery.

The program is planning to begin implementation of either TT surgery validation or surgical audits after a TT officer is appointed at the FMOH level to work on both. This person will also supervise TT surgeries and ensure increased TT output evaluations are conducted. The National Program is also planning to coordinate with the Sudan Public Health Training Initiative on TT surgery training to increase outreach and further understanding of the TT backlog estimations.

Antibiotic Therapy (A)

The National Program has completed trachoma prevalence surveys in all accessible areas. Surveys recently restarted in late 2019 in newly accessible areas in North Darfur. Two localities were surveyed, and one of the localities showed a TF prevalence above 10%. Impact surveys were conducted in 4 localities, and of those surveyed, 3 reached the elimination threshold for TF. A surveillance survey was conducted in one locality and the TF was less than 5%.

Through MDA in 2019, a total of 1,948,156 doses of azithromycin and 32,970 TEO doses were distributed by the National Program. The Carter Center assisted in distributing of 122,651 azithromycin doses and 3,809 TEO doses in South Sudanese Refugee camps in Aljabalain and Alsalam localities in White Nile state. There are 9 camps in these localities. MDA was conducted in all camps and hosting communities. Coverage was

lower than planned possibly due to several reasons including an overestimation of population figures either in the camps or hosting communities, regular movement by refugees into nearby communities, and seasonal work which takes many adult men away from the camps.

Facial Cleanliness (F) & Environmental Improvement (E)

The National Program carried out F&E activities during MDA and TT surgical camps in addition to direct sessions at schools and communities. A total of 20 health promoters worked on raising awareness among the population through advocacy sessions and mobile mass media. Additionally, 332 drug distributors participated in raising awareness during MDA. A total of 254 health education sessions were carried out and attended by women, men, and children. Thousands of posters, flipcharts, leaflets, T-shirts, caps, and bags were distributed. The program also supported broadcasting radio messages and live television health programs. Trachoma curricula are taught in primary and secondary schools. Flipcharts and posters are used in schools, as well as role playing activities. Trachoma Friendship Societies are also being established in schools to promote health education activities.

The National Program has no direct interventions for water and latrines. However, the program does work to involve local and government partners in supporting water provision and latrine construction in trachoma-endemic communities. The other entities working in this sector include the Federal Ministry of Education, UNICEF, the State Ministries of Engineering, and the Dams Construction Unit.

Operational Research

In 2019, the National Program implemented the serological monitoring of Chlamydia trachomatis antigens. This study is a sub-study within a trachoma baseline survey which was conducted in Kotom, El Seraif, and Seraf Omrah localities in North Darfur state. The study is in partnership with the CDC and The Carter Center. Survey teams measure trachoma clinical signs as part of baseline surveys and collect blood samples. All individuals over the age of 1 were targeted for clinical examination and blood sample collection. DBS are collected and analyzed.

Programmatic Challenges

In general, the implementation of activities in Sudan was affected by economic and political factors. This resulted in the delay of several activities including 6 rounds of MDA, 2 TIS, 3 TSS,12 baseline surveys, as well as the delayed implementation of TT case finding training and camp interventions.

Status of 2019 Program Review Meeting Recommendations:

Recommendation 1: The Sudan Trachoma Control Program should pilot a house-to-house TT case finding approach that involves clear criteria and data needed to properly document and ensure the strategy geographic coverage is attained.

Status: House-to-house TT case finding approach continued in 2019, with implementation in the Port Sudan locality.

Recommendation 2: The Sudan Trachoma Control Program should aggressively begin surgical camps in Darfur.

Status: A lack of funds is delaying the start of surgical activities in Darfur.

Recommendation 3: The Sudan Trachoma Control Program should consider appointing a TT officer at the FMOH level to work for the National Program to supervise TT.

Status: In process.

Recommendation 4: The Sudan Trachoma Control Program should train many additional general medical officers to conduct TT surgery to drastically increase TT surgical services.

Status: The National Program trained 2 general practical and 2 medical assistants in 2019. The result of this training was not encouraging. Therefore, the program is looking at an alternative solution in which practical training for TT surgeries is included in the Academy of Health Science and in-service training.

Recommendation 5: The Sudan Trachoma Control Program should complete baseline surveys in Darfur as soon as possible.

Status: Baseline surveys have restarted in North Darfur state. So far, 3 localities have been surveyed and 14 remain to be surveyed. The surveys are scheduled for 2020.

Targets for 2019 and Plans to Meet Targets:

Surgery (S)

- Operate 5,400 TT patients, 2,100 with Carter Center assistance
- Train 30 TT surgeons

Antibiotic Therapy (A)

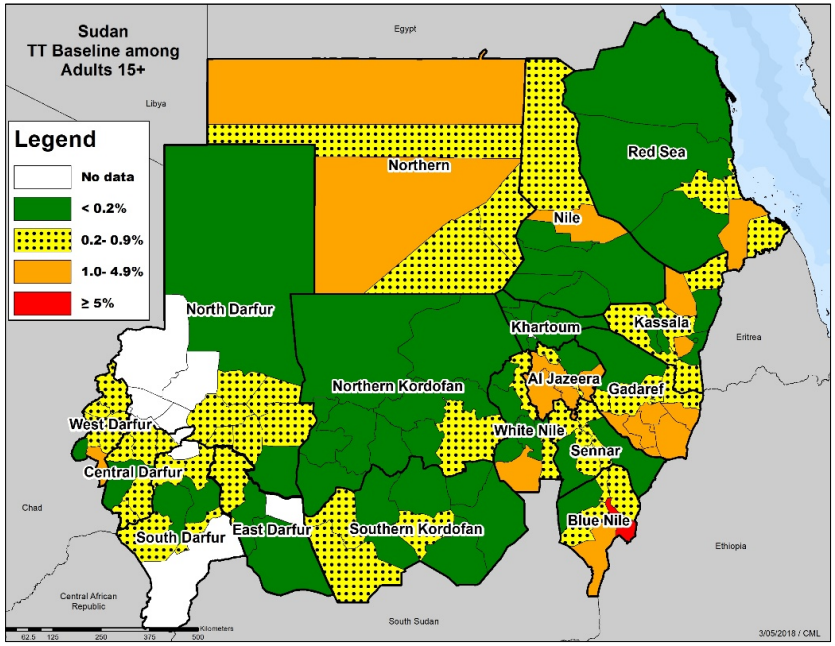
- Distribute 1,211,214 doses of azithromycin, 505,959 doses with Carter Center assistance
- Distribute 24,105 doses of TEO, 10,119 doses with Carter Center assistance
- Conduct TIS, TSS, and baseline surveys

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

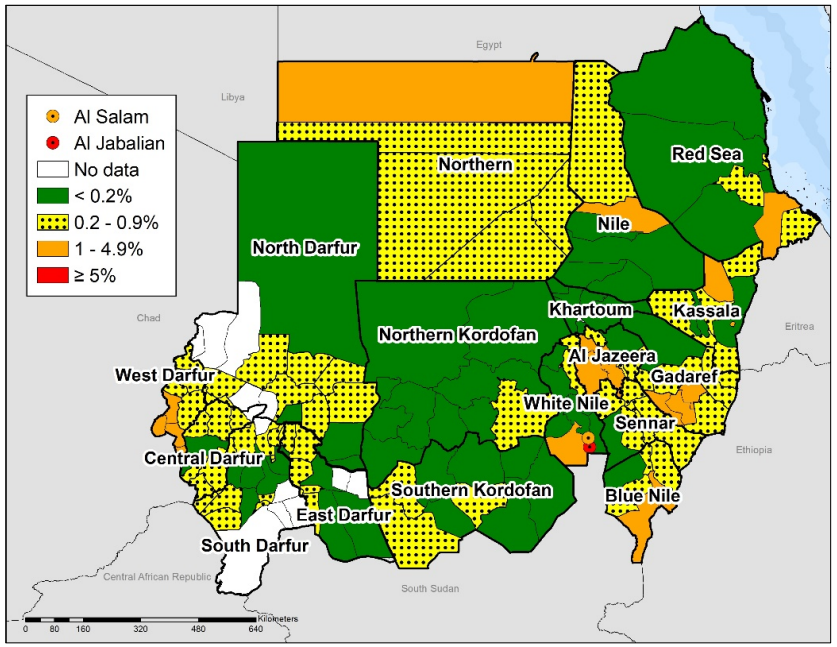
- Conduct health education in 1,530 villages, 30 with Carter Center assistance

Sudan: Prevalence of TT among Adults ≥ 15 years

Baseline, 2006-2019

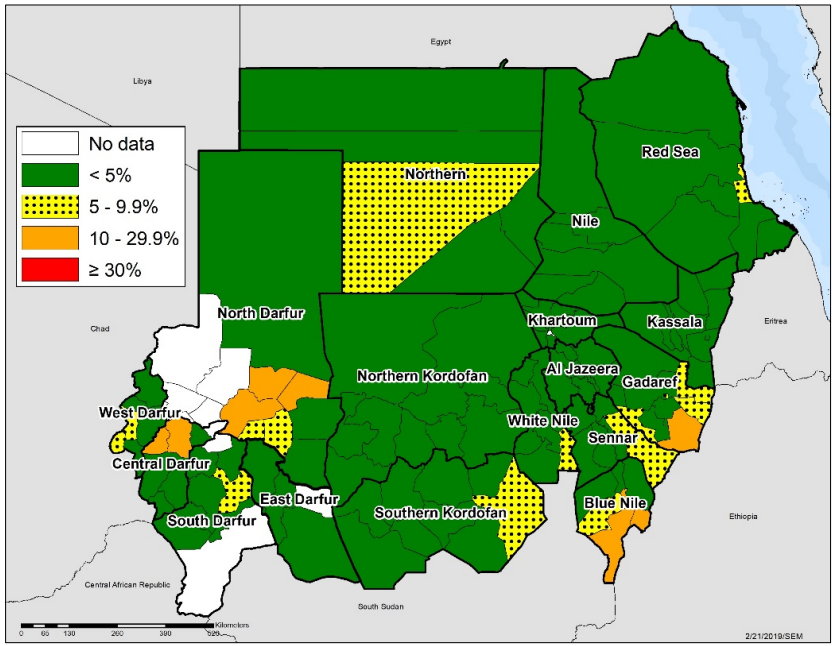


2019

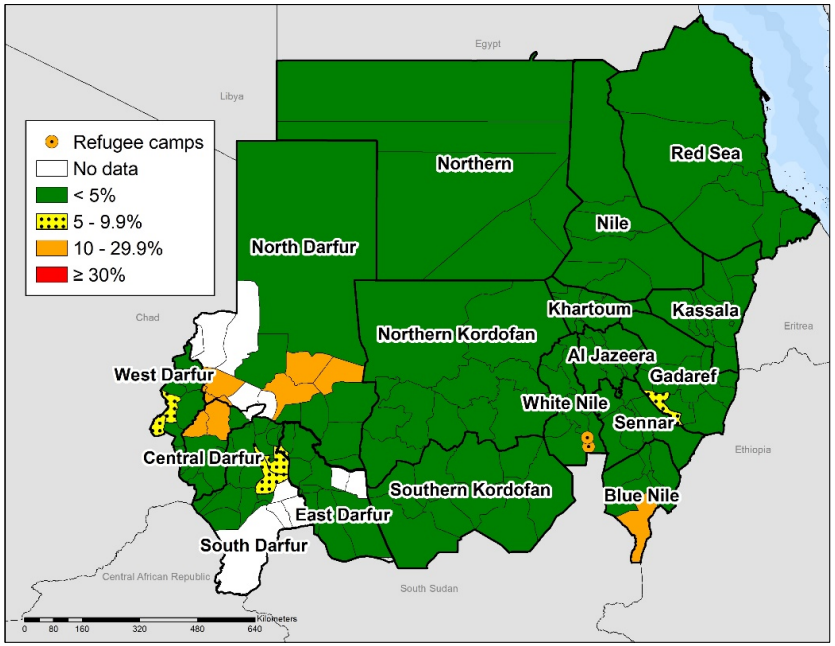


Sudan: TF Prevalence among Children 1-9 years

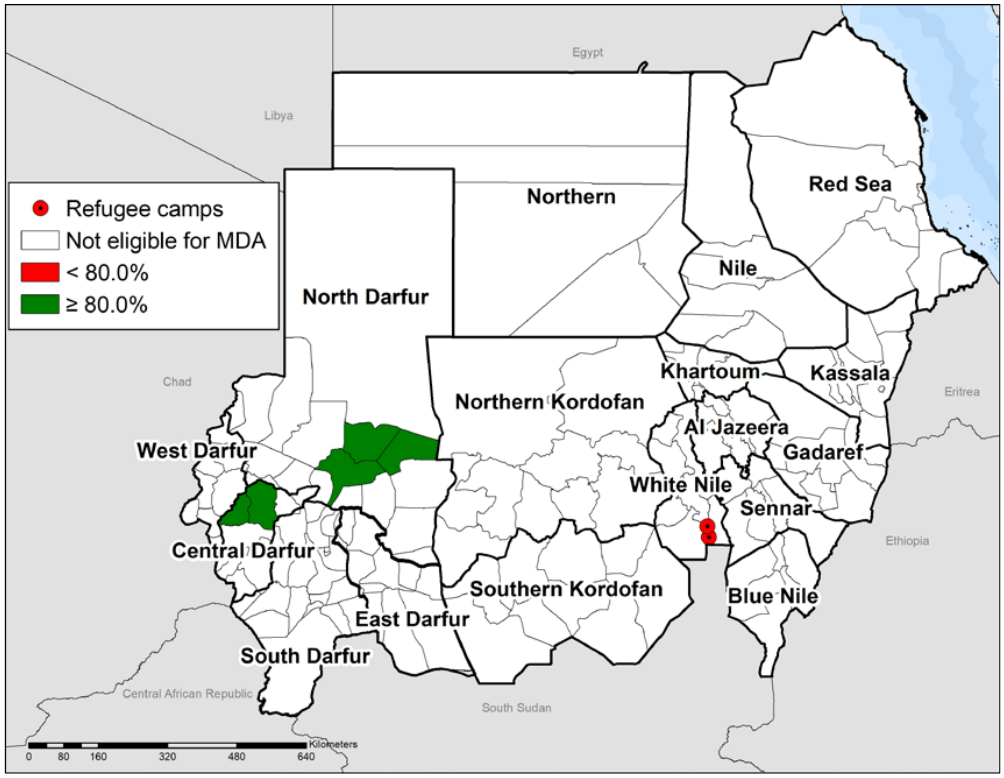
Baseline, 2006-2019



2019



Sudan: MDA Reported Coverage, 2019



Sudan: MDA Rounds Remaining, 2019

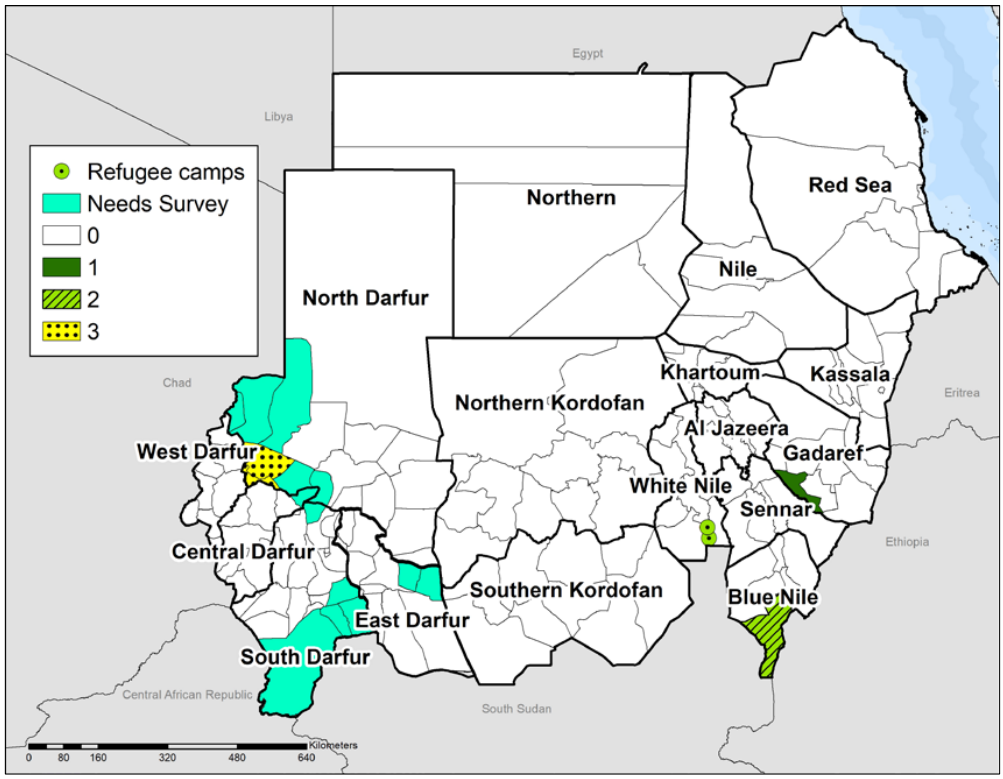


Table 1. Summary of National Data from Trachoma Control Programs (Carter Center-Assisted Countries)

National Data as Reported for 2019

	Mali	Niger	Sudan	South Sudan	Ethiopia	Total
Surgery						
Surgeries	N/R	8,149	1,347	1,625	N/R	**11,121**
2019 Target	N/R	15,000	7,500	2,650	N/R	**25,150**
Percent Coverage	N/R	54.3%	18.0%	61.3%	N/R	**44.2%**
Antibiotics						
Azithromycin						
Doses	N/A	3,152,048	1,948,146	265,145	N/R	**5,365,339**
2019 Target	N/A	3,541,627	1,952,631	303,030	N/R	**5,797,288**
Percent Coverage	N/A	89.0%	99.8%	87.5%	N/R	**92.5%**
Tetracycline Eye Ointment						
Doses	N/A	100,000	32,970	18,154	N/R	**151,124**
2019 Target	N/A	100,000	39,053	15,575	N/R	**154,628**
Percent Coverage	N/A	100.0%	84.4%	116.6%	N/R	**97.7%**
Facial Cleanliness and Health Education						
Villages with Health Education	N/R	600	1,575	1,202	N/R	**3,377**
2019 Target	N/R	600	1,585	1,000	N/R	**3,185**
Percent Coverage	N/R	100.0%	99.4%	120.2%	N/R	**106.0%**
Environmental Improvements						
Latrines	N/R	18,635	N/A	N/A	N/R	**18,635**
2019 Target	N/R	20,000	N/A	N/A	N/R	**20,000**
Percent Coverage	N/R	93.2%	N/A	N/A	N/R	**93.2%**

N/A=Not Applicable

N/R=Not Reported

Totals only include countries and districts where data are available.

Table 2. National Trachoma Control Program Annual Targets 2020 (Carter Center-Assisted Countries)

Targets[§] as Reported, March 2020

	Mali	Niger	Sudan	South Sudan	Ethiopia	Total**
Surgery						
Persons to operate for TT	N/A	8,540	5,400	1,200	N/R	**15,140**
Antibiotics						
Doses of azithromycin to distribute during MDA†	N/A	1,755,283	1,211,214	506,651	N/R	**3,473,148**
Doses of TEO to distribute during MDA	N/A	150,000	24,105	16,043	N/R	**190,148**
Facial cleanliness						
Villages to reach through health education	N/A	600	1,530	1,000	N/R	**3,130**
Environmental improvement						
Household latrines to construct	N/A	20,000	N/A	80	N/R	**20,080**

N/A=Not Applicable

N/R=Not Reported

[§]All targets are subject to change.

†Antibiotic targets do not reflect ITI-approved allocations of Zithromax®

Table 3. Carter Center-Assisted Implementation of SAFE (Carter Center-assisted output)

Summary of Interventions per Country, January - December 2019

Indicators	Mali	Niger	Sudan	South Sudan	Ethiopia-Amhara*	Total
Surgery						
Persons operated for TT	N/R	5,316	230	517	16,104	**22,167**
2019 Target	N/R	7,000	2,100	530	54,070	**63,700**
Percentage	N/R	75.9%	11.0%	97.5%	29.8%	**34.8%**
Antibiotics						
Doses of azithromycin distributed	N/A	N/A	122,651	265,145	13,317,156	**13,704,952**
2019 Target	N/A	N/A	337,602	303,030	14,977,993	**15,618,625**
Percentage	N/A	N/A	36.3%	87.5%	88.9%	**87.7%**
Facial cleanliness and health education						
Villages with ongoing health education	N/R	600	123	1,202	3,871	**5,796**
2019 Target	N/R	600	131	1,000	3,871	**5,602**
Percent Coverage	N/R	100.0%	93.9%	120.2%	100.0%	**103.5%**
Environmental improvement						
Household latrines constructed	N/R	10,043	N/A	N/A	N/R	**10,043**
2019 Target	N/R	10,000	N/A	N/A	N/R	**10,000**
Percentage	N/R	100.4%	N/A	N/A	N/R	**100.4%**

*Amhara reports latrine ownership, not latrines constructed; 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, 1999-2019

Indicators	Mali	Niger	Sudan	South Sudan	Ethiopia-Amhara	Total
Persons operated for TT	30,930	84,068	11,967	10,715	708,123	**845,803**
Doses of azithromycin distributed (MDA)	698,083	3,780,384	7,744,236	3,582,142	182,748,584	**198,553,429**
Villages with ongoing health education	3,886	1,708	664	3,574	3,871	**13,703**
Household latrines constructed	116,230	151,674	N/A	646	3,336,513	**3,605,063**

N/A=Not Applicable

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

National Program data as presented for January - December 2019

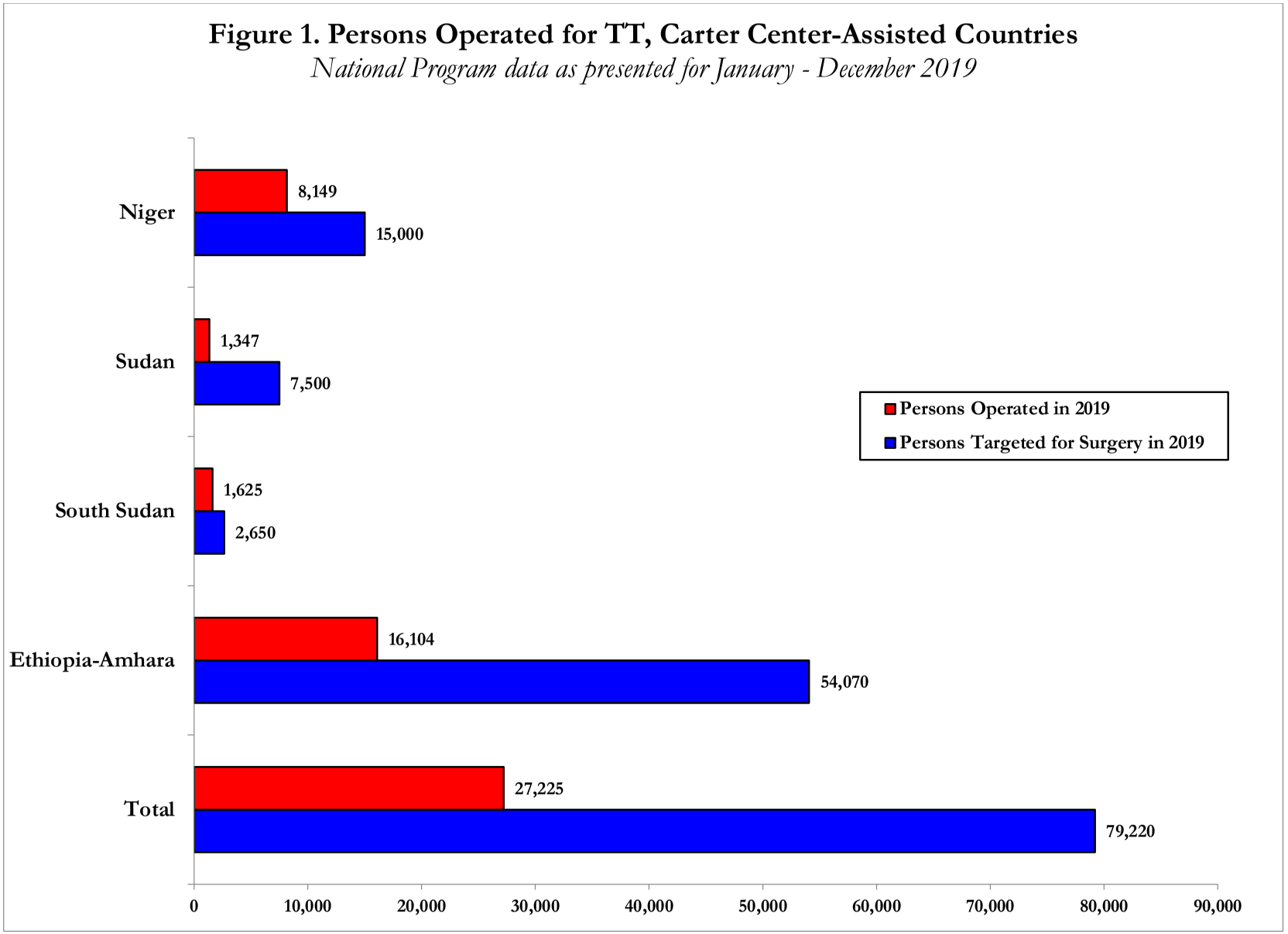


Figure 2. Azithromycin Distribution, Carter Center-Assisted Countries

National Program data as presented for January - December 2019

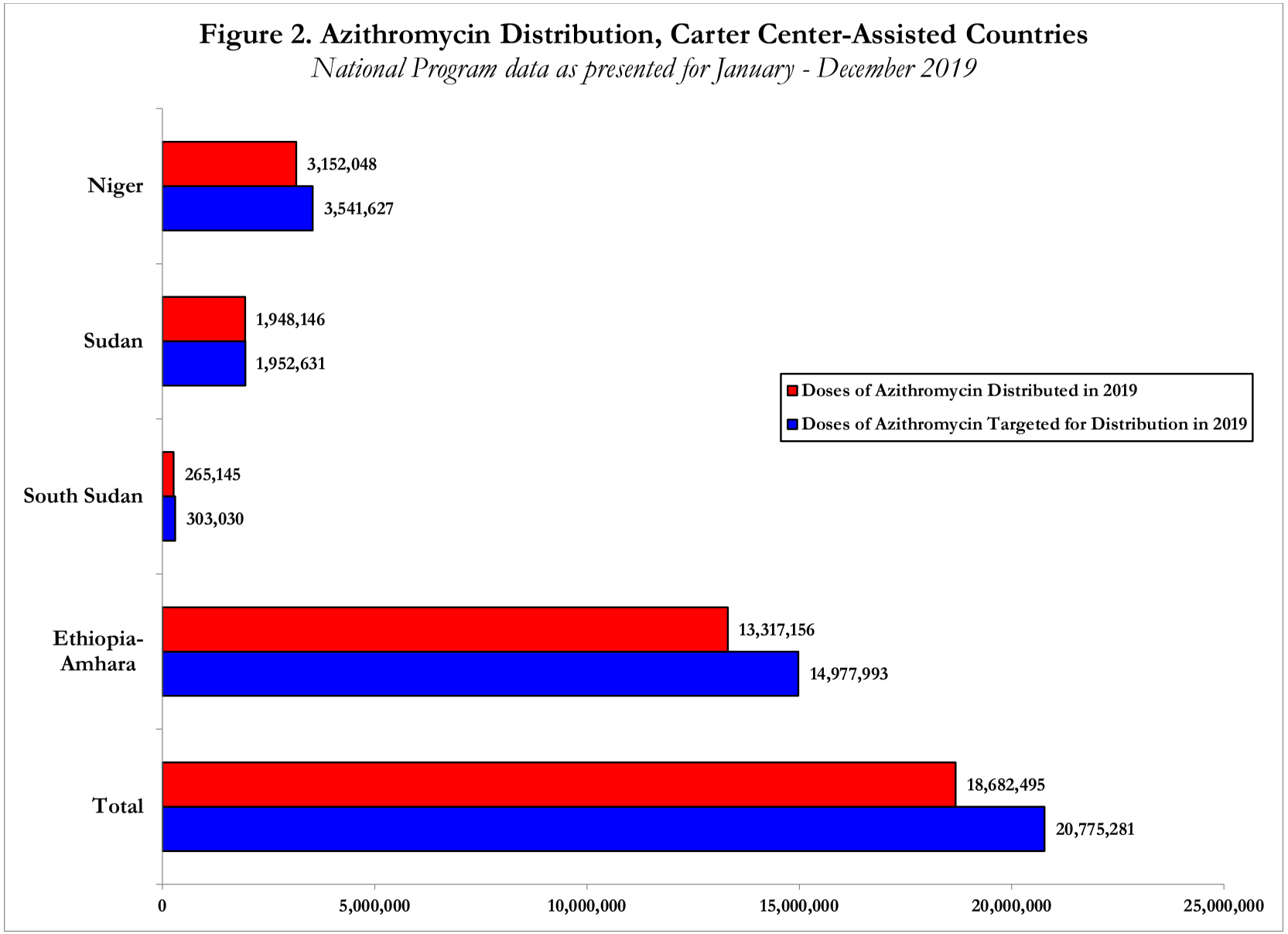
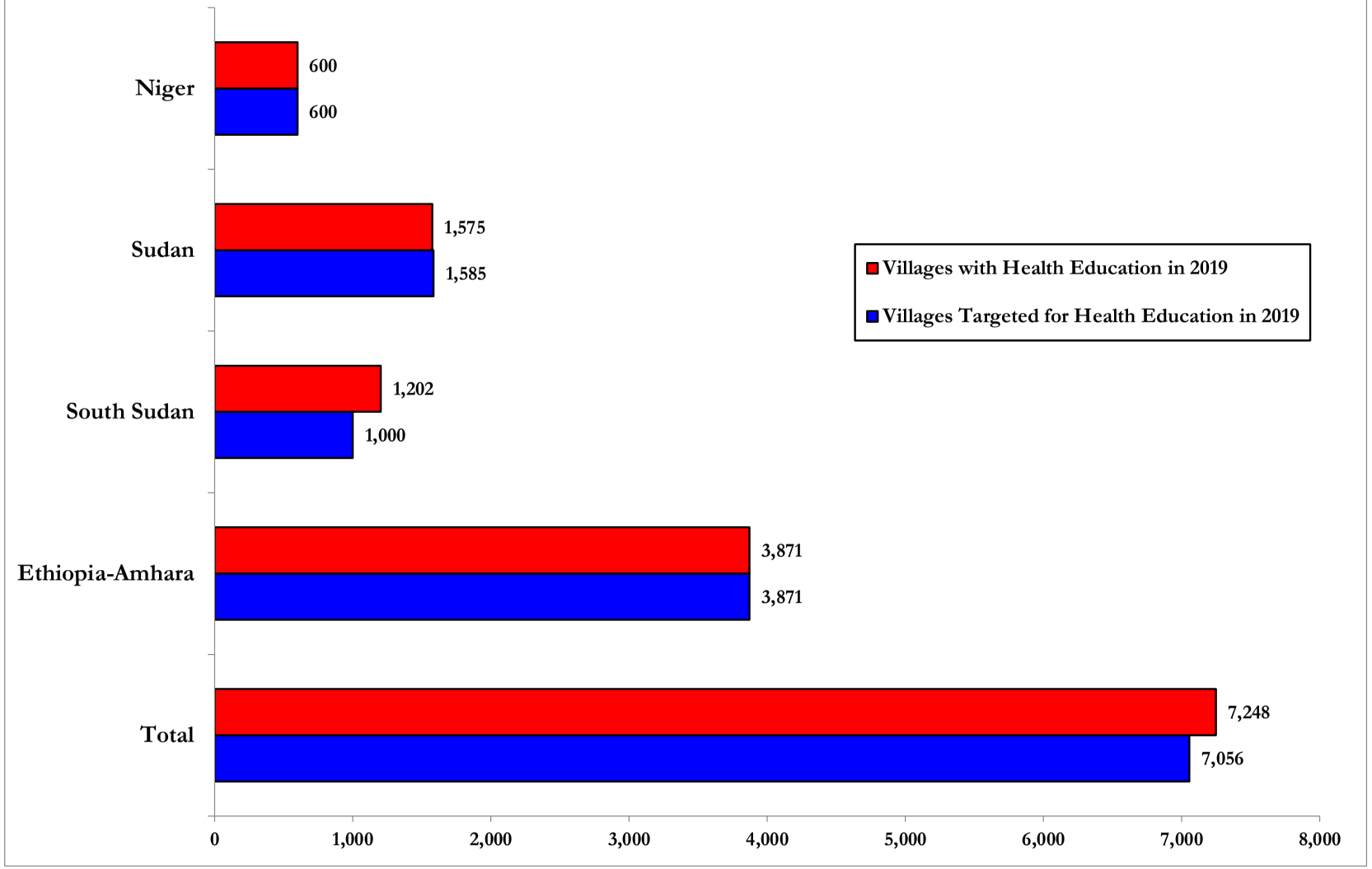


Figure 3. Health Education, Carter Center-Assisted Countries

National Program data as presented for January - December 2019



Trachoma Surveillance: Data from a highly endemic region, Amhara, Ethiopia

Presented by Ms. Tigist Astale, Epidemiologist, Trachoma Control Program, The Carter Center – Ethiopia

Authors and Affiliations: *Tigist Astale[1], Demelash Gessese[1], Andrew W. Nute[2], Eshetu Sata[1], Mulat Zerihun[1], Kimberly A. Jensen[2], Mahiteme Haile[3], Taye Zeru[3], Berhanu Melak[1], Zebene Ayele[1], Gedefaw Ayenew[1], Zerihun Tadesse[1], E. Kelly Callahan[2], Scott D. Nash[2]*

[1]The Carter Center, Addis Ababa, Ethiopia, [2]The Carter Center, Atlanta, GA, United States, [3]Amhara Public Health Institute, Bahir Dar, Ethiopia

Background

Trachoma has been endemic in the Amhara region for many years. Early data in 2001 showed that prevalence of TF/TI among children ages 1-10 years was over 80% in four districts of Amhara. Zonal level baseline survey conducted in 2007 also showed that most of the Amhara zones were hyperendemic with a TF prevalence of over 30% among children ages 1-9 years. To eliminate trachoma as a public health problem, the Amhara Trachoma Control Program has been implementing the WHO-endorsed SAFE strategy in all districts of Amhara since 2007. One of the elimination thresholds for trachoma is a TF prevalence of <5% among children aged 1 to 9 years. For districts that have achieved this elimination threshold based on the results of a trachoma impact survey, a follow-up surveillance survey is conducted to determine whether a TF prevalence <5% is sustained for at least two years without mass antibiotic administration. This study describes the results of surveillance surveys conducted in 39 districts of Amhara.

Methods

Thirty-nine district-level surveillance surveys were conducted between 2015 and 2019. Multistage cluster-random sampling design was used to select a population-based sample. All individuals ages 1 year and above were examined for clinical signs of trachoma by certified graders. Dried blood spots from all individuals ages 1 year and above; and conjunctival swabs from children ages 1 to 5 years were also collected in districts of interest.

Results

Among the 39 districts where a surveillance survey was conducted, 30 (77%) remained below the TF elimination threshold. All 9 districts with a first impact survey <5% TF remained <5% at surveillance. Ct infection was around 1.4% in one of the districts (Finote Selam town). Of the 10 districts with a first impact survey between 5-9.9% TF, 8 (80%) remained <5%. Two districts (Metema and Aderkay) were above the 5% TF threshold. Ct infection was not detected in these 2 districts.

Of 20 districts with a first impact survey between 10-29.9%, 13 (65%) remained <5%. In Alefa where TF at the first impact survey was 19.2%, TF remained below 5% at surveillance. Additional evidence from the serology study in this district showed that prevalence of Pgp3 and CT694 among children ages 1-9 years was 0.9% and 2.4% respectively. The Pgp3 prevalence increased with age, which suggests trachoma was once a problem in this district.

Among the 9 districts where TF was >5% at surveillance, the prevalence of trachomatous inflammation-intense (TI) was ≤1% in all 9 districts. Prior evidence of Chlamydia trachomatis infection in a district was not predictive of TF >5% at surveillance. Furthermore, water and sanitation indicators were not markedly lower in districts with TF >5%, compared to those <5% at surveillance. Eight of the 9 (89%) districts with a surveillance survey >5% were adjacent to districts that remain trachoma endemic.

Conclusion

There was a strong relationship between the TF prevalence observed at the first impact survey, and the prevalence at surveillance survey. Although most districts were <5% TF at surveillance in Amhara, collecting additional trachoma data such as infection and serological markers during these surveys could help determine whether a TF >5% is due to sampling variability or true resurgence. Future surveillance surveys may consider collecting additional trachoma data in some of the districts that are surrounded by high trachoma prevalent areas. A *Wait and Watch* approach will also be followed in 2 districts (Woreta town and Metema) where TF at surveillance became above 5%.

Genomics of Ocular Chlamydia trachomatis after 5 years of SAFE interventions for trachoma in Amhara, Ethiopia

Presented by Dr. Harry Pickering, Department of Clinical Research, London School of Hygiene & Tropical Medicine, UK

Harry Pickering,[1] Ambahun Chernet,[2] Eshetu Sata,[2] Mulat Zerihun,[2] Charlotte A. Williams,[3] Judith Breuer,[3] Andrew W. Nute,[4] Mahiteme Haile,[5] Taye Zeru,[5] Zerihun Tadesse,[2] Robin L. Bailey,[1] E. Kelly Callahan,[2] Scott D. Nash,[2] Martin J. Holland[1]*

**Presenter*

[1]Department of Clinical Research, London School of Hygiene & Tropical Medicine, UK, [2]The Carter Center, Ethiopia, Division of Infection and Immunity, [3]University College London, UK, [4]The Carter Center, Atlanta, USA, [5]Amhara Public Health Institute Bahir Dar, Ethiopia

In order to eliminate trachoma as a public health problem, the WHO recommends the SAFE (Surgery, Antibiotics, Facial cleanliness, and Environmental improvement) strategy. As part of the SAFE strategy in the Amhara Region, Ethiopia, the Trachoma Control Program distributed over 124 million doses of antibiotic between 2007 and 2015. The program also provided village- and school-based health education and assisted in the construction of latrines throughout the region as part of the F and E components. Despite an average of 5 years of these interventions, trachoma remained hyperendemic in many districts as measured by the indicator TF, and a considerable level of Ct infection was evident region-wide. This study utilized residual material from m2000 Abbott tubes used in previous infection assays to sequence 99 ocular Ct samples from Amhara to investigate the role of genomics in the continued transmission of Ct following 5 years of SAFE. These whole-genome sequences were further utilized to explore the relationship between Ct genomic variation and infection and trachoma prevalence at the village and district level. Sequences were typical of ocular Ct, at both the whole-genome level and in tropism-associated genes. There was no evidence of macrolide-resistance alleles in this Ct population. Polymorphism in a region around the serovar-determining ompA gene was associated with village-level TF prevalence. Additionally, presence of multiple ompA serovars in a village and greater ompA diversity at the district-level, were both associated with increased Ct infection prevalence. Our data found no evidence for Ct genomic variation contributing to continued transmission of Ct after multiple rounds of treatment, adding to previous evidence that azithromycin does not drive acquisition of macrolide resistance in Ct. The finding of higher Ct infection in villages harboring multiple ompA serovars, as well as in districts with greater ompA diversity, require longitudinal investigation to understand what impact this may have on treatment success and development of host immunity.

House-to-House Case Finding in Amhara

Presented by Mr. Eshetu Sata, Program Manager, Trachoma Control Program, The Carter Center – Ethiopia, and Ms. Kim Jensen, Associate Director, Trachoma Control Program, The Carter Center

Integrated Eye Care Workers (IECWs) have provided more than 708,000 TT surgeries in Amhara since 2001; this includes efforts during the Federal Ministry of Health's *Fast Track Initiative*, when hundreds of thousands of surgeries were conducted. This surgical output, and the changing severity of TT observed in the region, has resulted in a precipitous decline in surgeries in recent years. As there are fewer and fewer cases to find, particularly severe cases, the remaining cases have been more difficult to locate, resulting in a growing gap between the ever-changing TT backlog estimates and surgical output. (Figure 1)

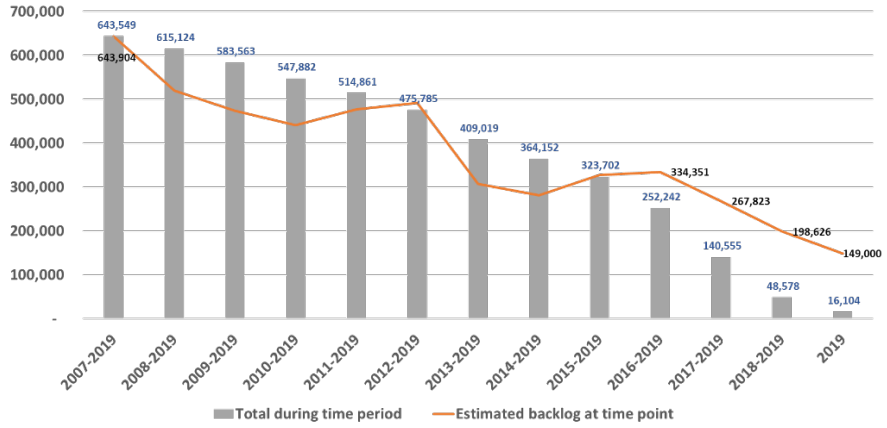


Figure 1. The changing backlog estimates over time as compared to the cumulative outputs for a given time period and the growing gap between the two in recent years.

To increase surgical output, the trachoma program in Amhara, Ethiopia began house-to-house case finding, first piloted in May 2018, to identify and offer surgery to TT patients. Case finders are trained community members who visit all households in their catchment area, looking for individuals potentially suffering from TT. All individuals ≥ 15 years living in the household are listed in the register and examined for TT. With support from kebele leaders and health extension workers, suspected TT cases are mobilized for screening by an IECW and, if necessary, offered surgery.

In November 2018, in response to the challenges observed globally related to the volatile TT estimates and decreasing surgical output, the WHO Fourth Global Scientific Meeting agreed that national programs could use different criteria to demonstrate the TT elimination target has been reached, including house-to-house case searches. As such, case finding would not only be used for finding TT cases, but also as evidence when there are no more cases to find; this is key to demonstrate that the TT threshold for the elimination of trachoma as a public health problem has been met.

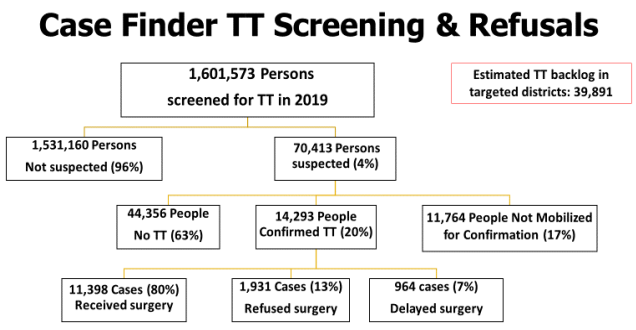


Figure 2. Breakdown of house-to-house case finding in 2019

In 2019, more than 1.6 million people were screened by case finders, resulting in 14,293 confirmed TT cases and 11,398 surgeries. (Figure 2) Since 2018, more than 3.5 million people have been screened in 52 districts in Amhara by 6,790 case finders, resulting in 28,162 confirmed TT cases (Figure 3). Though house-to-house case finding requires extensive human and financial resources, if done completely and documented adequately, districts may use this information to demonstrate elimination of TT as a public health problem.

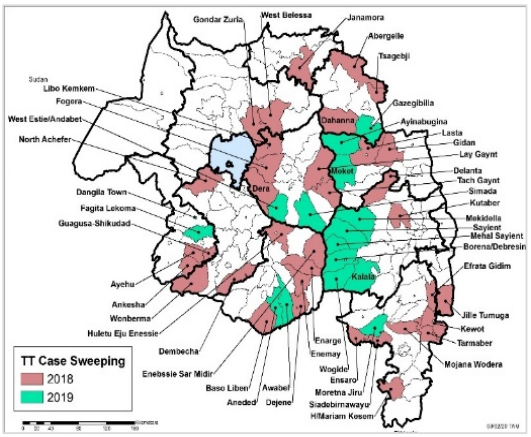


Figure 3. Districts conducting case finding in 2018 and 2019 in Amhara, Ethiopia

Considering case finding approaches to date, there are two main indicators that have been discussed: household coverage and population coverage of adults ≥ 15 years. Population coverage for adults ≥ 15 years has been used in some programs since surgeons act as case finders and can immediately confirm TT cases. In Amhara, using IECWs as case finders would not be feasible, considering the large estimated backlog, population, and geographic spread; it is necessary to use community members trained as case finders. Suspected cases of TT are then mobilized for screening and confirmation by an IECW during the second phase.

As IECWs must confirm whether an individual has TT in order to be considered evidence for the validation dossier, the criteria for "clearing" a district in Amhara must account for both the first and second stages of the case finding process. The ARHB and The Carter Center have thus proposed using a combined approach in 2020 which will demonstrate the needed coverage for the elimination dossier and is feasible within the Amhara context.

Case finders will target all households in their catchment area and all individuals ≥ 15 years in a household. Individuals suspected of TT will be mobilized for screening by the IECW and a minimum threshold of 80% of all suspected cases should be screened by an IECW for a district to be considered finished. Since it has been observed that, on average, only 21.2% of suspected cases are confirmed to have TT, the potential for missing many TT cases is believed to be low.

In the absence of clear guidelines, the Amhara region will continue to enhance its case finding strategy that provides surgery to individuals with TT, is feasible within the local context, and captures the necessary evidence to demonstrate to the WHO elimination validation committee that TT as a public health problem has been addressed.

Twelve-Year Longitudinal Trends in Trachoma Prevalence among Children aged 1 to 9 Years in 160 Districts of Amhara Region, Ethiopia 2007 to 2019

Presented by Dr. Scott Nash, POrogram Epidemiologist, Trachoma Control Program, The Carter Center

*Eshetu Sata[1], Andrew W. Nute[2], Tigist Astale[1], Mulat Zerihun[1], Demelash Gessese[1], Zebene Ayele[1], Ambahun Chernet[1], Berhanu Melak[1], Kimberly A. Jensen[1], Mahiteme Haile[3], Taye Zeru[3], Zerihun Tadesse[2], E. Kelly Callahan[1], Jeremiah Ngondi[4], Scott D. Nash[1]**

**Presenter*
[1]The Carter Center, Atlanta, GA, United States, [2]The Carter Center, Addis Ababa, Ethiopia, [3]Amhara Public Health Institute, Bahir Dar, Ethiopia, [4]RTI International, Washington DC, USA

To eliminate trachoma as a public health problem, the WHO recommends the SAFE (Surgery, Antibiotics, Facial cleanliness, and Environmental improvement) strategy. The Trachoma Control Program in the Amhara Region of Ethiopia, where all districts were trachoma endemic, began scale-up of SAFE in 2007. The Program has distributed approximately 15 million doses of antibiotic per year since scaling-up and has also provided annual village- and school-based health education and assisted in the construction of latrines throughout the region as part of the F&E components. The aim of this study was to provide an update on the prevalence of trachoma among children aged 1 to 9 years as of the most recent trachoma impact or surveillance survey in all 160 districts of Amhara. The 160 most recent population-based district-level surveys were conducted between 2015-2019 and included 106,321 children aged 1 to 9 years examined for trachoma by certified graders. As of 2019, 45 (28%) districts were below the elimination threshold of <5% prevalence of TF. There was a strong relationship between the TF prevalence observed at the first impact survey and eventual achievement of TF elimination threshold. Of the 26 districts with a first impact survey <10% TF, 20 (76.9%) had <5% TF at the most recent survey. Of the 75 districts with a first survey between 10-29.9% TF, 21 (28.0%) had <5% TF at the most recent survey. Finally, among 59 districts >30% TF at first survey, 4 (6.8%) had <5% TF by 2019. As of 2019, 30 (18.8%) districts remained with TF >30%. By 2019 the trachomatous inflammation-intense prevalence was <3% in 128/160 (80.0%) districts. 27 districts had a ≥60% prevalence of household access to water within 30 minutes (district range:10.1-99.0%) and 85 districts had ≥60% prevalence of household improved water source (range:7.5-96.5%). Amhara has seen great reductions of active trachoma since the start of the program. A strong commitment to the SAFE strategy coupled with data driven enhancements and adaptations are necessary to drive elimination of trachoma as a public health problem regionally in Amhara and nationwide in Ethiopia.

Leaving No One Behind: IDPs in Juba (Protection of Civilians (PoC) Camps 1 and 3, August 2019)

Presented by Ms. Lydia Banfield, Techincal Advisor, Trachoma Control Program, The Carter Center-South Sudan, and Ms. Angelia Sanders, Associate Director, Trachoma Control Program, The Carter Center

South Sudan gained independence from Sudan in 2011; civil war broke out in December 2013. Since then, population movements have continued inside and out of the country. There are currently an estimated 2.22 million people displaced as refugees and 1.67 million internally displaced people (IDP)[2], the equivalent to around 20% and 15% of the total population of South Sudan, respectively. Furthermore, South Sudan has been ranked as one of the top 10 countries worldwide for the number of people displaced due to conflict and violence[3].

PoC are IDP camps specific to South Sudan: they are UN Mission in South Sudan (UNMISS) peacekeeping bases that have been converted and adapted to house IDPs fleeing intense conflict in an area. A last resort in the UN mandate to protect civilians is to open their doors and provide shelter, temporarily; PoC are therefore built by default rather than by design and are often inadequate for long-term shelter. However, although some PoC sites have closed (Melut in Upper Nile State for example), South Sudan is the first country to have such long-term IDP sites within UN bases and the scale of the camps are unprecedented in UN history. There are currently 6 operational PoC sites in the country: Juba PoC 1, Juba PoC 3, Bor, Wau, Malakal, and Bentiu. The majority of these PoC house populations from areas that are known to be endemic for trachoma, based on surveys from 2012 onwards[4] (including those in Juba, Bor, Malakal, Bentiu).

The 2 PoC in Juba were created in December 2013 (PoC 1) and December 2014 (PoC 3) for IDPs mainly from Jonglei and Unity States. The population in these 2 camps is primarily Nuer, although there are also Shilluk, Mundari, Bari, and Murle, amongst others. Camp standards and IDP protection are ensured through essential civil-military coordination: the UNMISS branch responsible for PoCs is the Relief, Reintegration, and Protection (RRP) department while the Agency for Technical Coordination and Development (ACTED) is the international NGO leading the Camp Coordination and Camp Management cluster (CCCM). ACTED ensures the coordination of NGO activities within the PoC as well as coordination between the RRP and NGOs, while the RRP are responsible for camp security and overall management. The UN International Organization for Migration (IOM) track population movements in and out of the PoCs while International Medical Corps (IMC) lead all health activities in Juba PoC. Within each PoC, a Camp Chairman represents the IDPs for a maximum duration of 6 months with no second term. They are crucial in all activities and in ensuring community participation and acceptance.

The Carter Center and the national MOH wanted to show that the trachoma elimination strategy (SAFE: Surgery, Antibiotics, Facial cleanliness, Environmental hygiene) could be conducted in IDP camps. Since the majority of the Juba PoC population came from trachoma-hyperendemic areas in Jonglei and Unity States, it was assumed that the disease was highly likely to have moved with the IDPs. As such, a baseline prevalence survey was not carried out before piloting azithromycin MDA in Juba's two PoCs in August 2019, targeting the total estimated population of 32,328 IDPs: 7,640 in PoC 1 and 24,688 in PoC 3[5].

[2] https://reliefweb.int/sites/reliefweb.int/files/resources/South%20Sudan%20-%20Humanitarian%20Snapshot%20%28January%202020%29.pdf
[3] https://www.internal-displacement.org/mid-year-figures International Displacement Monitoring Center Mid-year figures 2019
[4] Edwards, T. et al. 2012. Prevalence of Trachoma in Unity State, South Sudan: Results from a Large-Scale Population-Based Survey and Potential Implications for Further Surveys. PLOS NTD & https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2626496/pdf/16462982.pdf
[5] Based on ACTED's January 2019 Juba PoC figures

In coordination with the UN RRP, IMC, ACTED, and the Camp Chairperson, the Carter Center's Trachoma Control Program trained 57 local leaders and 68 drug distributors across Juba PoC 1 and 3. Each PoC is broken down into blocks (PoC 1: 17 blocks) or zones that are further subdivided into blocks, due to the size of the camp (PoC 3: 10 zones). Each block or zone has a pair of leaders (man & woman) who attended the MDA training. These leaders, with support from their respective Camp Chairperson, were responsible for selecting the drug distributors and ensuring an even selection from each area. Once trained, both camps were treated at the same time over the course of 5 days, with a distribution team of 4 individuals allocated per block or per zone: 1 data recorder, 1 drug dispenser, 1 measurer, and 1 mobilizer. Each team was supported and supervised by the block or zone leaders and a Trachoma Control Program supervisor.

A total of 25,035 IDPs (77.4% of target) were treated across the PoCs with either Zithromax® tablets (>age 7), syrup (children between 6 months and 7 years), or TEO (pregnant women, children under 6 months, or very sick individuals). **Table 1** below summarizes the treatments.

Table 1: Summary of MDA Treatments in Juba PoC 1 and PoC 3, August 2019

COUNTY	PAYAM	Total # people treated - POS	Total # people treated - tablets	Total # people treated - TEO	Total # people treated with Zithromax®	Total pop. treated	Annual target	*Percent pop. covered*
JUBA	PoC 1	1,647	4,152	578	5,799	6,377		
	PoC 3	5,345	11,879	1,434	17,224	18,658		
	Total	**6,992**	**16,031**	**2,012**	**23,023**	**25,035**	**32,328**	**77.4%**

The MDA was not without challenges, notably due to the camp setting. Distribution followed PoC opening/closing times and was thus limited by this; and distribution teams were not permitted to keep the drugs overnight. Despite the PoC's role to protect the enclaved populations within, many IDPs move in and out throughout the day, leaving before 7am when the camp officially opens and returning just before closure at 5pm. These mainly include students studying in Juba and individuals with work outside of the PoCs. To catch as many of these people as possible, the MDA timeframe was extended to 5 days of distribution rather than 3. Furthermore, adults often refused to take the drugs until all the children had been treated, resulting in the first few days of distribution mainly targeting children while adults rushed to request treatment in the last few days.

These challenges, coupled with several days of poor weather, explain why the WHO recommended 80% coverage for trachoma MDA was not reached in the PoCs. In addition, due to a number of communities returning to their areas of origin, population estimates from January 2019 are likely to have been overestimated for August 2019. Increased coverage and easier MDA implementation can be achieved through improved coordination with all partners, especially in terms of WASH for water provision to the distribution teams and the CCCM to support the established wages; by allowing teams to keep drugs overnight and continue distribution without Trachoma Control Program supervision; and by ensuring a more global understanding of trachoma amongst PoC partners.

Although this MDA focused mainly on one aspect of the SAFE strategy, other components were not omitted: distributors screened for TT and eyelid entropion during MDA resulting in 9 confirmed cases, while health education on facial cleanliness and environmental hygiene was continuous throughout MDA implementation.

This pilot MDA demonstrated that MDA can be done in IDP camps. However, if communities from the areas of origin are not treated as well, then trachoma transmission will continue when IDPs return. Funding and partnerships with non-NTD NGOs are possible and encouraging as many other IDP/PoC are in endemic areas of South Sudan that could benefit from SAFE intervention.

Trachoma: The Disease

Trachoma, the world's leading cause of preventable blindness, can be found in over 37 countries. An estimated 158 million people are at risk for trachoma, and approximately 3.2 million are at immediate risk for blindness from TT. 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 GET2020 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 NGDOs, 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®, 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® 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 celebrated 3 20th anniversary milestones: The Carter Center beginning its pioneering work in 1998; WHA 51.11 calling for the elimination of blinding trachoma; and Pfizer creating the ITI to lead the drug donation program.