Summary Proceedings

Twenty-Fifth Annual Trachoma Control Program Review

The End is in Sight: Bridging the Gaps

THE
CARTER CENTER

Waging Peace. Fighting Disease. Building Hope.

Atlanta, Georgia

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"Working Together to Bridge the Gaps"

The Twenty-Fifth Annual Trachoma Control Program Review

The Carter Center

Atlanta, Georgia

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

Acknowledgements

The Carter Center's Trachoma Control Program (TCP) celebrated a year of achievements toward the elimination of trachoma as a public health problem in four Carter Center-assisted programs: the Amhara region of Ethiopia, Niger, South Sudan, and Sudan. These programs have historically been the largest of their kind, contributing to some of the most remarkable global SAFE (Surgery, Antibiotics, Facial cleanliness, and Environmental Improvement) outputs. In 2023, through unwavering acts of kindness, compassion, determination, and partnership, and despite challenges brought forth by insecurity, the programs continued to deliver significant outputs and therefore, impacted the lives of millions of persons at risk of the debilitating pain and suffering caused by trachoma, the world's leading cause of infectious blindness. The Carter Center, in partnership with the ministries of health, demonstrated in 2023 that, despite significant challenges, these world-renowned and long-standing trachoma programs could make significant progress to reach elimination thresholds.

In 2023 the Program's "mantra" was "The End is in Sight" using innovation and integration to accelerate the goal of eliminating trachoma as a public health problem within all Carter Center-assisted countries. This mantra was emboldened by the incredible determination and success of Mali being validated by the World Health Organization (WHO) on April 27, 2023, as having eliminated trachoma as a public health problem. The Carter Center is proud to have partnered with the Mali Ministry of Health and to have witnessed the incredible work put forth to ensure that the people of Mali no longer suffer from blinding trachoma.

In partnership with communities and ministries of health in Ethiopia, Niger, South Sudan, and Sudan, in calendar year 2023, the Carter Center's TCP assisted in providing trachomatous trichiasis (TT) surgeries to 47,275 individuals and distributing over four million doses of antibiotics through mass drug administration (MDA). Cumulatively, since 1999, The Carter Center has assisted in providing 949,683 persons with TT surgery and in distributing more than 236 million doses of antibiotics. The Center's partnerships have also contributed to health education programs reaching more than 3,800 villages and an estimated 9,000 schools, the training of over 14,000 masons, and the construction of over 3.6 million latrines.

The Carter Center's work and accomplishments would not be possible without the commitment and collaboration of the ministries of health and the significant support and dedication from many partners, such as Abbott, the Ajram Family Foundation, Alwaleed Philanthropies, ARISE Fund, Robert and Joan Blackman Family Foundation, Margaret A. Cargill Philanthropies, Children's Investment Fund Foundation, Coalition for Operational Research on Neglected Tropical Diseases (COR-NTD), The William H. Donner Foundation, The END Fund, Bill & Melinda Gates Foundation, The Ghanta Family Foundation, Conrad N. Hilton Foundation, HCP Cureblindness (HCP), William R. Hoch Family Foundation, Hopper-Dean Foundation, International Trachoma Initiative (ITI), Lions Clubs International Foundation, Lions Clubs of Ethiopia, Lions Clubs of Niger, Mr. Edward Magarian, Manaaki Foundation, The P.D Merrill Charitable Trust, Noor Dubai Foundation, Orbis International, The P Twenty-One Foundation, Pfizer Inc., The Francis I. Proctor Foundation for Research in Ophthalmology, The Rauch Family Foundation, Schreiber Philanthropy, SoapBox Soaps, The Task Force for Global Health (TFGH), United Nations International Children's Fund, University of North Carolina – Chapel Hill, U.S. Centers for Disease Control and Prevention

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Acronyms

AFRO	World Health Organization Africa Region
ARHB	Amhara Regional Health Bureau
AMR	Anti-Microbial Resistance
B-RAP	Bevel-Rotate, Advancement Procedure
BESRAT	B-RAP Eyelid Surgery Against Trabut
CBM	Christian Blind Mission
CDC	U.S. Centers for Disease Control and Prevention
CES	Coverage Evaluation Survey
CI	Confidence Interval
CST	Coverage Supervision Tool
Ct	*Chlamydia trachomatis*
DALY	Disability-Adjusted Life Year
DBS	Dried blood spot
DD	Drug Distributors
ETAG	Ethiopia Trachoma Advisory Group
ETAS	Enhancing the "A" in SAFE
ETB	Ethiopian Birr
ESPEN	Expanded Special Project for Elimination of Neglected Tropical Diseases
EU	Evaluation Unit
FGC	Full Geographic Coverage
FGD	Focus Group Discussion
GET2020	Global Elimination of Trachoma by 2020
HCP	HCP Cureblindness
HD	Health District
HH	Household
ICTC	International Coalition for Trachoma Control
IDP	Internally Displaced People
IECW	Integrated Eye Care Worker
ITI	International Trachoma Initiative
KETFO	Kebele Elimination of Trachoma for Ocular Health
LFA	Lateral Flow Assay
LSHTM	London School of Hygiene & F Tropical Medicine
MBA	Multiplex Bead Assay
MBG	Model-based Geostatistics
MDA	Mass Drug Administration
MFTA	More Frequent Than Annual
MOH	Ministry of Health
NTDs	Neglected Tropical Diseases
OCO	Ophthalmic Clinical Officer
PBT	Probability of being below the elimination threshold

PCR	Polymerase Chain Reaction
PC-NTD	Preventive Chemotherapy–Neglected Tropical Diseases
PLTR	Posterior Lamellar Tarsal Rotation
PNSO	Programme National de Santé Oculaire (National Eye Health Program)
POC	Point of Care
PTT	Postoperative Trachomatous Trichiasis
rPTT	Repeat Postoperative Trachomatous Trichiasis
SAFE	Surgery (S), Antibiotics (A), Facial Cleanliness (F), and Environmental Improvement (E)
SANPLAT	Sanitary Platform
SCR	Seroconversion Rates
SSM	Sentinel Site Monitoring
SSM1	Sentinel Site Monitoring 1
SSM3	Sentinel Site Monitoring 3
STP	School Trachoma Program
TCP	Trachoma Control Program
TEC	Trachoma Expert Committee
TEO	Tetracycline Eye Ointment
TFGH	The Task Force for Global Health
TI	Trachomatous Inflammation-Intense
TIS	Trachoma Impact Survey
TIS+	Enhanced Trachoma Impact Surveys
TSS	Trachoma Surveillance Survey
TF	Trachomatous Inflammation-Follicular
TT	Trachomatous Trichiasis
TWG	Technical Working Group
USAID	United States Agency for International Development
WASH	Water, Sanitation, and Hygiene
WHA	World Health Assembly
WHO	World Health Organization

Summary

The Twenty-Fifth Annual Trachoma Control Program (TCP) Review was held on April 22-23, 2024, in Atlanta, Georgia. This marks the first in-person review since 2019 and provided the participants a long-awaited opportunity to reconnect with colleagues and to review progress in the elimination of trachoma as a public health problem in some of the world's worst affected areas. Some guests who were not able to attend in person were present virtually. In honor of our 2023 "mantra", and to celebrate the partnerships and achievements, the theme of this year's review was "The End is in Sight: Bridging the Gaps". Attending this year's review were representatives from the ministries of health and Carter Center offices in the four countries where the Center's TCP currently assists: Ethiopia, Niger, South Sudan, and Sudan, along with our partners and donors including but not limited to Helen Keller Intl, Conrad N. Hilton Foundation, HCP Cureblindness (HCP), International Coalition for Trachoma Control (ICTC), International Trachoma Initiative (ITI), Lancaster University, London School of Hygiene and Tropical Medicine (LSHTM), Pfizer Inc., The Francis I. Proctor Foundation at the University of California at San Francisco, Task Force for Global Health (TFGH), University of North Carolina-Chapel Hill, the U.S Centers for Disease Control and Prevention (CDC), and the World Health Organization (WHO).

Following tradition, the program reviews enable the national programs to highlight progress towards elimination, discuss challenges encountered, and identify gaps to reach elimination thresholds. Ms. Kelly Callahan, Director of the TCP, welcomed the participants, in person and virtually, to the Twenty-Fifth Annual TCP Review. Ms. Callahan highlighted the great progress achieved in 2023, in the face of tremendous challenges and deep loss around the world, especially in Ethiopia, Sudan, and Niger, where insecurity affected the livelihood of millions, particularly children. She also remembered Mr. Aryc Mosher, who passed in 2023. Aryc was a friend, colleague, and champion in the fight against neglected tropical diseases (NTDs), especially trachoma.

Finally, Ms. Callahan commemorated Mrs. Roslynn Carter, co-founder of The Carter Center, who also passed in 2023. Mrs. Carter leaves a profound legacy of building hope, waging peace, and fighting disease globally in the name of equity and love for humanity. A video tribute to Mrs. Carter was shown followed by a brief video on the Legacy of The Carter Center Founders, President and Mrs. Carter, whose legacies continue to thrive. The video highlighted the Carters' commitment and unwavering dedication to eliminating NTDs in some of the world's poorest and hardest to reach communities. The Founders have left a remarkable and permanent impact on public health, and The Carter Center remains committed to controlling, eliminating, and eradicating NTDs to zealously preserve the legacies of President and Mrs. Carter.

In her first in-person program review since taking the helm in 2020, Ms. Paige Alexander, The Carter Center's Chief Executive Officer, shared opening remarks. Ms. Alexander welcomed participants to the program review and thanked partners and donors who make the work possible through their continued commitment, dedication, and partnership. She reflected on The Carter Center's founding and its commitment to "maintain and enhance our partnerships – to meet our collective goals in eliminating trachoma as a public health problem". Lastly, she emphasized that, although trachoma is disappearing, there are still a few obstacles that need to be addressed such as gaps in funding, geographical coverage, critical water, sanitation, and hygiene (WASH) infrastructure, and understanding persistent disease.

Following Ms. Alexander's remarks, Ms. Callahan welcomed The Carter Center's Vice President of International Health Programs, Dr. Kashef Ijaz, to provide remarks noting it was also his first in-person review meeting since taking on his role as VP. He stated that he has had the pleasure of learning about the tremendous achievements in the fight to eliminate trachoma worldwide with the support of incredible partners such as the ministries of health of Carter Center-assisted countries, ITI, ICTC, Pfizer Inc., WHO, and ESPEN (Expanded Special Project for Elimination of Neglected Tropical Diseases). Dr. Ijaz also touched on the Carters' legacy and pioneerism that is embedded in the ethos of the Center—to explore and investigate gaps in integration, health systems strengthening, geography, funding, and other barriers that hinder elimination.

Ms. Callahan provided an overview of efforts conducted in 2023 to achieve the elimination of trachoma as a public health problem in Carter Center-assisted countries, and she provided a brief background of President and Mrs. Carter and their intent to make the world a better place. Embedded within The Carter Center's mission is the recognition that "the possibility of failure is an acceptable risk," which provides a space to innovate, ideate, and try. Ms. Callahan noted the importance of trying a variety of implementation methods when working in areas experiencing insecurity. The Carter Center, in partnership with the ministries of health in Ethiopia, Niger, South Sudan, and Sudan has continuously strived to achieve programmatic goals despite uncertainty and insecurity; this past year was no different. In 2023, The Carter Center-assisted programs performed 47,275 trachomatous trichiasis (TT) surgeries, 31,973 (68%) performed on women; over four million doses of antibiotics were distributed; more than 4,600 new people were trained in health education; and an estimated 5,072 latrines were built.

The Amhara Program (Ethiopia), the largest of The Carter Center-assisted trachoma control programs, has had periods of insecurity in the past few years. Despite this, the Program managed to distribute 3.9 million doses of antibiotics to prevent transmission of trachoma. The Program screened more than 2.6 million individuals for TT and provided 44,370 TT surgeries. The Niger Program is expected to further expand house-to-house case-finding efforts to find the last remaining TT cases, prepare its elimination dossier, and transition the Program in the next few years. In South Sudan, the Program distributed 209,256 doses of antibiotics, conducted 1,049 TT surgeries, and is close to completing baseline mapping of the country with two evaluation units left as of December 2023. The Sudan Program experienced extreme challenges related to insecurity in 2023, which resulted in the suspension of activities. However, prior to activities being halted, the Program conducted impact surveys in Gedarif and White Nile states. Results indicated a decrease in trachoma prevalence, especially in South Sudanese refugee camps in White Nile state.

Throughout the two-day Program Review, country-specific and topical presentations highlighted how The Carter Center and its partners remain resolute in mitigating challenges and achieving the elimination of trachoma as a public health problem. This year, in addition to the SAFE (Surgery, Antibiotics, Facial cleanliness, and Environmental improvement) updates from national program representatives, significant attention was given to scientific studies, investigating gaps, and innovative approaches to trachoma elimination. Ms. Hadley Burroughs, Study Coordinator at Francis I. Proctor Foundation, provided an update on the Kebele Elimination of Trachoma for Ocular Health (KETFO) study in Amhara, Ethiopia. Ms. Sarah Gwyn, Microbiologist at the CDC, presented on lateral flow assay (LFA). Dr. Albino Nyibong Ajang, Director of Eyecare, Ministry of Health South Sudan

presented on the use of integrated surgery campaigns in South Sudan. Dr. Emily Gower, Associate Professor at the University of North Carolina – Chapel Hill, introduced a novel surgery technique for managing postoperative TT (PTT). Drs. Emanuele Giorgi and Anna Harte, Associate Professor in Biostatistics, Lancaster University & Research Fellow, LSHTM, jointly presented on the use of model-based geostatistics to inform trachoma elimination. Mr. Mohamed Bah, Associate Public Health Advisor with the TGFH, presented findings from a multi-country operational research study on persistent and recrudescent trachoma.

To highlight various approaches to enhanced MDA implementation, Mr. Eshetu Sata, Trachoma Control Program Manager, Carter Center Ethiopia; Dr. Jeremiah Ngondi, Regional NTDs Technical Advisor for RTI International; and Ms. Elisabeth Chop, Monitoring and Evaluation Associate, Helen Keller Intl shared the experiences of implementing enhanced MDA strategies in Amhara, Ethiopia, Tanzania, and Niger, respectively. A panel discussion presented the Enhancing the "A" in SAFE (ETAS) study implemented by the TCP, which measured the cost, feasibility and community acceptance of more frequent than annual (MFTA) MDA in South Sudan. Dr. Scott Nash, Senior Associate Director of Research, Trachoma Control Program, The Carter Center; Mr. Nicholas Presley, Research Coordinator, The Carter Center; Dr. Angelia Sanders, Senior Associate Director, Trachoma Control Program; and Mr. Tim Jesudason, Health Economics and Communications Consultant, Partners in Global Health, all presented aspects of the study, including treatment coverage, acceptability, and a cost analysis of the approach.

In addition to understanding the gaps and addressing enhanced strategies that could hasten progress toward elimination, the Program Review also included discussions on the need for the global program to address gaps in support and ensure populations are not left behind. Ms. PJ Hooper, Deputy Director, ITI and Vice Chair of ICTC, commenced this session by providing an update on the ICTC, its executive team, and ICTC's strategic plans to improve the global program. Dr. Amir Bedri Kello, Medical Officer, Trachoma, WHO – Regional Office for Africa, presented on access to SAFE interventions. Dr. Angelia Sanders, Senior Associate Director, Trachoma Control Program, The Carter Center, presented on special and vulnerable populations. Lastly, Dr. Paul Emerson, Director of ITI, discussed unknown challenges to the elimination of trachoma as a public health problem.

The Carter Center has been a dedicated partner in the global community, with close collaboration with the WHO, ITI, and Pfizer Inc., to assist countries in eliminating trachoma as a public health problem as we follow and define the path to get there. During the Program Review, each of these organizations provided an update on the road to elimination from their relevant focal points. Dr. Anthony Solomon, Chief Scientist of NTDs, WHO, provided an update on the WHO NTD Roadmap followed by Dr. Amir Bedri Kello with an update on ESPEN. Dr. Paul Emerson discussed ITI's management and distribution of Zithromax® over the years, while Miss Julie Jenson, Director Product Access at Pfizer Inc., provided an update on the Zithromax® production, changes to packaging, and plans for maintaining the supply chain and shipping capabilities.

Dr. David Addiss concluded the two-day meeting with the tenets of compassion in public health for practitioners—awareness of suffering, empathy, and the action required to ease or prevent suffering.

In her closing remarks, Ms. Kelly Callahan reflected on the words of Dr. Addiss and the importance of compassion in global health. Ms. Callahan reflected on the presentations and rich discussions

between the national programs, ministries of health, implementing partners, donors, and grant managers, which will allow us to reach the elimination end game. Despite experiencing severe insecurity, the ministries of health of Ethiopia, Niger, South Sudan, and Sudan and their partners have once again demonstrated their determination to end suffering caused by trachoma. Finally, Ms. Callahan expressed immense gratitude to everyone for the collective efforts towards ridding the world of trachoma and bridging gaps as a community to make the world a better place, following the mission set forth by President and Mrs. Carter.

SAFE in Ethiopia

Presented by Mr. Fikre Seife, National NTD Program Coordinator, Ministry of Health – Ethiopia

Background

Ethiopia has the highest trachoma burden globally, with more than 52% of the global population living in trachoma endemic districts. At baseline 886 out of 960 districts were endemic for trachoma, exhibiting trachomatous inflammation-follicular (TF) prevalence ≥5% in children ages one to nine years. Due to years of dedicated efforts to reduce the burden of disease, 320 previously endemic districts have reached the TF elimination threshold of <5%; 566 districts remain endemic for trachoma, and the National Program will continue its efforts to eliminate trachoma as a public health problem by 2030.

Surgery (S)

Since 2003, Ethiopia has provided more than 1.7 million TT surgeries; with the initiation of the Fast Track Initiative, more than 700,000 surgeries have been completed since 2015 (Figure 1). Through this initiative, the National Program aimed to address the TT burden in Ethiopia by training additional integrated eye care workers (IECWs) to provide surgical services to those in need. The greatest number of TT surgeries completed to date in Ethiopia was in 2016 during the Fast Track Initiative. The fewest number of surgeries completed was in 2020 due to the impact of the COVID-19 pandemic, though outputs have progressively increased each year since. In 2023, a total of 98,210 surgeries were completed in 11 regions; most of the surgeries were completed in Amhara (45%) and Oromia (29%). The collaborative efforts of the regions and partners enabled the National Program to exceed its surgical target of 88,612 surgeries by 10%. Due to these efforts, the national prevalence of TT has dropped by 60% since baseline, with a mean prevalence of 0.8%, as compared to 2.07% at baseline.

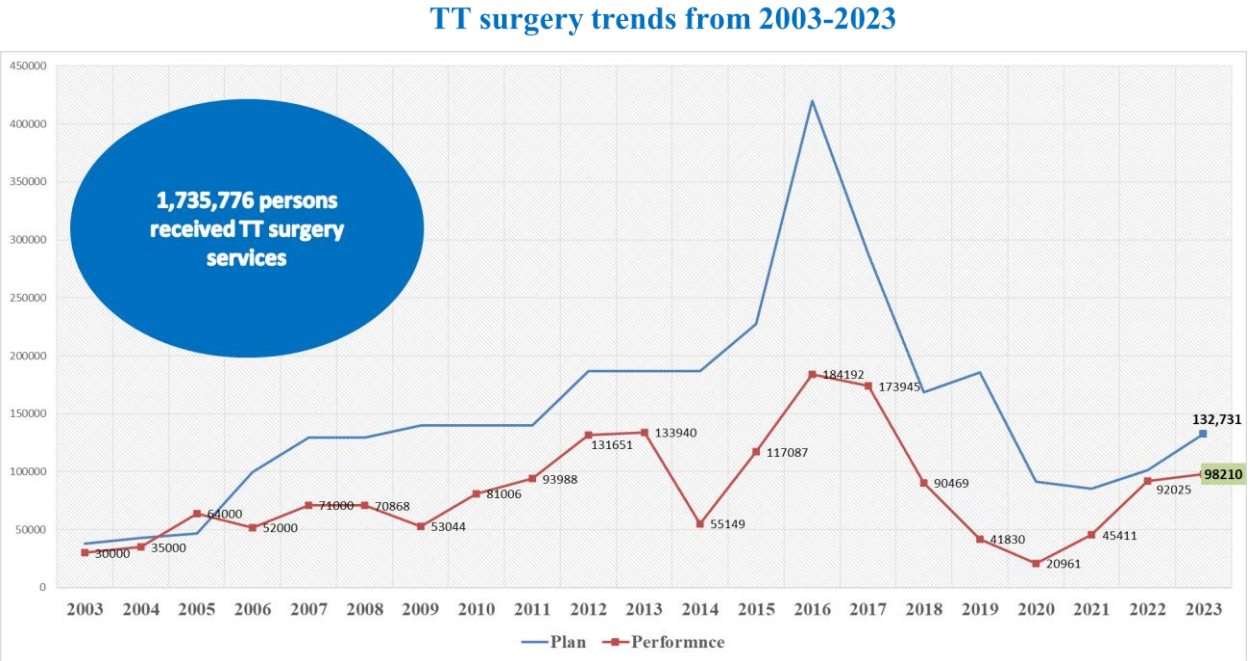


Figure 1 – TT surgery trends through 2023

Of the 850 districts that were ever endemic for TT, 132 have achieved the elimination threshold for TT.

Antibiotic Therapy (A)

As of the end of 2023, the mean prevalence of TF in Ethiopia was 9.3%, demonstrating a 65% reduction since baseline, when the mean national TF prevalence was 26.2%. All regions have demonstrated reductions in their TF prevalence estimates since baseline, including Amhara, Central Ethiopia, and the Southwest Ethiopia region which initially had the greatest mean TF of 33.9%, 32.6%, and 32.6%, respectively. Amhara has since decreased to 13.7% mean TF, 13.4% for Central Ethiopia, and 7.5% in Southwest Region. Currently, there are 566 districts with TF ≥5%, down from 886 endemic districts at baseline. Of the 566 that are currently endemic and require additional MDA, 197 (34.8%) have TF prevalence 5-9.9%, 284 (50.1%) have TF 10-29.9%, and 85 (15%) have a TF prevalence of TF ≥30%.

In 2023, the National Program distributed 21.2 million doses of antibiotics for trachoma in 216 districts or 46% of the 465 districts targeted for MDA. Of the 216 districts completing MDA, 204 (94.4%) achieved the 80% minimum standard for therapeutic coverage. For the remaining 249 districts that did not complete MDA, it was largely due to the shortage of Zithromax® and insecurity. This brings the total treatments of antibiotics distributed since 2003 to approximately 486,570,000.

Facial Cleanliness (F) & Environmental Improvement (E)

In alignment with the F & E components of the WHO-endorsed SAFE strategy, the Ethiopian government has been advocating for stronger WASH and NTD collaboration and has integrated WASH initiatives at various levels of government. At the National level, the WASH-NTD technical working group (TWG) which consists of individuals from the national One WASH group, members from the water sector, and WASH and NTD departments of the Ministry of Health (MOH), have been meeting regularly to monitor progress, share experiences, and gather data via systematic reviews and meta-analyses on the effect of WASH on NTDs; their objective is to apply evidence-based advocacy to these efforts. Additionally, the TWG has defined and recommended minimum WASH packages, monitored current WASH strategies, and compiled best sustainable practices for behavioral change. After successful advocacy, NTDs are now included in the revised national One WASH implementation guidelines as a pathway to expand water coverage and accessibility. The regional level WASH-NTD TWGs have been using data to target programmatic action on the WASH components of F & E and WASH investment in NTD-endemic districts. At the district level, the TWGs have led joint planning between stakeholders to implement the WASH-NTD toolkit, as well as to strengthen local leaders and community engagement during NTD-related activities.

Several initiatives focused on improving safe water access, basic sanitation, and hygiene education have been implemented by WASH and NTD partners across the country. F & E strategies have been implemented at the school and community levels through school curricula (in the environmental science subjects for Grades 1-4), anti-trachoma clubs, gamification of hygiene in schools, and WASH facility construction in selected schools. Social Analysis and Action initiatives, face washing demonstrations during MDAs, sanitation marketing, radio messaging, and Community-led Total Sanitation and Hygiene have also been part of community-focused F & E strategies.

Surveys

The National Program conducted 97 trachoma impact surveys (TIS) and 71 trachoma surveillance surveys (TSS) throughout 10 regions in 2023. The highest number of surveys were conducted in Southwest Region (39 districts), Oromia (25 districts), Southeast Region (23 districts), Afar (20 districts), Sidama (19 districts), and Amhara (18 districts). Of the 168 districts surveyed, 74 (44%) districts had TF <5%; the regions of Amhara, Oromia, and Southwest Region reported the fewest number of districts falling below the 5% TF threshold with 33%, 12%, and 18% respectively. Surveys in 2023, and historically have revealed the challenge of persistent TF in Ethiopia (i.e., districts that fail to achieve TF <5% after at least two TIS); 207 out of 566 endemic districts in Ethiopia are considered persistent. The region with the greatest proportion of persistent districts out of the total number of endemic districts is Amhara (88%), followed by Sidama (62.5%), Central Region (48.9%), and Southeast Region (36.2%). Additionally, 15% of the currently endemic districts in Ethiopia (85 districts), are considered recrudescent (i.e., resurgence of TF ≥5% after a TSS). The greatest number of recrudescent districts are found in Oromia and Sidama, with 27 districts each, while the districts with the greatest proportion of recrudescent districts of their total endemic districts include Southeast Region and Somalia, with 57.4% and 28.6%, respectively.

Child MDA

To address the challenge of the number of persistent and recrudescent districts in Ethiopia, the National Program investigated alternative approaches for MDA to support elimination efforts. In response to the recommendations from the WHO Informal Consultation on End-Game Challenges in December 2021, which encouraged programs to implement alternative strategies to address TF, the Ethiopia Trachoma Advisory Group (ETAG) considered the MFTA MDA strategy for Ethiopia. This strategy is called Child MDA, since it consists of providing annual trachoma MDA for the entire community followed by one additional round of treatment four to six weeks later for children six months to nine years of age. The ETAG and partners developed the protocol, and the approach was piloted in six districts across the regions of Amhara (Lasta and Wadilla districts), Oromia (Adami Tulu and Sebata Hawas districts) and Southwest Region (Cheha and Emdebir districts). To assess the feasibility of the Child MDA approach, a feasibility assessment was conducted by the National Program to assess district capacity and intervention fidelity, beneficiary and provider attitudes toward MDA, and governmental leadership attitudes toward persistent and recrudescent trachoma.

A cross-sectional mixed methods design was used, which included a desk review, key informant interviews, observation of MDA, and exit interviews with MDA recipients to acquire qualitative and quantitative evidence on the Child MDA implementation. Interviews were conducted with 52 key informants involved in the intervention; 80 exit interviews were conducted with caregivers; and observations were completed at five MDA sites. A desk review of MDA treatment and coverage data was completed, along with a review of the human resource needs for MDA implementation. A cost assessment was implemented looking at costs associated with community-wide and child MDAs in the six districts. Findings of this cross-sectional assessment revealed overall high coverage for community MDA (>88%) and child MDA (>92%). Coverage <80% was reported from 11 (9%) of the kebeles during community-wide MDA and two (1.6%) during child MDA. Coverage of ≥110% (which was considered significant), was observed in 10 (7.8%) districts during community MDA and

19 (15%) during child MDA. This was believed to be the result of an issue with the population denominator. While the cost assessment does not consider the size or population density of a district and does not include all relevant cost categories for the assessment, based on the assessment, the community-wide MDA cost per treatment estimate was 9.2 Ethiopian Birr (ETB) (95% Confidence Interval [CI]: 4-14) and 13.7 ETB (95% CI: 7-20) for child MDA; the assessments found that the average cost per treatment for the enhanced two rounds of MDA was still lower than the global average benchmark of 16.5 ETB (95% CI: 12.1-19.3).

Programmatic Challenges

Ongoing civil unrest in many regions of Ethiopia, especially Amhara, Oromia, and Tigray regions have made some areas inaccessible to the National Program. Drug shortages and delays in certain districts continue to be a challenge, which could be driving TF recrudescence and persistence. Funding gaps in some districts in the Afar and Somali regions have prevented the continuation of survey and MDA activities. Despite advocacy and encouraging initiatives through collaborative efforts of donors and partners, WASH coverage and combined NTD program coordination remains low. Increased investment in WASH and child MDA mechanisms will be critical to achieving the 2030 elimination target.

SAFE in Amhara, Ethiopia

Presented by Mr. Adisu Abebe, NTD Team Leader, Amhara Regional Health Bureau

Background

The Amhara region of Ethiopia is the most trachoma-affected region in Ethiopia; at baseline it had the greatest burden of trachoma in the country as well as globally. Zonal trachoma prevalence surveys conducted by 2007 revealed that all zones in the Amhara region were endemic for trachoma, with TF prevalence over 10% in all zones and with some areas showing TF prevalence well above 30%. This meant that all areas required the full SAFE strategy, which was taken to scale in every zone in the region by 2007. More than 215 million doses of antibiotics have been distributed to combat trachoma throughout the Amhara region. Due to these efforts, as of December 2023, 58 out of 166 districts in the Amhara region have achieved the <5% elimination threshold for TF and are exempt from MDA. This leaves 108 districts with an estimated population of 15.9 million people still requiring MDA for trachoma. In addition to TF, at baseline, all zones in Amhara were endemic for TT, with an estimated 643,904 people requiring TT surgery. Since the provision of surgeries began in 2001, a total of 801,775 people have received surgery to correct TT. While there have been significant decreases in district-level prevalence throughout the region, currently there are still 165 out of 166 districts that are endemic for TT. Based on survey results and the TT surgeries recently conducted, an estimated 75,929 people remain that require TT surgery to reach the elimination threshold.

In 2023, the Trachoma Control Program in Amhara continued to be impacted by insecurity, resulting in Program implementation delays, particularly surveys and MDA. Despite these challenges, in 2023 the Program completed 44,370 surgeries, trained or retrained 116 TT surgeons, distributed nearly four million doses of antibiotics, and completed 16 prevalence surveys. The Amhara region remains focused on reaching elimination of trachoma as a public health problem by strengthening TT outreach and achieving full geographic coverage while sustaining the quality of surgical outcomes.

To ensure that individuals with TT were located and offered surgery, in 2023 house-to-house case finding were conducted in 31 districts.

Table 1. Program Achievements in 2023

Indicator	Amhara Region (Carter Center-Assisted)		
	Target	Achieved	% Achieved
# of persons operated	34,744	44,370	128%
# of women operated		30,062	68%
# of surgeons trained	56	74	132%
# of surgeons retrained	73	42	58%
Doses of Zithromax® distributed during MDA	15,316,384	3,909,938	26%
Doses of tetracycline distributed during MDA	328,874	85,368	26%
# of surveys administered	60	16	

Surgery (S)

As of the end of December 2023, 165 of the 166 districts in Amhara remain above the 0.2% elimination threshold for TT, though much progress has been made to decrease the burden of TT in the region. Of the 165 currently endemic districts, 95 (58%) are <1% TT and 61 (37%) are <2% TT—demonstrating a significant decrease of the burden of TT as compared to baseline. Further, of the 165 endemic districts, 107 (65%) have <500 TT cases that need to be managed—this not only demonstrates the progress to date but also that the region will have to conduct case finding to finish districts and demonstrate full geographic coverage has been achieved. In 2023, 44,370 people received TT surgery across the region, which was 128% of the 34,477 target, and 13,404 more surgeries than 2022 outputs. Of those operated, 30,062 (68%) were women. House-to-house case finding was completed in 31 districts, during which 2,669,619 people (90% of the target population) were screened, 22,848 (23%) of the 98,351 suspected TT cases examined were confirmed cases of TT, and 19,611 individuals accepted surgery. Data were collected to document the house-to-house coverage as evidence for the elimination dossier that these districts have addressed the TT burden.

To ensure surgical quality in the region, in 2023 the Amhara Regional Health Bureau (ARHB) conducted surgical outcome assessments at 24 hours, seven to 14 days, and three to six months; of the 44,282 surgeries assessed at 24 hours, 23,205 patients assessed at seven to 14 days, and the 10,001 assessed at three to six months, 44,058 (99.5%), 22,919 (98.8%), and 9,260 (92.6%) had good surgical outcomes, respectively. The ARHB also ensured quality surgical provision by training 74 new TT surgeons, known locally as IECWs; retrained 42 existing IECWs; and provided supportive supervision to 51 active IECWs during surgical outreach activities. Nine IECWs were audited in 2023, and all were assessed to have good surgical abilities and outcomes to continue providing surgical services.

Antibiotic Therapy (A)

By the end of 2023, 58 of the 166 districts in the Amhara region reached the elimination target for TF and no longer require MDA for trachoma; this includes 45 districts that remained below the elimination threshold at surveillance survey, thus achieving one of the requirements for elimination of trachoma as a public health problem. This achievement shows great progress throughout the region compared not only to the survey results at baseline, when every district was endemic for TF, but also through 2015, when only nine districts were below the TF threshold. Further, in 2023, while 107 (65%) of the districts are still above the TF threshold, 72 (43%) of the districts are now between 10-29.9%, with 60% of these 72 districts found to be <20%. Amhara conducted MDA in 34 of the 102 planned districts for 2023; with the support of 6,469 trained individuals, a total of 3,995,306 doses of antibiotics were distributed, or 26% of the annual target. Due to delays related to insecurity and a shortage of Zithromax®, 64 districts, located largely in west Amhara, could not be completed and are planned for June 2024. A pilot study for Child MDA (the enhanced MFTA strategy endorsed in Ethiopia) was conducted in two districts, Lasta and Wadilla, found in North Wollo zone. The community-wide MDA was completed in May 2023 followed by the targeted treatment to an estimated 83,000 children ages six months to nine years in June 2023.

Surveys

In 2023, the Program completed 16 surveys to assess disease burden and progress toward elimination. Of the surveys completed, constituting 27% of the annual target, nine were TIS and seven were TSS. Ocular swabs examining *Chlamydia trachomatis* (*Ct)* infection were collected in select areas; these samples provide further information for the regional Program to enhance progress toward elimination. According to the survey results, six of the districts surveyed fell below the elimination threshold for TF while 10 remained above the threshold.

Facial Cleanliness (F) & Environmental Improvement (E)

As F & E is also key to achieve elimination, the regional trachoma Program remained focused on implementing F & E through health education activities in communities and in schools. The School Trachoma Program (STP) reaches more than 8,900 primary schools in the region and has been implemented since 2017 with great success. On average, 92% of schools submit quarterly reports, which include information related to the trachoma activities implemented and the facial cleanliness assessments completed. In 2023, to improve the implementation of the STP, existing radio messages were revised to address feedback from teachers and other Program stakeholders. Additionally, in 2023 the Amhara Bureau of Education took considerable initiative by formally including trachoma lessons in the standard regional school curriculum for primary grade levels one through four, highlighting the sustainability that exists for trachoma education in Amhara. A pre-grade STP was piloted in the region in 60 schools, which will be scaled up to additional pre-grade schools in 2024.

To enhance the STP, 22 school water points, including shallow wells, hand dug wells, line extensions, and spring development projects, were constructed in 2023; all water points were monitored for functionality and maintenance. For each of the 22 schools receiving a water point in 2023, a school WASH committee was established. The committee consisted of members of the school and community who were trained on basic water point monitoring and maintenance activities. They were also connected with their local water bureaus to address any issues that the committee members could not manage themselves.

Notable Achievements

Despite the challenges of insecurity in the region in 2023, there were many accomplishments. The Program completed 44,370 surgeries, which not only surpassed the 2023 target and was 13,404 more surgeries than 2022 outputs, but the surgeries were completed in a seven-month period, from January-July, due to the onset of insecurity later in the year. The Program also constructed 22 water points, implemented 34 MDAs, and completed 16 surveys, also all before the end of July 2023. After years of supporting a supplemental, parallel curriculum that was used in addition to the standard school curriculum, in 2023 the trachoma lessons were included in the standard curriculum, highlighting the sustainability of trachoma education and engagement of stakeholders in Amhara. The Program also conducted laboratory testing of ocular swabs, at the Amhara Public Health Institute laboratory in Bahir Dar, and graded conjunctiva photos, at the Gondar Grading Center at the University of Gondar, demonstrating great collaboration across country programs and projects to support Amhara and the global program to eliminate trachoma as a public health problem.

Programmatic Challenges & Mitigation Measures

The fluctuating TT estimates continue to be a challenge in Amhara and globally. Implementing the case finding approach in Amhara and achieving full geographic coverage so that districts can be considered completed will be key to achieving the elimination thresholds for TT in Amhara. Low WASH coverage also continues to be a challenge in Amhara, which may delay the region's ability to swiftly eliminate trachoma as a public health problem. The Program is constructing water points as much as possible and continues to advocate for additional partners to support WASH activities, though additional support will be required. Insecurity in most of the region and a shortage of Zithromax® continued to impact Program implementation, delaying survey and MDA activities. Additionally, the region is facing challenges of persistent and recrudescent trachoma—with 95 districts defined as persistent and 13 as recrudescent. To address these challenges, the Program has proposed various mitigation measures, including expanding the Wait & Watch approach and implementing a "survey first" approach to determine if districts still require MDA; prioritizing districts with TF >30%; and conducting child MDA where appropriate and feasible.

Program Plans for 2024

Surgery (S)

- Operate 34,845 TT cases
- Train 44 new IECWs
- Retrain 50 IECWs

Antibiotic Therapy (A)

- Distribute 15,856,569 doses of Zithromax®, including doses distributed during child MDA in 18 districts
- Distribute 320,531 doses of Tetracycline Eye Ointment (TEO)

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

- 100% of schools submit quarterly activity reports
- Construct 20 water points

Amhara, Ethiopia – TT Prevalence: Adults ≥ 15 Years

Baseline (2007)

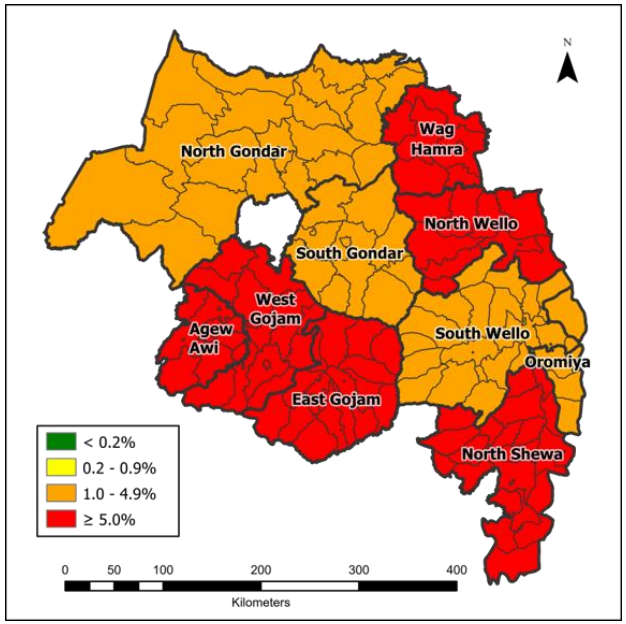


Figure 1 – Estimated TT prevalence at baseline

2015

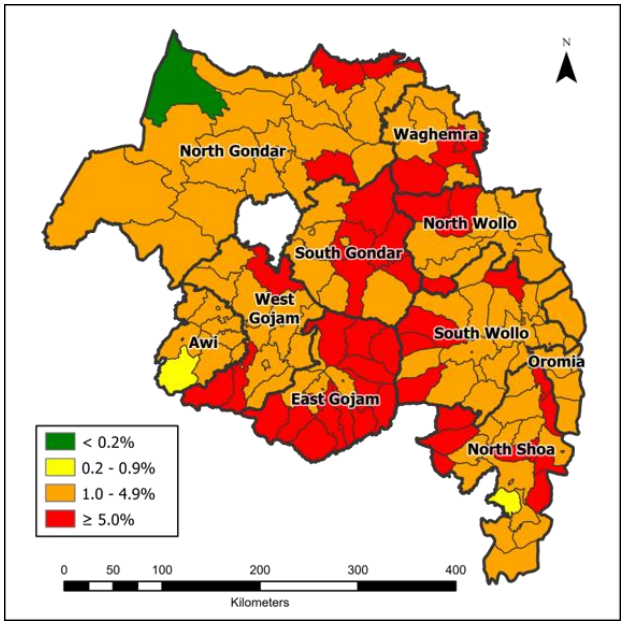


Figure 2 – Estimated TT prevalence through 2015

2023

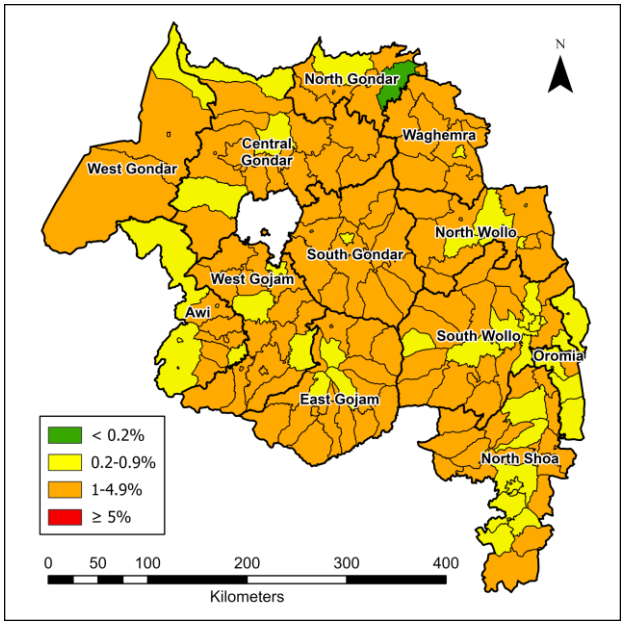


Figure 3 – Estimated TT prevalence through 2023

Amhara, Ethiopia –TF Prevalence: Children 1–9 years

Baseline (2007)

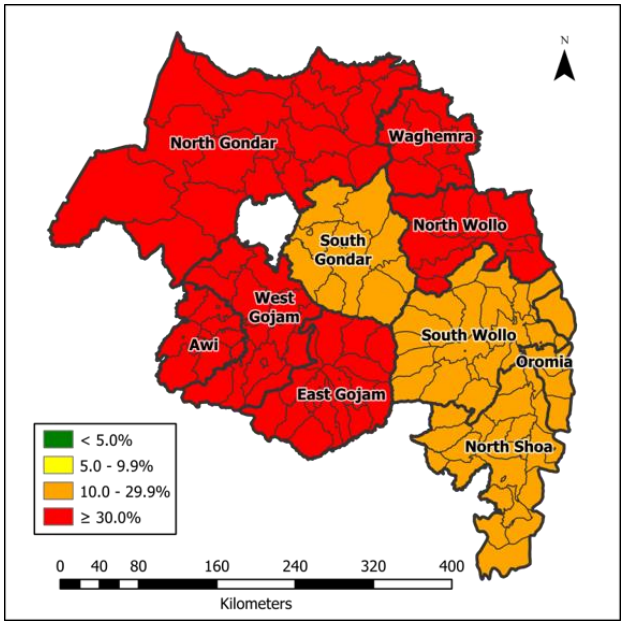


Figure 4 – Estimated TF prevalence at baseline

2015

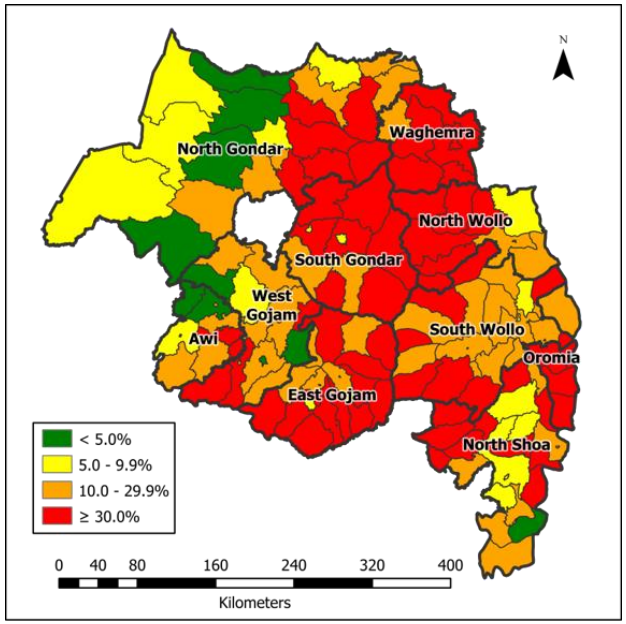


Figure 5 – Estimated TF prevalence through 2015

2023

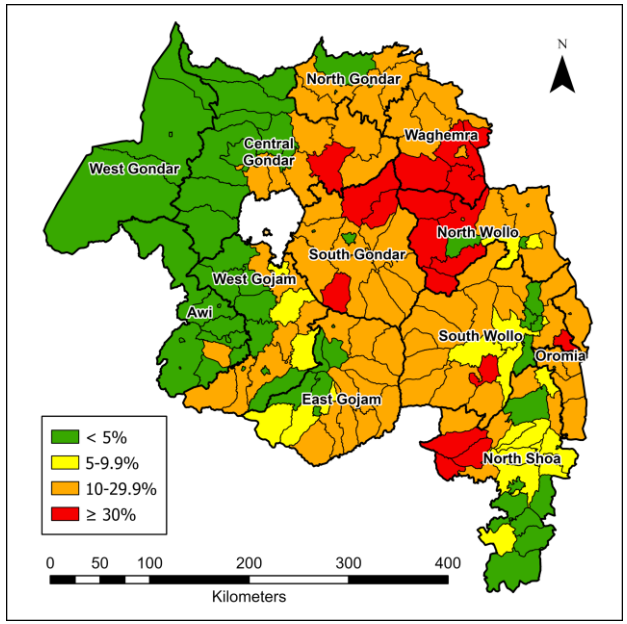


Figure 6 – Estimated TF prevalence through 2023

Amhara Ethiopia – MDA and Survey Activities

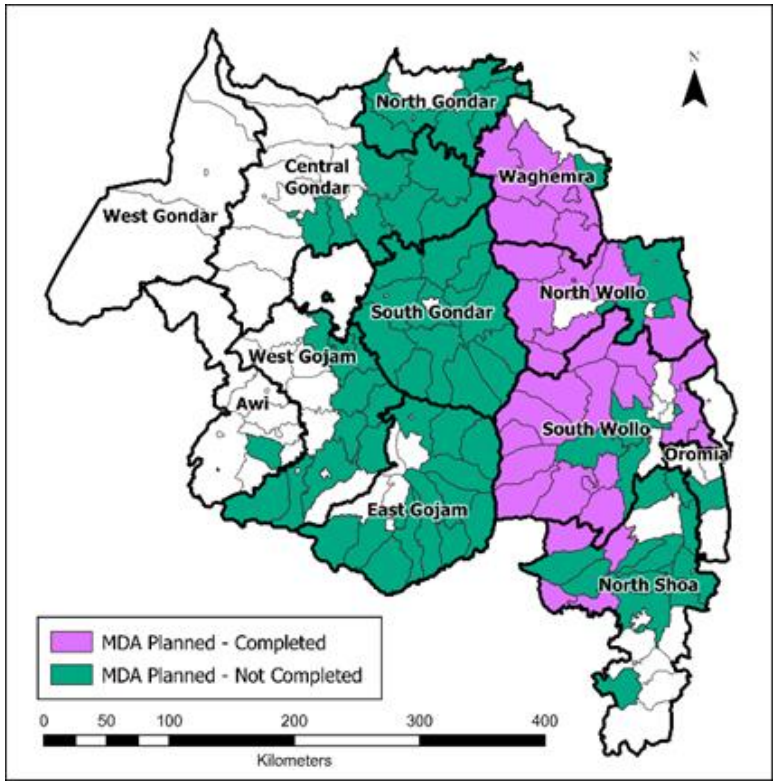


Figure 7 – Completed MDA in 2023

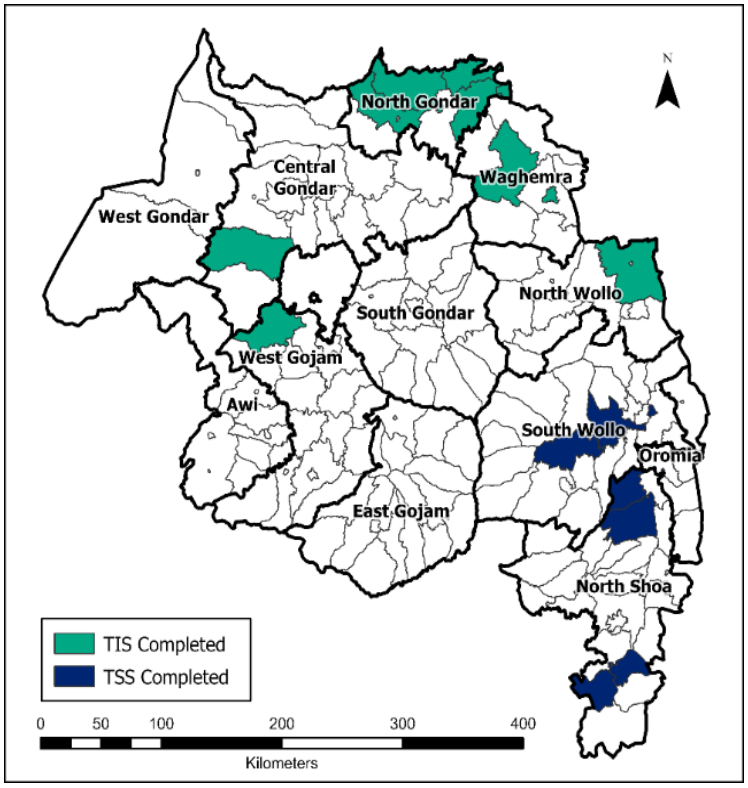


Figure 8 – Completed Surveys in 2023

SAFE in Niger

Presented by Dr. Ibrahim Almou, Deputy Coordinator, National Eye Health Program, Ministry of Health – Niger

Background

Baseline surveys conducted in various regions of Niger from 1997 to 1999 found that 1.7% of women over 15 years of age had TT and 44% of children ages one to nine years had active trachoma. To combat the problem of trachoma in Niger, the National Eye Health Program (Programme National de Santé Oculaire—PNSO), formerly the Programme National de Lutte contre la Cecité, formed the National Trachoma Task Force in 1999 and began district-level prevalence surveys in 2001 to determine which districts were endemic and required intervention. In 2002, results indicated that of the 72 health districts, all but 10 districts were endemic for TF. As of the end of 2023, 36 of the 62 ever-endemic districts remain endemic for TF and/or TT, though not the entirety of each district, as many districts have been subdivided into smaller evaluation units (EUs) for survey. Out of 96 EUs, 87 have achieved the <5% elimination threshold for TF, eight are between 5-9.9%, and one is currently between 10-29.9%. Unfortunately, at the end of July 2023, Niger's political situation shifted, thus causing the Program to suspend some activities due to insecurity and travel restrictions. Despite this challenge, the Program is still targeting 2027 to eliminate trachoma as a public health problem in Niger.

Table 1. Program Achievements in 2023

Indicator	National		Carter Center-Assisted	
	Target	Achieved	Target	Achieved
# of persons operated	3,600	4,354 (121%)	1,800	1,633 (91%)
# of women operated		2,717		1,006
# of surgeons trained	20	0	0	0
# of doses of antibiotics distributed during MDA		1,376,657	N/A	N/A[1]
# of masons trained	120	0	120	0
# of SANPLAT latrines built	50,000	5,072 (10%)	10,000	5,072 (51%)
# of block latrines built	20	26 (130%)	20	26 (130%)
# of radio messages broadcast	N/A	51,013	N/A	31,265

Surgery (S)

Due to the tremendous efforts and activities conducted since 2002, the prevalence of TT in Niger has dramatically decreased. As of December 2023, many districts are no longer endemic for TT, with the burden mostly found in Diffa, Maradi, and Zinder regions, with a small TT burden in Dosso region.

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

In 2023, an estimated 5,169 people required TT surgery to achieve the elimination threshold for TT. The National Program planned to operate 3,600 people and exceeded this target by performing 4,354 surgeries, of which 62.4% were provided to women. The Carter Center assisted the PNSO to complete 1,633 surgeries, 1,006 of which were women. To complete these surgeries, most were conducted during TT camps in which >480,000 people ages ≥15 years were screened for TT. The PNSO planned to train 20 surgeons in 2023, though this did not occur; the PNSO has requested support from The Carter Center to implement in the upcoming year.

In 2024, the PNSO plans to implement a new house-to-house case finding (ratissage) approach using trained local community volunteers (relais) to conduct the initial screening of all individuals ≥15 years, followed by Ophthalmic Technicians screening the suspected TT cases identified by community volunteers. In preparation for this approach, the PNSO and implementing partners planned to conduct a ratissage pilot to assess the training and data collection materials as well as the capacity of the community volunteers to conduct house-to-house screenings. The pilot was delayed due to various reasons, including the change in location from Guidan Roumdji to Magaria; competing programmatic activities; and the insecurity and financial impact of the July 2023 political situation. The pilot will now take place in 2024.

Antibiotic Therapy (A)

As of 2002, nearly all areas were endemic for trachoma, but as of the end of 2023, most of the country has achieved the elimination threshold for TF. Some pockets of disease remain in Bilma in the Diffa region and Damagaram Takaya, Dungass, Mirriah, and Takeita in the Zinder region. Of the 96 EUs in Niger, 87 are below the TF threshold; eight are between 5-9.9%, and one is between 10-29.9%. In 2023, the PNSO distributed 1,376,657 doses of antibiotics in five EUs with the support of Helen Keller Intl through USAID's Act to End NTDs | West program. The 1.3 million doses included 309,305 doses distributed during a second round of MDA conducted in two persistent EUs in the Zinder region (Matameye 3 and Takeita 1).

Surveys

In 2023, the PNSO completed 10 surveys, including four TIS and six TT-only surveys. A total of 24 surveys—four TIS, 10 TSS, and 10 TT-only—were planned for 2023 but were delayed to the beginning of 2024. The surveys completed in 2023 were conducted with the support of Helen Keller Intl through Act | West.

Facial Cleanliness (F) & Environmental Improvement (E)

To enhance the elimination efforts in Niger, the PNSO implemented various F & E strategies in 2023, including the construction of 5,072 SANPLAT (sanitary platform) latrines and 26 school block latrines, all with Carter Center support. To promote health education and trachoma awareness, a total of 51,013 radio messages were broadcast in 2023, including 31,265 supported by The Carter Center and 19,748 by Helen Keller Intl. The PNSO also planned to train an estimated 120 educators in select endemic areas on trachoma and trachoma prevention in 2023, though this was delayed to early 2024. While the Program has been constructing some block latrines in schools, there is a significant gap with most of the schools lacking adequate water and/or sanitation services.

Programmatic Challenges and Mitigation Measures

The Niger Program has been facing challenges with persistent and recrudescent districts, which they have aimed to address by completing the biannual MDA in two EUs—because of this work, in 2024 there is no plan for additional MDA. Niger has also experienced an unstable political situation since July 2023 resulting in insecurity. In the areas where there is insecurity (particularly in Tillabery region, parts of Maradi [Madarounfa and Guidan Roumdji], and Diffa) the PNSO and partners are following the security situation and implementing activities when there are signs of stability; the Program is also using actors local to the communities to implement activities whenever possible and engaging with the relevant local government stakeholders during all activities to assess and mitigate security issues. To address the challenge of community mobilization and acceptance of TT surgery, the PNSO and partners have developed social mobilization messages for radio broadcasts to ensure communities have adequate information about the benefits of TT surgery and where the activities will take place.

Program Plans for 2024

Surgery (S)

- Operate 8,000 TT cases, 2,000 with Carter Center assistance
- Implement house-to-house case finding (ratissage)

Antibiotic Therapy (A)

- No MDAs are currently planned in 2024

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

- Train 120 educators with Carter Center assistance
- Construct 6,000 latrines with Carter Center assistance
- Construct 24 block latrines with Carter Center assistance

Surveys

- Conduct 16 surveys, five TT-only surveys with Carter Center assistance

Niger – TT Prevalence: Adults ≥ 15 years

Baseline (2002)

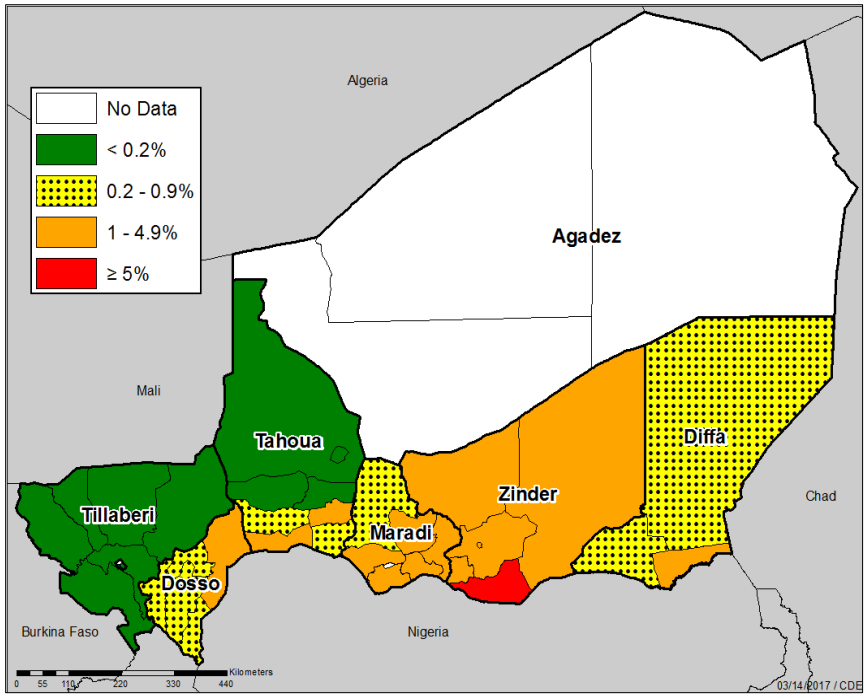


Figure 1 – Estimated TT prevalence at baseline

2023

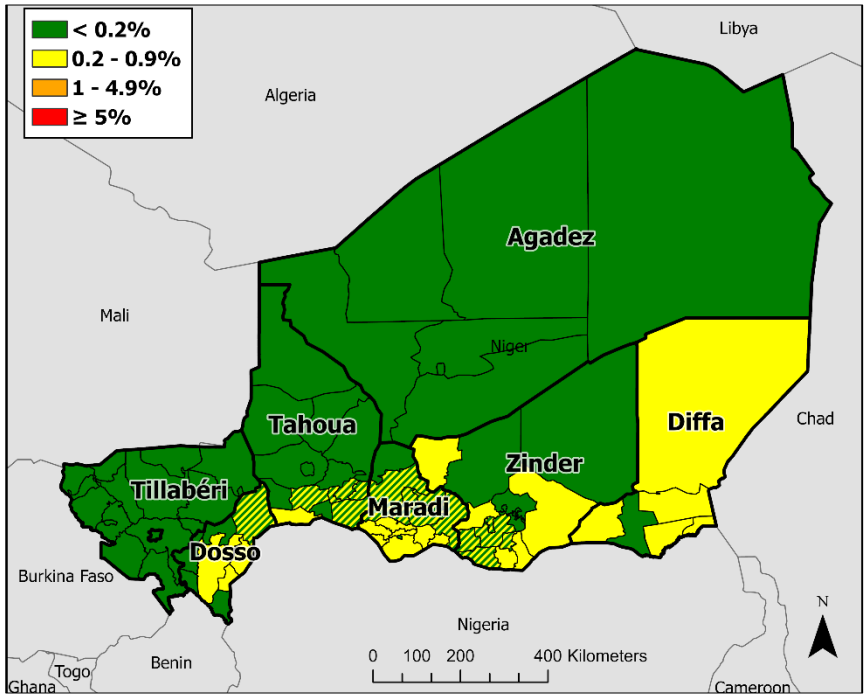


Figure 2 – Estimated TT prevalence through 2023

Niger – TF Prevalence: Children 1–9 years

Baseline (2002)

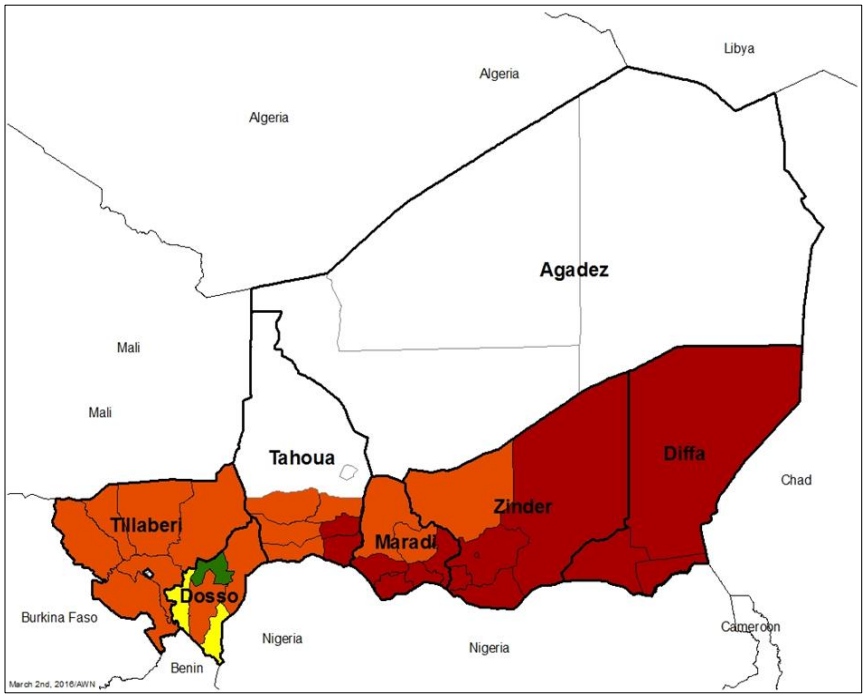


Figure 3 – Estimated TF prevalence at baseline

2023

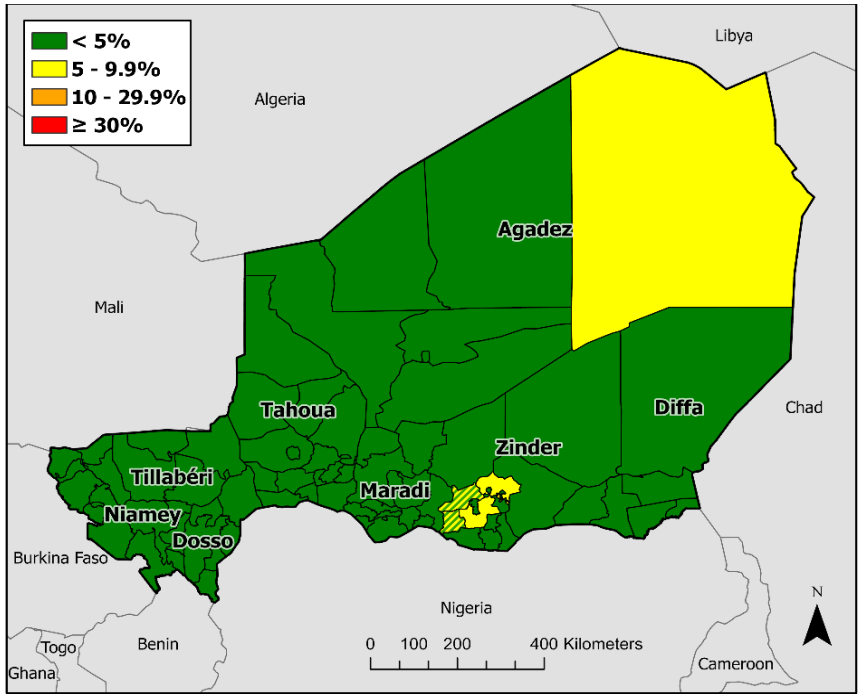


Figure 4 – Estimated TF prevalence through 2023

Niger – MDA and Survey Activities

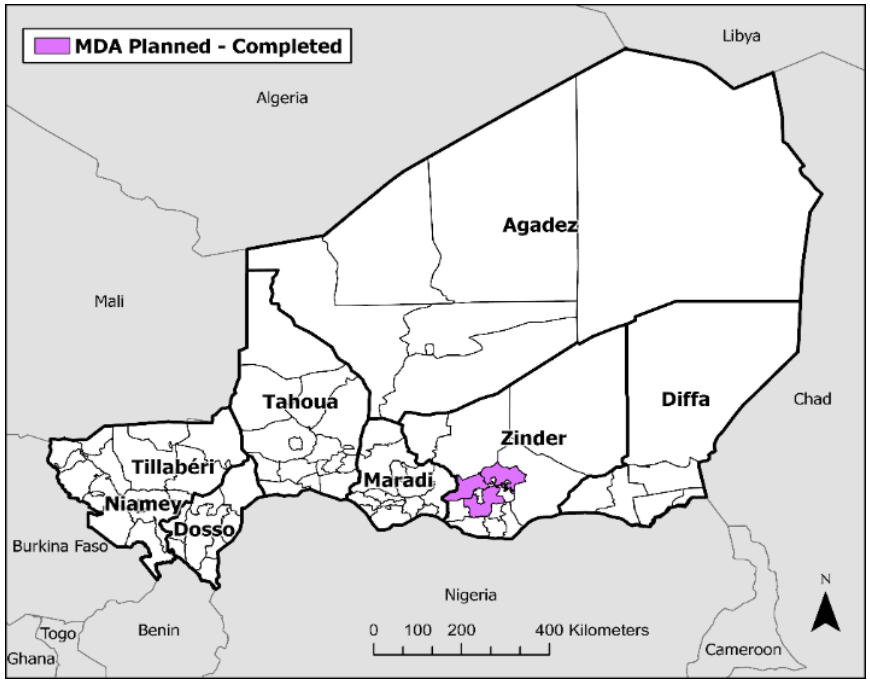


Figure 5 – MDA Completed in 2023

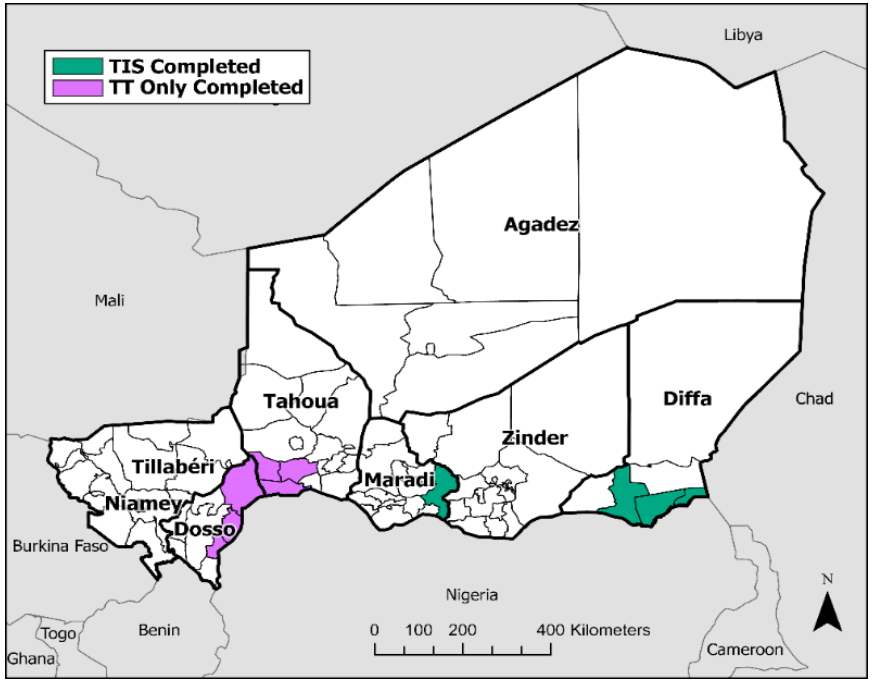


Figure 6 – Surveys Completed in 2023

SAFE in South Sudan

Presented by Mr. Yak Yak Bol, Director for Preventive Chemotherapy (PC) – PC-NTDs, Ministry of Health, South Sudan

Background

In 2011, South Sudan gained its independence from Sudan becoming the world's youngest nation. It is a landlocked country comprised of ten states and three administrative areas and over 14.2 million inhabitants. While South Sudan is diligently working to make progress across all sectors, it is grappling with population health-related challenges including endemicity to 19 out of 21 WHO-recognized NTDs, five of which require preventative chemotherapy such as trachoma, the world's leading cause of infectious blindness.

Trachoma prevalence surveys conducted in South Sudan between 2021 and 2023 showed that South Sudan is highly endemic for trachoma, especially in the eastern part of the country. During this period, South Sudan had some of the highest known trachoma prevalence levels in the world, with one baseline survey conducted in one county (the equivalent of a district) showing over 50% TF in children ages one to nine years, and 4% TT in adults 15 years and above. These far exceed WHO thresholds for trachoma elimination as a public health problem. Furthermore, due to decades of civil war as South Sudan fought for independence from Sudan and then periods of insecurity since independence in 2011, the medical infrastructure in South Sudan is limited, resulting in millions of people having little-to-no access to health services. Despite these challenges the Program had many successful achievements (Table 1).

Table 1. Program Achievements in 2023

Indicator	National		Carter Center-Assisted	
	Target	Achieved	Target	Achieved
# of persons operated	2,100	3,801 (181%)	600	1,049 (175%)
# of women operated		2,841*		743*
# of surgeons trained/retrained	12	14 (116%)	-	-
# of doses of Zithromax® distributed during MDA	1,320,410	906,617 (69%)	316,828	196,216 (62%)
# of doses of TEO distributed during MDA	164,164	111,935 (68%)	23,568	13,040 (55%)
# of villages with health education	3,276	2,004 (62%)	2,916	1,939 (67%)
# of latrines built	2	2 (100%)	0	2 (200%)
Surveys	33	29 (85%)	5	3 (60%)

**Disaggregated data not collected in one camp, therefore number of women operated is assumed to be greater than shown*

Surgery (S)

In 2023, over 300 people were trained as TT case finders to support TT surgical outreaches. This enabled 3,801 individuals to receive TT surgery in South Sudan. Of those operated, The Carter Center supported the provision of surgery to 1,049 people, 743 of whom were women. These incredible outcomes can be attributed to the collaboration between HCP, the MOH, and The Carter Center, who partnered to integrate cataract and TT surgeries simultaneously, and thus expanded access to various eye care services. To ensure surgical quality and output, Christian Blind Mission (CBM) supported the training of 14 health workers in Buluk Eye Center by an ophthalmologist and two TT surgeons.

Antibiotic Therapy (A)

The National Program administered 906,617 doses of Pfizer-donated Zithromax®, 196,216 doses with Carter Center assistance. There were 111,935 doses of TEO distributed by the National Program, 13,040 doses provided with assistance from The Carter Center. The program took extra steps to ensure all communities were reached such as renting boats to reach islands in Unity state or traveling far distances to reach cattle camps in Eastern Equatoria state.

Facial Cleanliness (F) & Environmental Improvement (E)

Although F & E funding is limited, the National Program persevered and provided more than 13,000 children with health education in 2023 through anti-trachoma clubs. During these sessions, children were taught valuable hygiene practices such as hand and face washing; skills they can take back to their households to assist in preventing trachoma. In partnership with the South Sudan Guinea Worm Eradication Program, 33 boreholes were refurbished in Lafon and Uror counties with provision of spare parts and tools, 173 WASH team members were trained, and two public latrine blocks constructed. Additionally, the Trachoma Control Program maintained behavior change and communication health education as part of MDA and surgical activities.

Surveys

In 2023, out of the 33 prevalence surveys targeted, the National Program conducted 29 (85%) prevalence surveys to determine whether interventions were required. Of these, three were completed with support from The Carter Center. Many of the surveys consisted of baseline surveys in the western part of the country, a region now known to be non-endemic. As part of operational research, three baseline surveys in Eastern Equatoria state integrated serological surveillance through dried blood spot (DBS) collection from over 9,300 individuals to determine whether *Ct* antibodies are present, and conjunctival swabs of more than 1,300 children to inform on active infection which is indicative of current transmission. As of the end of 2023, only two counties remained to be surveyed but were not surveyed due to insecurity which prevented the survey teams from safely conducting the work.

Other Notable Achievements

The ETAS study was successfully completed in 2023 and showed that complex operational research is possible within South Sudan (see page 60). The National Program launched its NTD Master Plan. The Carter Center CEO, Paige Alexander, and the South Sudan Minister of Health, Honorable Dr.

Yolanda Awel Deng, observed trachoma activities in Lafon county and engaged in high level advocacy meetings with various national and state level leaders.

Programmatic Challenges & Mitigation Efforts

South Sudan faced challenges in 2023. Poor reverse logistics from the counties and drug delays caused multiple counties to schedule MDA activities in the rainy season, which negatively impacted coverage or postponed MDA until 2024. Flooding was another barrier to program implementation as the population became displaced, further complicating the National Program's effort to track population movements and impacting coverage. Insecurity also interrupted MDA, surgery, and survey activities. Nonetheless, when counties became accessible, activities were implemented, such as in Ayod county which received MDA for the first time in ten years.

To mitigate these challenges, the National Program developed alternate plans and shifted focus to surgery and surveys when drug was not available. To ensure that activities are carried out safely, the Program monitors the security situation and implements activities when safely feasible. Finally, the MOH and partners continue to advocate for local resource mobilization from donors to support SAFE activities in all endemic counties.

Program Plans for 2024

Surgery (S)

- Operate 4,500 TT patients, 1,500 with Carter Center assistance
- Train 18 TT surgeons

Antibiotic Therapy (A)

- Distribute 1,753,570 doses of Zithromax®, 569,651 with Carter Center assistance
- Distribute 43,839 doses of TEO, 14,240 with Carter Center assistance

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

- Conduct health education in 4,000 villages, 2,600 with Carter Center assistance
- Construct 12 latrines, 10 with Carter Center assistance

Surveys

- Conduct six prevalence surveys, four with Carter Center assistance

South Sudan – TT Prevalence: Adults ≥ 15 Years

Baseline (1999)

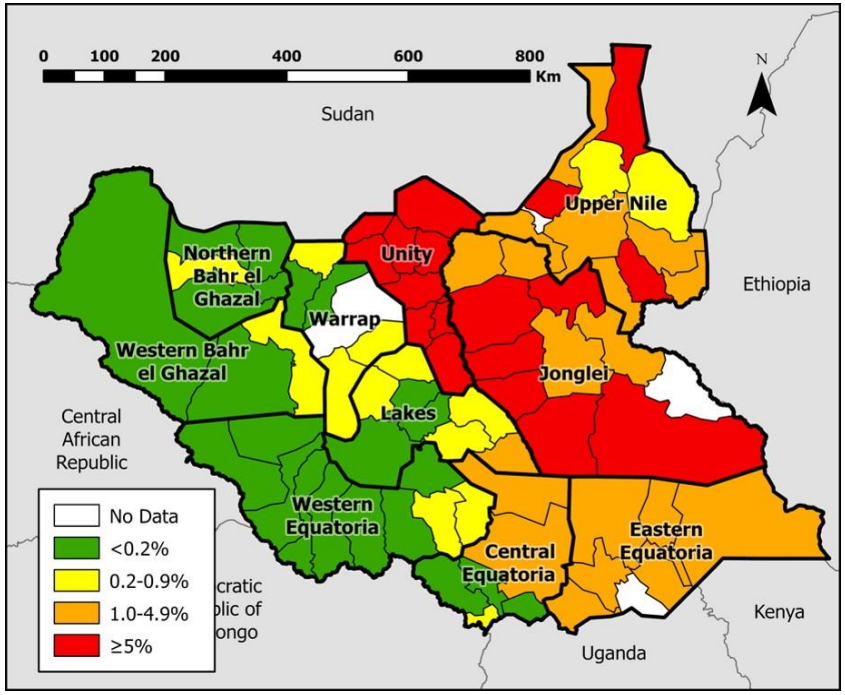


Figure 1 – Estimated TT prevalence at baseline

2023

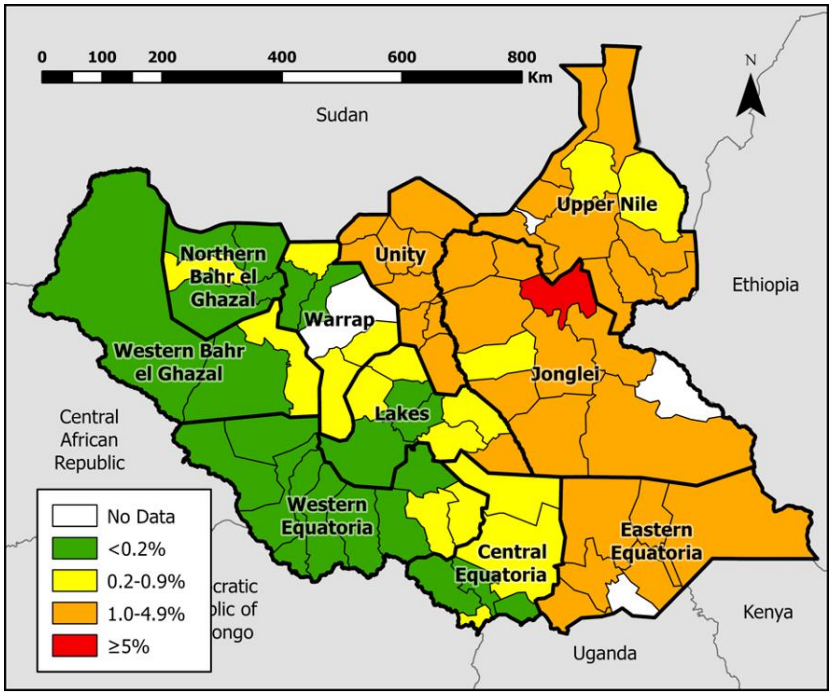


Figure 2 – Estimated TT prevalence through 2023

South Sudan – TF Prevalence: Children 1–9 years

Baseline (1999)

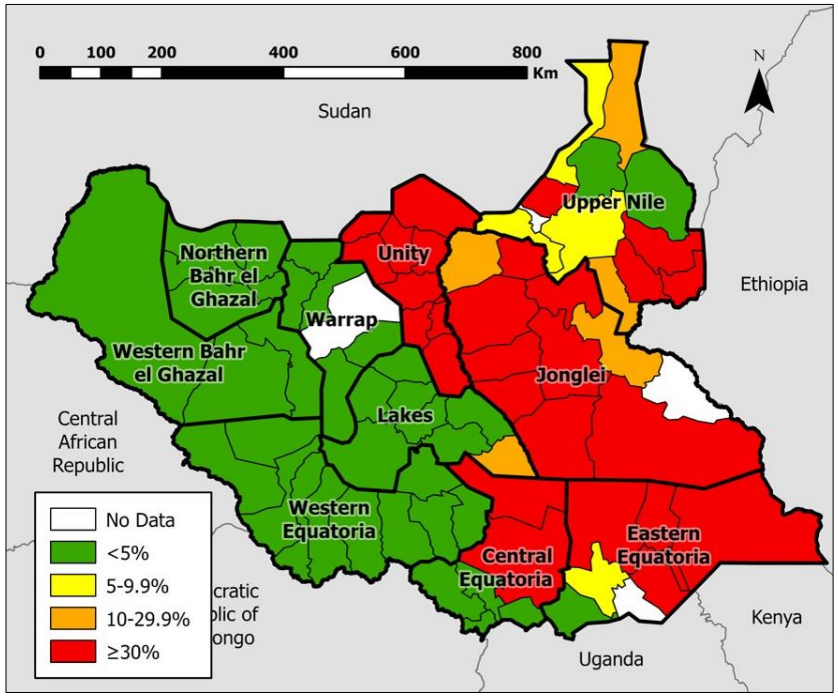


Figure 3 – Estimated TF prevalence at baseline

2023

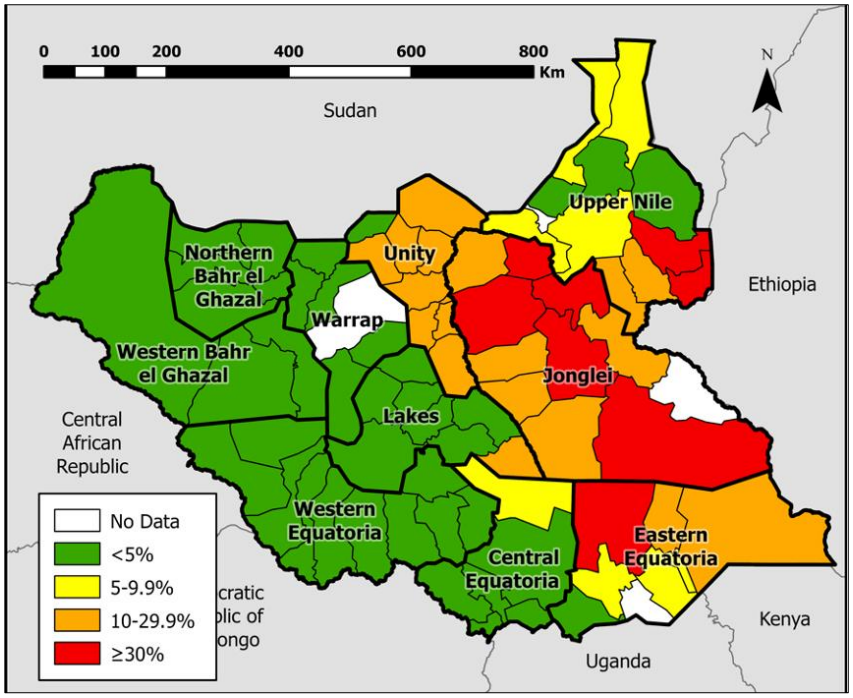


Figure 4 – Estimated TF prevalence through 2023

South Sudan – MDA and Survey Activities

2023

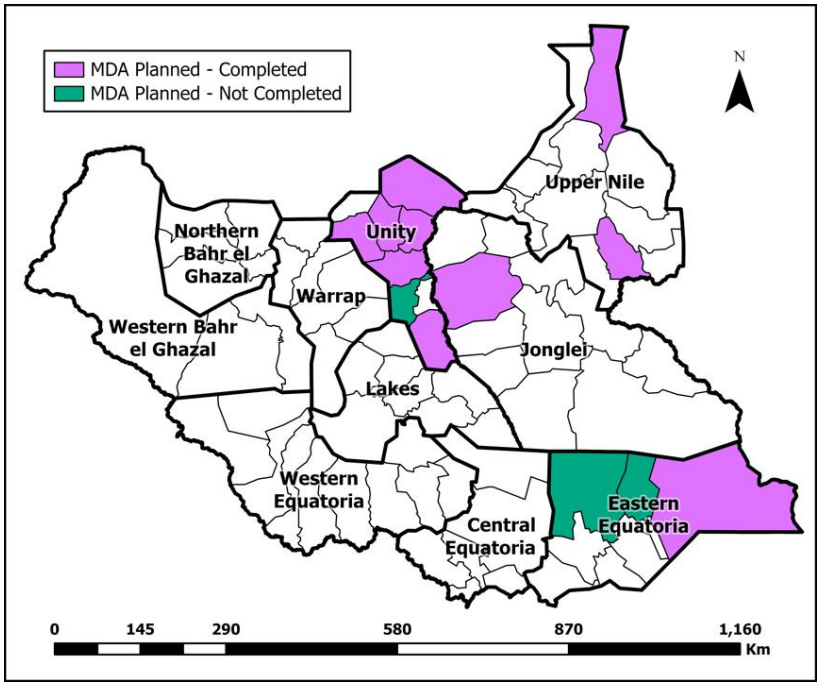


Figure 5 – MDA Completed in 2023

2023

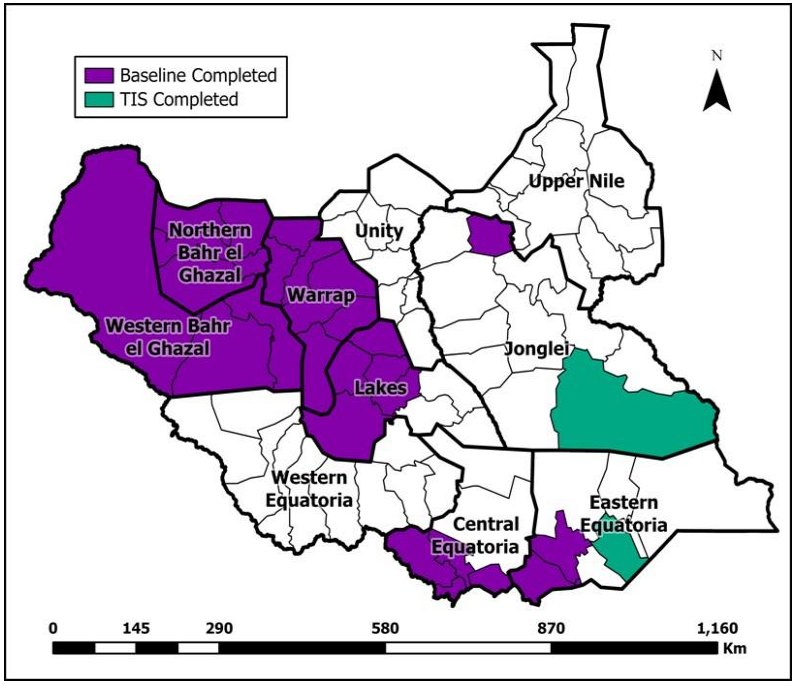


Figure 6 – Surveys Completed in 2023

SAFE in Sudan

Presented by Dr. Sara Lavinia Brair, Senior Country Representative, The Carter Center, on behalf of Dr. Balgesa Elshafie, Sudan National Coordinator for Trachoma Control Program, Federal Ministry of Health, Sudan

Background

The Federal Ministry of Health has been working to eliminate trachoma as a public health problem in Sudan for decades with the goal of reaching elimination by 2030.

Unfortunately, on 15 April 2023, a civil war between the military government of Sudanese Armed Forces and the paramilitary Rapid Support Forces began during the month of Ramadan. As a result, nine million people have been internally displaced and there are almost two million refugees. Additionally, at least 70% of hospitals located in conflict-affected areas are unable to operate and at least 19 million children are out of school. Though the fighting and displacement have severely impacted programming, before the war started, some activities were conducted. Additionally, the National Program hosted The Carter Center's CEO, Paige Alexander, who observed TT surgeries in a Khartoum clinic and other Program activities in White Nile state.

Table 1. Program Achievements in 2023

Indicator	National		Carter Center-Assisted	
	Target	Achieved	Target	Achieved
# of persons operated	7,400	170 (2%)	2,100	170 (8%)
# of women operated		128		128
# of surgeons trained/retrained	30	0 (0%)	-	-
# of doses of Zithromax® distributed during MDA	637,100	0 (0%)	637,110	0 (0%)
# of doses of TEO distributed	13,002	0 (0%)	13,002 (0%)	0 (0%)
# of villages with health education	562	0 (0%)	562	0 (0%)
Surveys	27	6 (22%)	27	6 (22%)

Surgery (S)

The National Program, with support from The Carter Center, conducted 170 TT surgeries during calendar year 2023, 128 of which were performed on women. Eighty-five percent of these surgeries (145) were a result of TT surgical campaigns conducted in two internally displaced people (IDP) camps in El Fashir locality, North Darfur state. Over 8,700 people were screened for eye conditions. In addition to TT surgery, 600 reading glasses and other eye related services were provided.

Antibiotic Therapy (A)

The National Program planned to distribute 637,100 doses of Zithromax® and 13,002 doses of TEO, with The Carter Center's assistance in the Darfur region and Gedarif state. Due to the civil war, the central medical stores were looted and the Zithromax® supply stolen; therefore, no planned MDA activities took place.

Facial Cleanliness (F) & Environmental Improvement (E)

The 2023 F & E targets to reach 562 villages with health education during MDA and surgery camps were not met. Despite the activity setback, a radio session and community meetings with women, youth, and civil administration officials were held during the surgical camp in North Darfur state. Group discussions with 5,769 men and women were also held to raise trachoma awareness. Hundreds of trachoma prevention posters, leaflets, and stickers were distributed in markets and mosques.

Surveys

Four impact surveys were conducted in Gedarif state, and two impact surveys were conducted in White Nile state. Results from the impact surveys showed that TF in children ages one to nine years is persistent in Gedarif, with three out of four localities between 5-9.9%. Ethiopian refugee camps were included in the Gedarif surveys for operational research purposes but were not included in the final analysis. Impact surveys were also completed in two localities hosting South Sudanese refugee camps in White Nile state. Prior to the surveys, three years of MDA, surgical camps reaching 482 patients, and health education were conducted. Survey results showed that TF in children ages one to nine years was below the threshold but TT remained greater than the threshold in adults ages 15 years and above. It is unclear how the civil war will impact South Sudanese residents of these camps, with some likely to return to South Sudan.

Programmatic Challenges and Mitigation Strategies

The civil war which broke out in April 2023 was still ongoing as of April 2024. The fighting resulted in all Program activities being suspended. There has been a large displacement of the Sudanese population as refugees and IDPs including Carter Center program staff. The impact on the Trachoma Control Program and the population numbers in endemic localities is unclear. The Carter Center Khartoum office was looted, and MOH staff are spread across different areas of the country and outside the country. The spread of conflict has in turn led to economic hardships, a rise in inflation, and an increase in Program costs. Despite this, The Carter Center plans to establish another office away from the capital and will focus its resources in Gedarif state where there is less fighting.

Program Plans for 2024

Surgery (S)

- Operate 400 TT patients with Carter Center assistance

Antibiotic Therapy (A)

- Distribute 591,224 doses of Zithromax®, with Carter Center assistance
- Distribute 12,000 doses of TEO with Carter Center assistance

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

- Provide 400 villages with health education

Surveys

- Conduct one impact survey, with Carter Center assistance

Sudan – TT Prevalence: Adults ≥ 15 years

Baseline (1999)

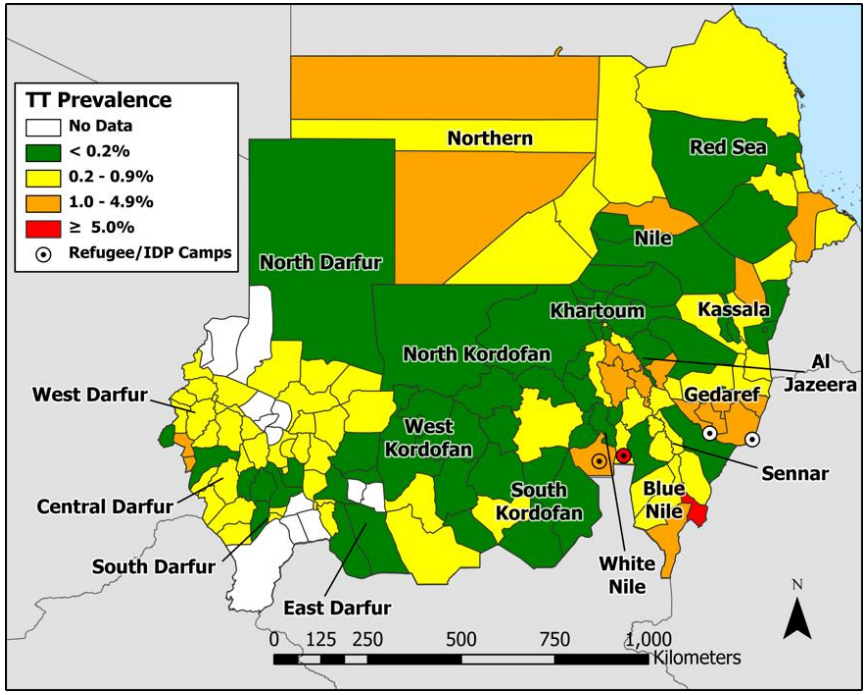


Figure 1 – Estimated TT prevalence at baseline

2023

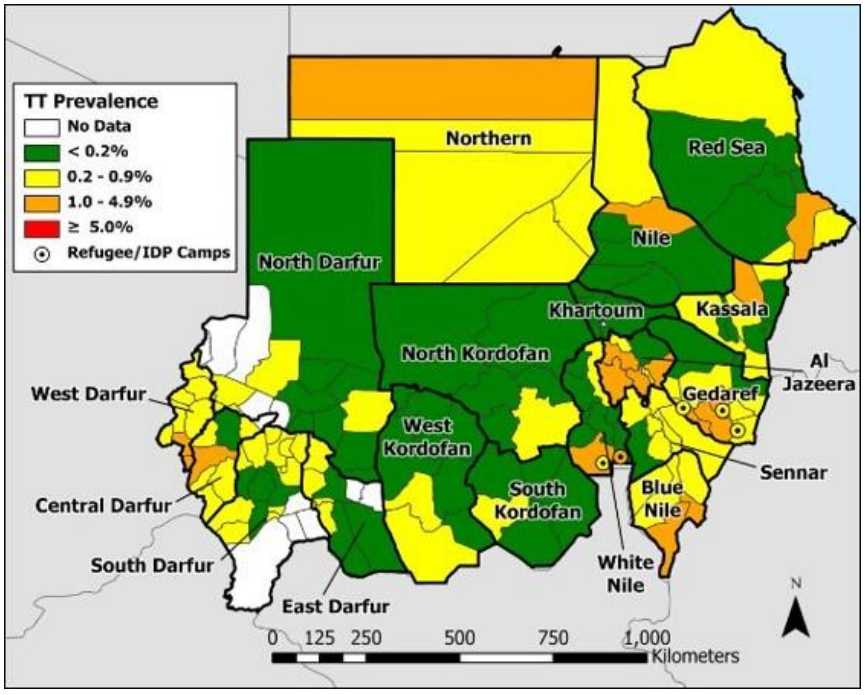


Figure 2 – Estimated TT prevalence through 2023

Sudan – TF Prevalence: Children 1–9 years

Baseline (1999)

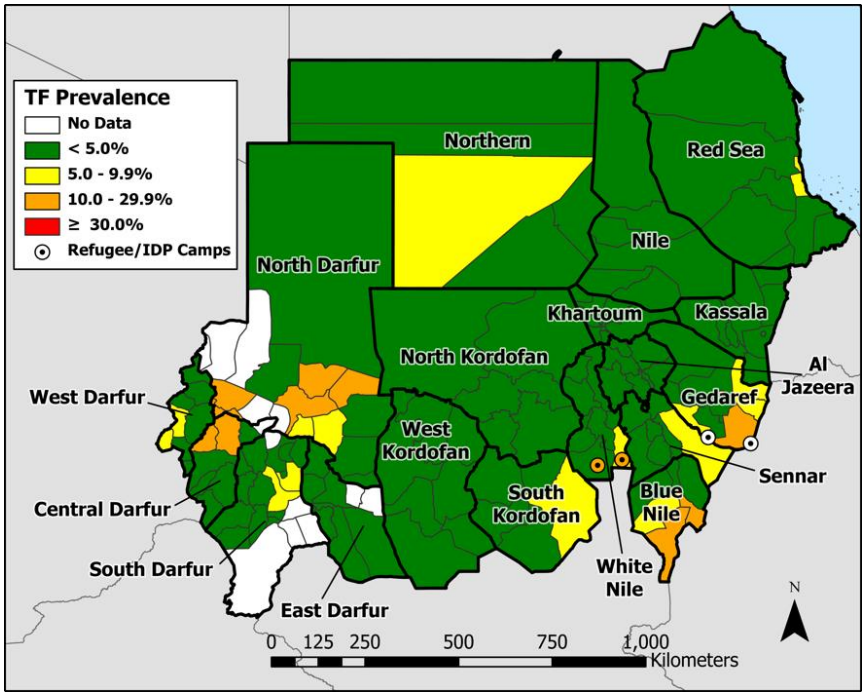


Figure 3 –Estimated TF prevalence at baseline

2023

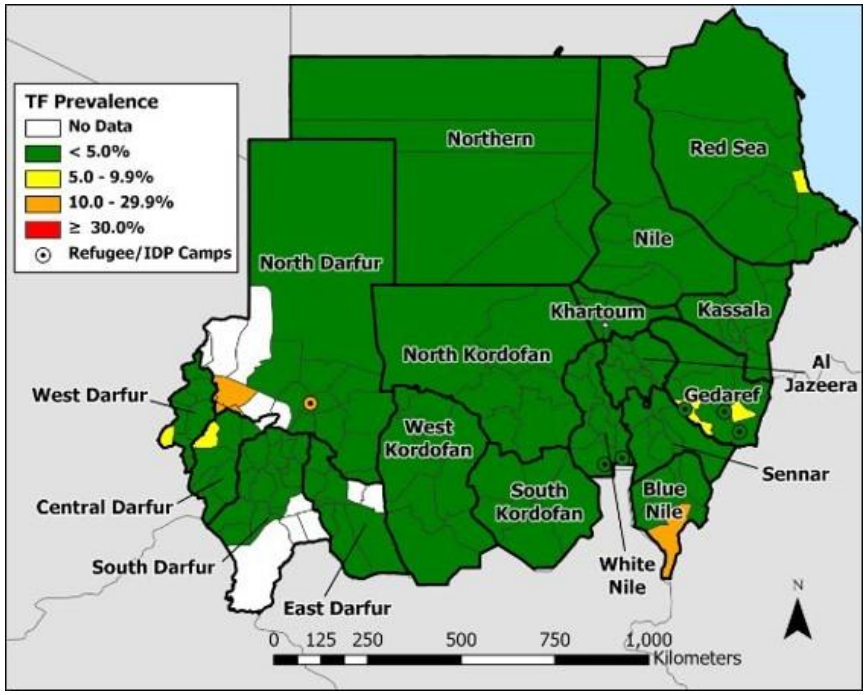


Figure 4 – Estimated TF prevalence through 2023

Sudan – MDA and Survey Activities

2023

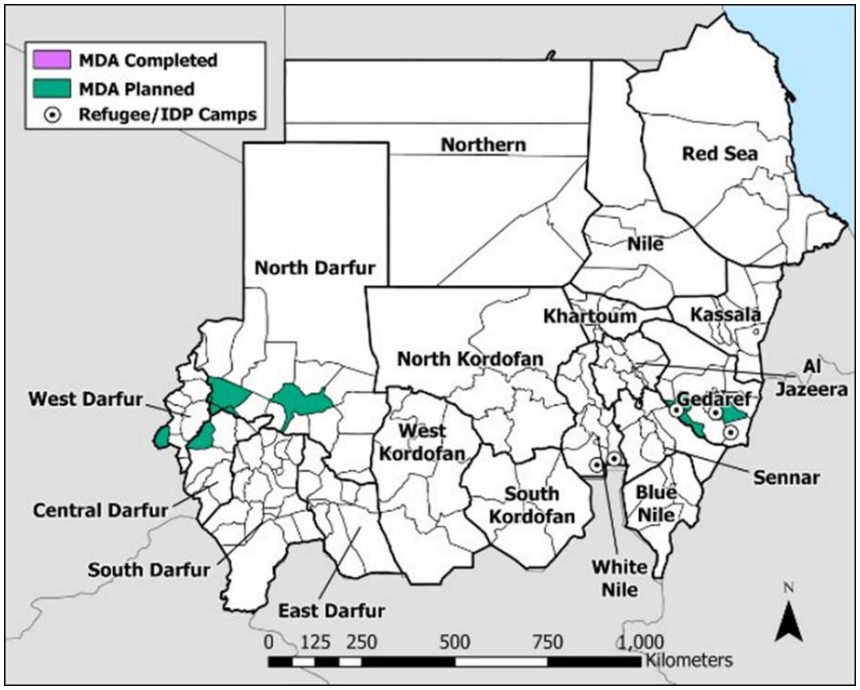


Figure 5 – MDA Completed in 2023

2023

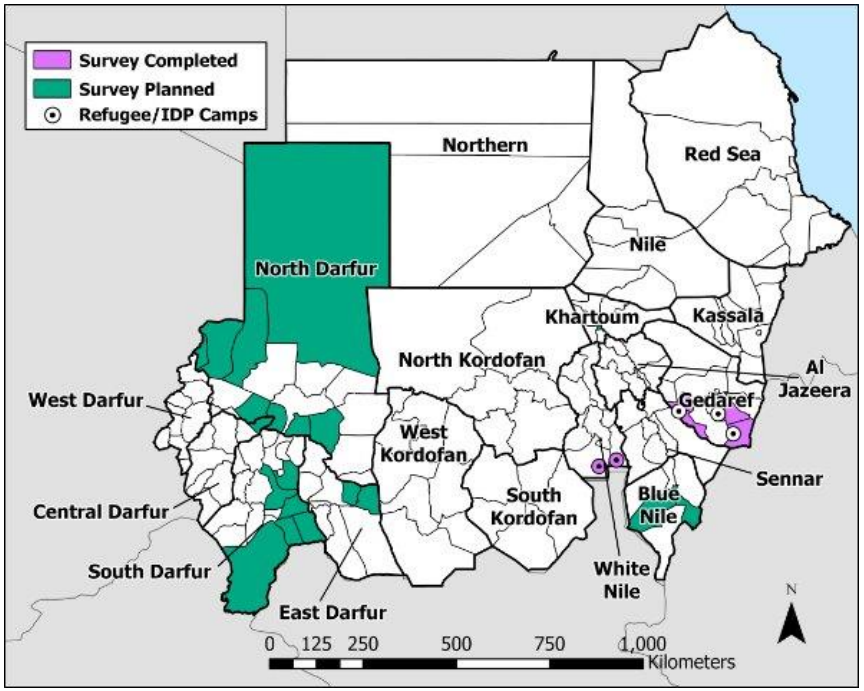


Figure 6 – Surveys Completed in 2023

Table 1. Summary of National Data from Trachoma Control Programs (Carter Center-Assisted Countries)					
National Data as Reported for 2023					
Indicators	**Niger**	**Sudan**	**South Sudan**	**Ethiopia**	**Total**
Surgery					
Surgeries	4,354	170	3,801	N/R	**8,325**
2023 Target	3,600	7,400	2,100	N/R	**13,100**
Percent Coverage	120.9%	2.3%	181.0%	N/R	**63.5%**
Antibiotics					
Azithromycin					
Doses	1,376,657	0	906,617	N/R	**2,283,274**
2023 Target	N/R	637,100	1,320,410	N/R	**1,957,510**
Percent Coverage	N/R	0.0%	68.7%	N/R	**116.6%**
Tetracycline Eye Ointment					
Doses	N/R	0	111,935	N/R	**111,935**
2023 Target	N/R	13,002	164,164	N/R	**177,166**
Percent Coverage	N/R	0.0%	68.2%	N/R	**63.2%**
Facial Cleanliness and Health Education					
Villages with Health Education	N/R	0	2,004	N/R	**2,004**
2023 Target	N/R	562	3,276	N/R	**3,838**
Percent Coverage	N/R	0.0%	61.2%	N/R	**52.2%**
Environmental Improvements					
Latrines	5,098	N/A	2	N/R	**5,100**
2023 Target	50,020	N/A	2	N/R	**50,022**
Percent Coverage	10.2%	N/A	100.0%	N/R	**10.2%**
N/R=Not Reported					
N/A=Not Applicable					
Totals only include countries and districts where data are available					
*TCC Supports the Amhara region of Ethiopia. Ethiopia National data are not reported here					

Table 2. Carter Center-Assisted Implementation of SAFE (Carter Center-assisted output)					
Summary of Interventions per Country, January - December 2023					
Indicators	**Niger***	**Sudan**	**South Sudan**	**Ethiopia-Amhara**	**Total**
Surgery					
Persons operated for TT	1,633	170	1,049	44,370	**47,222**
2023 Target	1,800	2,100	600	34,744	**39,244**
Percentage	90.7%	8.1%	174.8%	127.7%	**120.3%**
Antibiotics					
Doses of antibiotics distributed	N/A	0	209,256	3,909,938	**4,119,194**
2023 Target	N/A	650,112	340,396	15,316,384	**16,306,892**
Percentage	N/A	0.0%	61.5%	25.5%	**25.3%**
Facial cleanliness and health education					
Villages with ongoing health education	N/R	0	1,939	N/R	**1,939**
2023 Target	N/R	562	2,916	N/R	**3,478**
Percent Coverage	N/R	0.0%	66.5%	N/R	**55.8%**
Environmental improvement					
Household latrines constructed	5,072	N/A	2	N/A	**5,074**
2023 Target	10,000	N/A	N/A	N/A	**10,000**
Percentage	50.7%	N/A	N/A	N/A	**50.7%**
Surveys					
Trachoma Prevalence Surveys	N/A	6	3	16	**25**
2023 Target	N/A	27	5	60	**92**
Percentage	N/A	22.2%	60.0%	26.7%	**27.2%**
N/A=Not Applicable					
N/R=Not Reported					
Totals only include countries and districts where data are available					
*TCC does not assist MDA implementation and distribution activites but TCC does assist in purchasing TEO for MDA					

Table 3. National Trachoma Control Program Annual Targets 2024 (Carter Center-Assisted Countries)						
Targets[§] as Reported, April 2024						
Indicators	**Niger**	**Sudan**	**South Sudan**	**Amhara - Ethiopia**	**Ethiopia**	**Total****
Surgery						
Persons to operate for TT	8,000	400	4,500	34,845	N/R	**47,745**
Antibiotics						
Doses of azithromycin to distribute during MDA†	N/A	591,224	1,753,570	15,856,569*	N/R	**18,201,363**
Doses of TEO to distribute during MDA	N/A	12,000	43,839	320,531	N/R	**376,370**
Facial cleanliness						
Villages to reach through health education	N/R	400	4,000	N/R	N/R	**4,400**
Environmental improvement						
Household latrines to construct	6,000	N/R	12	N/A	N/R	**6,012**
N/A = Not Applicable						
N/R = Not Reported						
[§]All targets are subject to change						
†Antibiotic targets do not reflect ITI-approved allocations of Zithromax®						
*Includes doses to be distributed during child MDA in 18 woredas						
**Totals only include countries where data are available						

Table 4. Cumulative Carter Center-Assisted Implementation of SAFE

Cumulative Interventions per Country, 1999-2023

Indicators	Niger	Sudan	South Sudan	Ethiopia-Amhara*	Total
Persons operated for TT	91,480	13,089	12,654	801,775	**918,998**
Doses of antibiotic distributed (MDA)	4,331,365	9,053,129	5,348,617	214,646,551	**233,379,662**
Villages with ongoing health education	550	490	2,831	3,447	**7,318**
Household latrines constructed	194,283	0	646	3,336,513	**3,531,442**

*TCC only supports the Amhara region of Ethiopia

Table 5. Summary of Carter Center-Assisted Programs Activity Plans, Accomplishments, and Challenges 2023-2024				
Country	**2023 Plans**	**2023 Accomplishments**	**Challenges**	**2024 Plans**
Ethiopia (Amhara)	•34,744 TT surgeries •Train 56 new IECWs •Retrain 73 IECWs •Distribute 15,316,384 doses of Zithromax® •Distribute 328,874 doses of TEO •STP in 8,576 Schools, 100% F&E reporting •Increase latrine coverage by 30% •Conduct 60 prevalence surveys	•44,370 TT surgeries •Operated 30,062 women •Trained 74 new IECWs •Retrained 42 IECWs •Distributed 3,909,938 doses of Zithromax® •Distributed 85,368 doses of TEO •STP in 8,900 Schools, 92.4% F&E reporting •Conducted 16 prevalence surveys •Constructed 22 water points	•Insecurity •Fluctuating TT estimates •Low WASH coverage •Drug shortage •Persistent and recrudescent districts	•34,845 TT surgeries •Train 44 new IECWs •Retrain 50 IECWs •Distribute 15,856,569 doses of Zithromax® •Distribute 320,531 doses of TEO •100% F&E schools reporting quarterly •Construct 20 water points
Niger	•1,800 TT surgeries •Construct 10,000 latrines •Construct 20 block latrines •Conduct 4 TT-only surveys	•1,633 TT surgeries •Operated 1,006 women •Constructed 5,072 latrines •Constructed 26 block latrines	•Insecurity •IDPs •Target not available at the time of TT surgery (socio-economic and household activities) •Inadequate prior population estimates for TT surgery implementation •Persistent and recrudescent districts	•2,000 TT surgeries •Train 120 educators •Construct 6,000 latrines •Construct 24 block latrines •Conduct 5 TT-only surveys
South Sudan	•600 TT surgeries •Distribute 316,828 doses of Zithromax® •Distribute 23,568 doses of TEO •Health education in 2,916 villages •Conduct 5 prevalence surveys •Complete ETAS study •Finalize and launch NTD Master Plan and M&E Framework	•1,049 TT surgeries •Operated 743 women •Distributed 196,216 doses of Zithromax® •Distributed 13,040 doses of TEO •Health education in 1,939 villages •Constructed 2 latrines •Conducted 3 prevalence surveys	•Insecurity •IDPs and refugees •Delayed arrival of Zithromax® shipments •Slow reverse logistics from counties, delay MDA in others •Unclear source of population data estimation to determine targets •Inadequate funding for SAFE activities in many endemic counties in the country	•1,500 TT surgeries •Distribute 569,651 doses of Zithromax® •Distribute 14,240 doses of TEO •Health education in 2,600 villages •Construct 10 latrines •Conduct 4 prevalence surveys
Sudan	•2,100 TT surgeries •Distribute 637,100 doses of Zithromax® •Distribute 13,002 doses of TEO •Conduct health education in 562 villages •Conduct 27 prevalence surveys	•170 TT surgeries •Operated 128 women •Conducted 6 prevalence surveys	•Insecurity •IDPs and refugees •MOH staff located in different parts of the country •Carter Center office looted •Limited access to most of Sudan for TCP •Hyperinflation increasing program costs	•400 TT surgeries •Distribute 591,224 doses of Zithromax® •Distribute 12,000 doses of TEO •Health education in 400 villages •Conduct 1 prevalence survey

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

National Program data as presented for January - December 2023

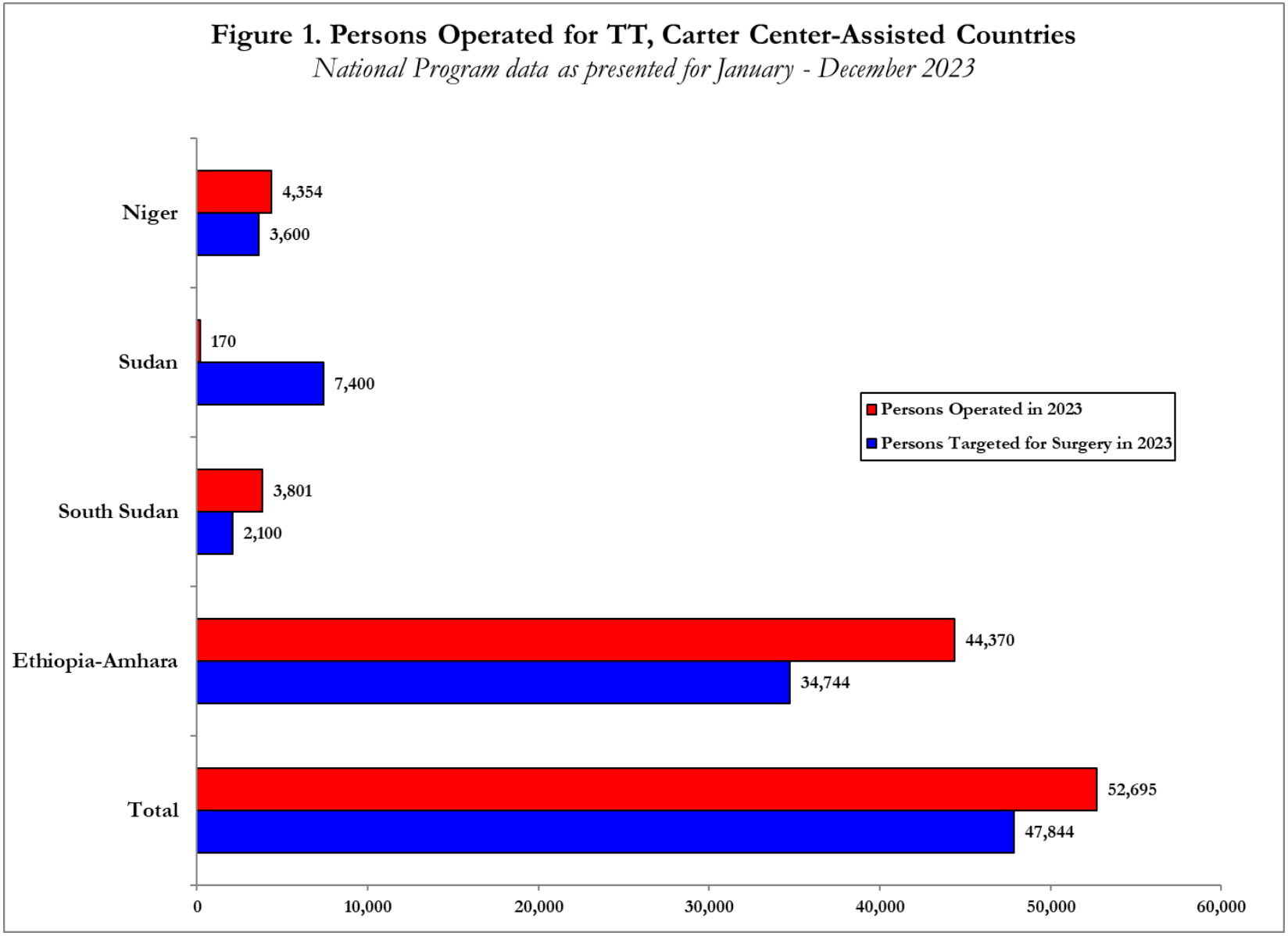
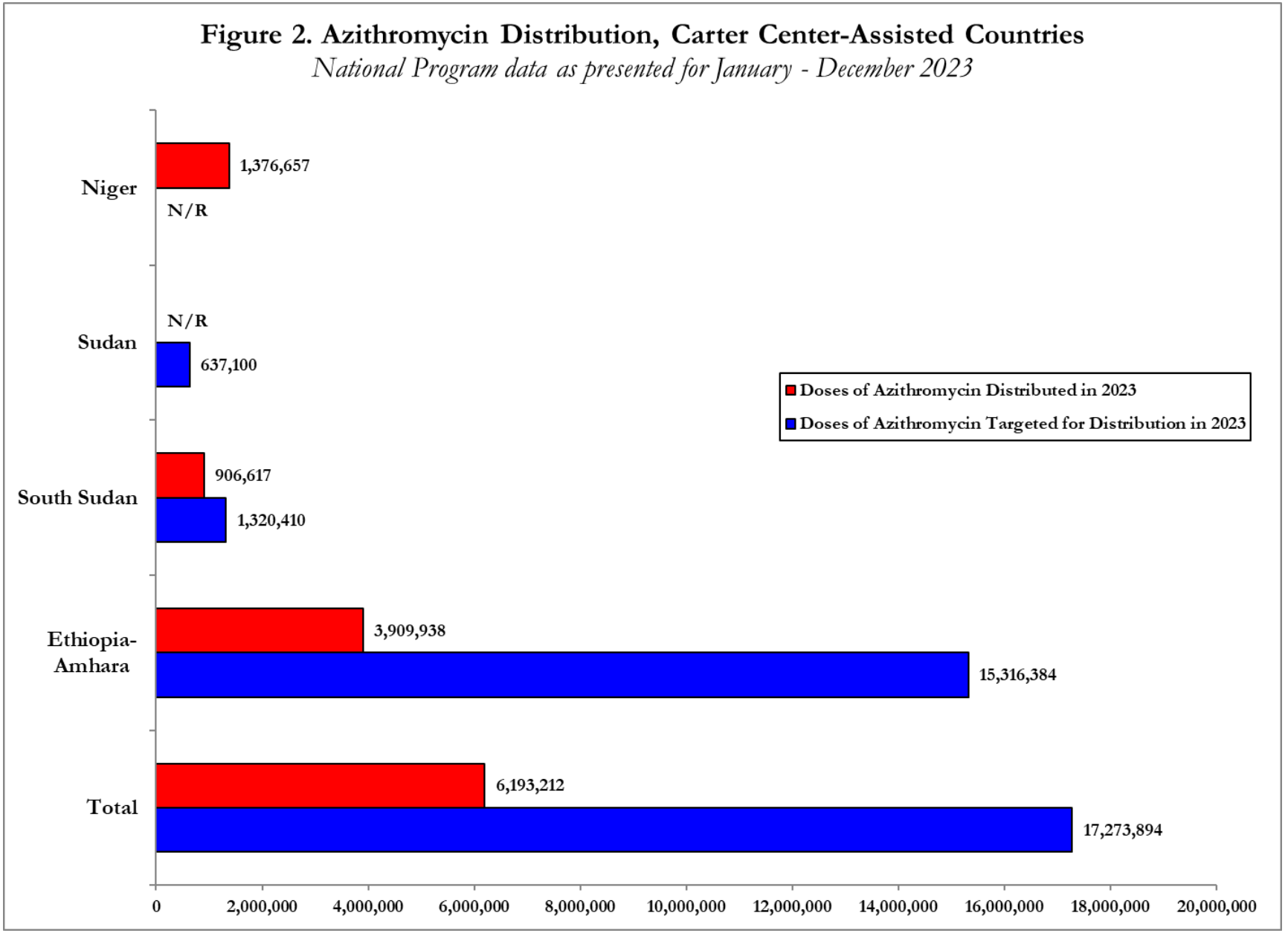


Figure 2. Azithromycin Distribution, Carter Center-Assisted Countries

National Program data as presented for January - December 2023



Amhara, Ethiopia: Kebele Elimination of Trachoma for Ocular Health Study Update

Presented by Ms. Hadley Burroughs, Study Coordinator, Francis I. Proctor Foundation, University of California, San Francisco

The Kebele Elimination of Trachoma for Ocular Health (KETFO) study is designed to determine whether an intensive elimination strategy targeting a core group is more effective than the current WHO program at achieving complete elimination of trachoma after three years. The study is a cluster-randomized controlled trial, with 120 communities across four arms. The communities in the control arm receive the WHO-recommended treatment of annual MDA of all residents. The three core group arms receive the WHO-recommended annual MDA of all residents plus three targeted treatments of a core group of children: (1) all children ages two to nine years; (2) all children ages two to nine years with PCR-based infection at the previous exam; or (3) all children ages two to nine years who received a trachomatous inflammation-intense (TI) grade at the previous exam. All communities receive annual screening and exams to determine the core groups. The trial is set in the Merhabete District, North Shoa Zone, Amhara Region of Ethiopia, which had TF prevalence of 36% and *Ct* prevalence of 34% in 2019 (Nash et al. 2023).

The primary outcome of the study is the prevalence of ocular chlamydia assessed by PCR at 36 months. The primary comparison will be between the WHO-recommended arm and all the core group arms; if that is statistically significant, then the core group arms will be compared to determine if there is a minimum core group necessary to achieve elimination of trachoma.

Baseline exams were conducted in 2022 for 8,765 children ages six months to nine years. For all 120 communities, overall TF prevalence was 44%, and TI prevalence was 16%. Baseline chlamydial infection prevalence as assessed by PCR for the individually processed communities was 34%. For communities that were tested with 5-pools, all communities with 100% prevalence at the 5-pool level were retested as 3-pools, followed by 2-pools, with two communities receiving individual testing. Those results are currently being analyzed. The Spearman's rank correlation showed a moderate correlation between pooled infection prevalence and the TF ($R^2 = 0.49$) and TI ($R^2 = 0.43$) prevalence at the Gott level.

The study team completed the 12-month exams in June 2023, in which 8,326 children ages six months to nine years received conjunctival swabs. PCR 5-pooling for the 12-month exams was completed in November 2023, and individual testing of the PCR arm was completed in December 2023. The second MDA of the study was completed in the Merhabete district between January to March 2024, and achieved 94% coverage of the censused population (83% coverage of projected population). As of April 2024, the study team has completed four targeted treatments and plans to continue targeted treatments and the third MDA through 2025 with the local Merhabete health officers.

Study close-out activities (36-month census, exams, and PCR) are planned for the Spring of 2025, with primary results following.

Lateral Flow-based Assay

Presented by Ms. Sarah Gwyn, Microbiologist, Global Neglected Tropical Diseases Team Laboratory Science and Diagnostics Branch, Division of Parasitic Diseases and Malaria, U.S Centers for Disease Control and Prevention

There are multiple indicators of *Ct:* TF, infection, and serology. We have been evaluating the use of antibodies for post-elimination surveillance. Antibodies are indicative of previous exposure to *Ct* and are useful for evaluating historical transmission within a community. Initial serology data was collected using a multiplex bead assay (MBA) platform. This is a robust assay with excellent performance but can be challenging to implement in other labs due to the specialized equipment required. We quickly realized the need for a more low-tech test to make trachoma serology testing accessible more broadly.

We initially developed a field-friendly lateral flow assay (LFA) intended to be run at a point of care (POC) setting. This prototype was field tested in Tanzania as part of a community-based survey of around 500 individuals. The DBS were collected for testing by MBA at the CDC, and whole blood and plasma were tested by LFA in the field. Ocular swabs were collected and tested for infection by PCR in Tanzania. Of the 38 individuals testing positive by PCR, only 84.2% (95% CI: 68.8-94.0) tested positive by LFA with whole blood, compared to 94.7% (95% CI: 82.3-99.4) by MBA and LFA with plasma. The LFA was field tested in other settings as well, and we received feedback from the field teams that running the LFA in the field made the workflow very challenging. Since antibody data will be used for population level surveillance rather than individual diagnosis, the testing does not need to be done at a POC setting. We decided to reoptimize the test to be run in the lab with DBS, a very easy to collect sample type.

We readapted the test to a lab-based dipstick assay and evaluated two detector reagents: colloidal gold (LFA-gold) and black latex (LFA-latex). We found that the LFA-latex yielded comparable results at a population level to the MBA, while the LFA-gold had a lower specificity. We have now compared the LFA-latex and MBA in 12 different EUs from five countries at various stages in trachoma programs. Although we started this work to evaluate antibodies for post-validation surveillance, this test is now being used in a variety of settings, such as in areas experiencing persistent and recrudescent trachoma and baseline mapping.

As more and more labs are using this assay, we have adapted the training to a virtual training format. One of the first we did earlier this year with the Amhara Public Health Institute lab in collaboration with the Carter Center. Three technicians were trained and passed competency testing, completing testing of the study samples in just a few weeks.

We are currently in the process of finalizing and standardizing analysis approaches and determining serological thresholds. Data from 44 surveys from a variety of transmission areas are being used to determine these serological thresholds for programmatic use. This data will ultimately be reviewed by the WHO guideline development group as they consider serology for WHO guidelines.

Amhara, Ethiopia Child MDA Pilot

Presented by Mr. Eshetu Sata, Trachoma Control Program Manager, The Carter Center – Ethiopia

Background

Since the beginning of the Trachoma Control Program, great gains have been made in the fight against trachoma in Amhara. As of December 2023, 58 (35%) of districts achieved the TF elimination threshold (TF <5% among children ages one to nine years) and no longer require MDA for trachoma. Although progress has been made in reducing the burden of trachoma in the region, the burden remains high in some areas. In December 2021, a WHO Informal Consultation on End-Game Challenges meeting defined persistent trachoma as "districts where there have been two or more trachoma impact surveys in which the prevalence of TF among children one to nine years was never below 5%, and the current TF prevalence remains greater than 5%". A key recommendation from the informal meeting was to conduct MFTA MDA as a possible approach for districts defined as persistent. The ETAG and the National Trachoma Taskforce recommended piloting Child MDA as a MFTA MDA strategy to tackle the problem of persistent trachoma in Ethiopia. The Child MDA provides an additional MDA for children ages six months to nine years, four to six weeks after community-wide MDA.

Pilot Overview

The Amhara Child MDA pilot study was conducted in the persistently hyperendemic districts of Lasta and Wadilla of North Wollo zone. The selected districts had completed 13 MDA rounds and three impact surveys before the pilot, and the current prevalence of TF among children ages one to nine years was greater than 30% in both districts. The MDA intervention in 2023 for these two districts included two rounds of MDA—the community-wide MDA for all individuals, followed by a second round of MDA targeted to children ages six months to nine years four weeks later. Prior to the Child MDA pilot study, a Child MDA implementation guide was developed, and training of health workers was completed using said guide. Since the Child MDA took place within the programmatic context, programmatic monitoring, including the WHO coverage supervision tool (CST) and enhanced post-MDA coverage were conducted to understand the fidelity and the effectiveness of the intervention.

Activities Conducted

In May 2023, the community-wide MDA was conducted in both districts and the child targeted round of MDA was completed in June 2023; 328,130 people received MDA in the two districts (258,831 during the community-wide round and 78,592 during the child only round of MDA). The administrative coverage in both woredas was greater than 85% for both MDAs. Rapid assessment/CST was implemented using electronic forms during the child-only round. The CST was conducted in 27 kebeles (villages) in Lasta and 22 kebeles in Wadilla, with 20 households assessed per kebele. The CST findings showed good coverage (>80%) during the child-only MDA in both districts. Three weeks after the child-only MDA was finished, enhanced post-MDA coverage surveys were conducted. The surveys were conducted in each district to evaluate self-reported coverage during both rounds of MDA. The survey followed the standard coverage survey methodology (30 clusters/district and 30 Households (HHs)/cluster). Survey teams moved house to house, interviewed HH members on MDA participation, and showed drug/tablet to confirm participation in trachoma MDA. Children ages one to nine years were swabbed for *Ct* infection. While results from the post-MDA survey

showed lower coverage as compared to administrative coverage, the post-MDA survey demonstrated coverage was still above the 80% guideline, including the coverage for children during both the community-wide round of MDA and the child-only round of MDA. The coverage survey also showed that the refusal rate was very low; among those who did not receive MDA, the majority stated they were not offered due to travel or inability to attend the outreach.

Conclusion and Next Steps

The coverage across the two districts for both rounds of MDA showed acceptable MDA coverage, exceeding the 80% minimum standard. Good acceptance of child MDA was observed by the communities and health workers—only two percent of individuals during the community-wide MDA and 0.5% of the child-only MDA were offered the medication but did not take it. The pilot showed that a second round of MDA targeted to children only, four to six weeks after the community-wide MDA is feasible, particularly due to the efficiencies that are gained conducting the second round of MDA shortly after the first. Many of the activities that are needed to implement the child-only round of MDA is required for the community-wide MDA; as such, there is minimal additional preparation or training that is required (and thus minimal added cost) to accommodate the second round of targeted MDA. The next steps of the Amhara Child MDA study include completing the cost analysis of the enhanced child MDA strategy; finalizing the analysis of the post-MDA coverage survey, including analysis of *Ct* results; and conducting an evaluation survey, when security permits to assess the impact of the Child MDA strategy.

Tanzania Enhanced MDA

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

Since the first MDA with Zithromax® in 1999, Tanzania has made great progress towards the elimination of trachoma as a public health problem with 60 of 69 endemic districts having attained TF prevalence of <5%. However, several districts in Arusha, Manyara, and Dodoma Regions have experienced persistent and recrudescent active trachoma largely due to high baseline prevalence and partly due to low MDA coverage. When the United States Agency for International Development (USAID) began their support to MDA in 2012, the program focused on improving MDA implementation in districts where impact or surveillance surveys had results of TF >5%. For example, in Arusha Region, the program conducted activities, such as: a qualitative investigation to develop a Maasai Behavioral Change Communication strategy; microplanning; modified MDA strategies; cross-border MDA; WASH-NTD sectoral collaboration; and sentinel site monitoring (SSM). From 2022, Tanzania started implementation of modified MDA comprising of MFTA biannual MDA or increasing the number of years of annual MDA. The SSM study aimed to 1) investigate the relationship between TF, *Ct* infection, and Pgp3 serology in EUs with persistent or recrudescent trachoma; and 2) explore evolution and differences in TF, *Ct* infection, and Pgp3 comparing MFTA vs Annual MDA.

The study was done in four districts: Longido and Ngorongoro (MFTA-biannual MDA); and Monduli and Simanjiro (increased rounds of annual MDA). Ten sentinel site clusters per district were selected from the most recent surveys where proportion of TF was highest. At each SSM site, 50 children ages one to nine years were selected, examined for trachoma signs, and ocular swab and DBS samples taken. Sample collection was scheduled to take place just before MDA: first round (SSM1) in June 2022; second round (SSM2) in January 2023; and third round (SSM3) in October 2023. Coverage Evaluation Surveys (CES) were conducted in October 2022 and June 2023 to validate reported MDA coverage and were expanded to include sentinel site clusters.

The SSM1 data were correlated with previous prevalence survey. There was little difference between SSM1 and SSM3. Data from Simanjiro showed that *Ct* infection was low. Where TF increased or declined, it did so across all age groups. A CES validated that first and second round of biannual MDA were of quality, as district coverage was >80% based on data from sentinel sites. Among children ages one to nine, within district pgp3 seroprevalence was similar across rounds, and seroconversion rates (SCR) were higher than 1.5 per 100 children per year in all four districts.

The TF and *Ct* infection findings support on-going transmission of ocular chlamydia in Longido, Ngorongoro, and Monduli. The data has supported shifting the modified MDA strategy from annual to MFTA-biannual in Monduli and has supported the MOH decision to increase investments in WASH interventions across all districts. Continued monitoring once a year will be valuable to the program. Enhanced trachoma impact surveys (TIS+) are planned in the four districts at the end of the MDA cycle.

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Niger Enhanced MDA

Presented by Ms. Elisabeth Chop, Monitoring and Evaluation Associate, Helen Keller Intl

Baseline trachoma mapping and re-mapping surveys conducted between 1999 and 2016 revealed that 62 out of 72 Health Districts (HDs) in Niger were endemic, with TF prevalence among children ages one to nine ranging from more than 5% to over 50% in some areas. Since 2002, MDA has gradually expanded, achieving 100% geographic coverage of endemic districts in 2016. Over the past two decades, Niger has made significant progress toward eliminating the transmission of trachoma with over 90% of endemic districts meeting the criteria for stopping MDA. Despite this progress, there have been challenges, notably with areas with consistently high trachoma prevalence and other areas seeming to experience a resurgence of $TF_{1\text{-}9}$ during follow-up surveillance surveys.

The USAID Act to End NTDs | West project initiated a trachoma learning agenda and deep dive in 2019 and 2020 to address these challenges, convening Niger's NTD program, WHO, trachoma experts, and partners to investigate underlying reasons for non-responding districts and develop effective strategies. Potential contributing factors include high baseline $TF_{1\text{-}9}$, MDA coverage issues, survey quality concerns, insecurity, population movement, redistricting from 42 to 72 HDs in 2017, and the creation of smaller EUs due to updated WHO guidelines, meaning that detection of clusters or "risk areas" of $TF_{1\text{-}9}$ could be more likely. Following the WHO informal consultation on end game challenges for trachoma elimination in December 2021, Niger's PNSO proposed biannual MDA, the "wait and watch" strategy, targeted interventions in refugee camps, and program delivery enhancements in some districts with persistent and recrudescent trachoma. The "Wait and Watch" strategy is being piloted in one district in the Agadez region (Bilma) where $TF_{1\text{-}9}$ prevalence has hovered just above the 5% threshold at baseline and during three subsequent TIS.

The PNSO decided to conduct biannual MDA in four persistent districts in 2022 and in two recrudescent districts in 2023. Across all districts and rounds, reported coverage was generally high, ranging from 79% in Matamaye to 96% in Bosso. After the second MDA round in both 2022 and 2023, coverage surveys were conducted to evaluate coverage and acceptability across both rounds, MDA implementation quality, knowledge, attitude, and practices relating to trachoma. A total of 8,777 individuals from six districts were surveyed with roughly 86% reporting being treated each round. 82% were treated twice and only 9% missed both rounds of treatment. Although reported coverage was not validated by the survey results in all cases, the surveyed coverage was also generally high, ranging from 78% to 97%.

While there are limitations of the coverage evaluation survey, including recall and social desirability bias, the preliminary results from these surveys reveal characteristics of the 9% of respondents that missed both rounds. Males, ages 15-24, and individuals in Diffa, Maine Sora, and Takeita had higher rates of non-treatment and absenteeism and Community Drug Distributors not coming account for almost two-thirds of the reasons for non-treatment. Preliminary results indicate that the biannual MDA was successful, with high rates of acceptability across both rounds. Additionally, the four districts that conducted biannual MDA in 2022 subsequently reported a $TF_{1\text{-}9}$ prevalence of less than 5%, achieving the criteria to stop MDA. Re-TIS and TIS+ assessments are planned for the remaining endemic HDs in 2024. Through collaborative efforts and innovative strategies, Niger is rapidly advancing towards the goal of trachoma elimination, demonstrating the power of partnership and persistence in tackling NTDs.

Innovative Surgery Campaigns in South Sudan

Presented by Dr. Albino Nyibong Ajang, Director of Eyecare, Ministry of Health – South Sudan

Background

Due to decades of civil war as South Sudan fought for independence from Sudan, and then periods of insecurity since independence in 2011, the medical infrastructure in South Sudan is limited. The health service delivery budget is less than 4% of the national total budget. Most people live in remote areas of the country where there is limited to zero access to eyecare services. There are currently only five ophthalmologists in the country and less than 30 trained eyecare workers, many of which are based in the capital Juba. The ophthalmic clinical officer (OCO) training program was stopped in 2014 and has not resumed. Regarding trachoma, over half the country has TT greater than 0.2% in adults 15 years of age and above, with many counties well above the WHO threshold for elimination of trachoma as a public health problem. It is assumed that there are approximately 70,000 people needing TT surgery.

Additionally, given the high levels of trachoma in parts of the country, the South Sudan MOH has documented TT in children, especially in Jonglei state. The program conducts surgery on children 12 years and above in a surgical outreach setting, but those 11 years and below must be operated in a hospital so that they may be given anesthesia. Unfortunately, there are few hospitals that can provide this service, and many parents cannot afford the costs associated with traveling to cities to get the surgery. At a surgical outreach camp conducted in Uror county in March 2024, 31 children (12 male, 19 female) ages 11 and below were identified with TT. The National Program will need to make arrangements to ensure these children receive surgical services.

Surgical Camp Strategies

Overnight Patients

The MOH organizes surgical camps in trachoma endemic counties to bring services as close to the population as possible. In Eastern Equatoria state, The Carter Center and MOH set up large hospital tents that allow patients to sleep overnight after their surgery. Patients are provided a sleeping mat, bedsheet, and food and they are allowed to bring their children and/or a caretaker. Given women are disproportionally affected by TT, the Program has found that this service allows women better access to surgery since they do not have to worry about feeding their children while their eyes are bandaged after surgery. This approach adds additional costs because of the sleeping mat, bedsheets, food, cooking staff, and added logistics needed to transport the large tents and supplies.

Integrated TT and Cataract Camps

Cataracts are the leading cause of blindness globally. Cataract surgeries require specialized surgeon training and equipment. The Carter Center, HCP, and, MOH have been partnering to expand TT camps to also include cataract surgeries since November 2022. HCP provides cataract surgical equipment and consumables while The Carter Center provides the TT related surgical items. TT and cataract case finders are trained a few days before the camp is scheduled to allow time to identify and mobilize patients. At the surgical campsite, there is an operating room for cataracts with two beds and a separate operating room for TT with two to three beds depending on the TT caseload. Both patients have their bandages removed the next day. Those with *both* TT and cataracts are provided TT surgery

first and then seven to ten days later they get the cataract surgery. In Eastern Equatoria state, where The Carter Center has done many years of standalone TT surgery, patient turnout has been low. The Carter Center and MOH observed that the integrated camp resulted in higher TT patient turnout. It was noted this might be because of a perceived increased positive view of camps because no one is turned away (as the camps treat all eye health).

Between November 2022 to March 2024, eight integrated camps were conducted. In total, 1,644 people received TT surgery and 2,452 people received cataract surgery. In the Eastern Equatoria counties where there have been many TT camps in the past, there were more cataract surgeries than TT. In Uror county, Jonglei state, the TF prevalence in children ages one to nine years is greater than 50% and TT in adults is 3.7%. These prevalence levels are well above the elimination thresholds and are likely the reason that of the 1,426 patients operated in that county, 62% (879) were TT patients.

Political Engagement

The Program has significantly increased efforts to engage political leaders in raising awareness about eyecare and trachoma. This has resulted in local leaders, members of parliament, the Undersecretary of the MOH, and the Minister of Health for the MOH attending various surgical campaigns.

Current Challenges/Gaps

There are many challenges facing the provision of eyecare services and reaching the TT elimination thresholds:

1. It is very expensive to conduct surgical campaigns in remote/logistically challenged areas.
2. There are not enough eyecare workers to meet eyecare needs.
3. Many within the current eyecare cadre will be retiring in the next 4-5 years.
4. The Juba Teaching Hospital for OCOs has been closed since 2014. It is critical that this training program is restarted.
5. More cataract equipment sets and training on how to maintain/fix them are needed.
6. Training for pediatric ophthalmologists and anesthesiologists is needed.
7. Climate change adds additional burdens on patients and staff. This has mostly been seen with issues connected to extreme heat and flooding in some parts of the country.

Appreciation

The South Sudan Ministry of Health appreciates the many donors and partners supporting surgical activities in South Sudan. These include: The Carter Center, CBM, HCP, Ophthalmic Association of South Sudan, Mission Aviation Flights, ARISE Fund via The End Fund, Tuach Riek Gai Foundation, Pfizer Inc., and ITI.

B-RAP Eyelid Surgery Against Trabut for PTT (BESRAT)

Presented by Dr. Emily Gower, Associate Professor, University of North Carolina – Chapel Hill

This presentation reported on results of a recent clinical trial conducted in three regions in Ethiopia. The goal of the clinical trial was to compare repeat trichiasis surgery outcomes of the current standard, posterior lamellar tarsal rotation (PLTR, also referred to as modified Trabut) versus a newly developed procedure, the Bevel-Rotate, Advancement Procedure (B-RAP). The B-RAP was designed to address shortcomings of the PLTR procedure for repeat trichiasis surgery. Specifically, in PLTR, the incision is made 3 mm above the eyelid margin, with a partial thickness cut. This cut typically goes through the scar from the prior surgery. When the eyelid is sutured, the area where the incision is made becomes twice as thick, due to the tarsal rotation. In contrast, B-RAP uses an incision beveled towards the lid margin and the existing scar tissue is removed, making a thinner fragment that can be more easily managed during suturing.

Individuals were eligible for the BESRAT trial if they had at least one eyelid with postoperative trachomatous trichiasis (PTT) with entropion. We randomized 700 individuals on a 1:1 basis to surgery with B-RAP or PLTR. If both eyes had operable PTT, both eyes received the same surgery to maximize the likelihood of a similar appearance between the two eyelids. The surgery was performed by either an IECW or an oculoplastic surgeon. Participants were followed for one year after surgery. We assessed three primary outcomes: repeat PTT, eyelid contour abnormality, and pyogenic granuloma formation. We defined repeat PTT (rPTT) as one or more lashes touching the eye or evidence of epilation at either the 6-week post-operative visit or the one-year visit.

We found that overall, rPTT was less common among eyes that received B-RAP surgery as compared to eyes that received PLTR surgery. The difference between the procedures was greatest for eyes that had severe PTT prior to study enrollment. Eyelid contour abnormality rates were similar between the groups, and somewhat higher than rates seen following first time surgery. However, nearly half of eyelids that had an eyelid contour abnormality at baseline no longer had an eyelid contour abnormality at follow up, suggesting that good quality repeat TT surgery can also improve existing eyelid contour abnormalities. Granuloma rates were very low. These results show a strong promise for including B-RAP in PTT management guidelines.

Of note, surgical outcomes following surgeries performed by the IECW had outcomes at least as good as those of the oculoplastic surgeon. The IECW is a full-time TT surgeon, who has performed several thousand PLTR surgeries. He was hand-selected for this trial given his excellent surgical skill and outcomes noted in our previous clinical trial. These findings demonstrate that with appropriate surgeon selection and training, IECWs can successfully perform repeat TT surgery. However, it is essential that they receive excellent training and have quality supportive supervision on a consistent basis.

Using Model-Based Geostatistics for Informing Trachoma Elimination

Presented by Dr. Emanuele Giorgi & Dr. Anna Harte, Associate Professor in Biostatistics, Lancaster University & Research Fellow, London School of Hygiene & Tropical Medicine

Since 2012, the Global Trachoma Mapping Project and its successor, Tropical Data, have supported high-quality trachoma surveys in over 4,500 districts across 52 countries worldwide. The current method employs a design-based approach. While this method has been highly effective with most surveyed EUs, there are some situations where a different approach could be beneficial, this is particularly relevant in countries reaching the end of their trachoma elimination journey, with focal points of above-threshold areas. Model-based Geostatistics (MBG) may be able to provide a solution to these issues.

Geostatistics is a branch of statistical methods relevant to the analysis of geolocated data with the aim being to study geographical variation throughout a region of interest when the available data are limited to surveyed locations. What differs from non-spatial statistical methods is the ability to quantify and account for spatial correlation, the phenomenon that things are more similar when the geographical locations are closer. It is known that trachoma prevalence tends to cluster spatially, so in such a case, the spatial correlation can be leveraged so that information from sampled locations can help understand neighboring unsampled locations.

Lancaster University's Centre for Health Informatics, Computing and Statistics or CHICAS, and Tropical Data have worked in partnership to support countries in the design and analysis of trachoma survey data using MBG. A protocol was designed to clarify steps on how to use MBG and provide technical support on survey design and analysis.

With MBG, risk surface can be treated as continuous over space, and the continuous surface can be aggregated at any desired spatial scale. This can be at the EU level for trachoma. The predictive probability of elimination, which can be interpreted as the probability of having achieved the elimination target can also be provided. Values closer to 100 or 0% indicate that the elimination has been or has not been achieved. If the value is close to 50%, there is a lot of uncertainty, specifically about the elimination status. As opposed to the conventional 95% confidence intervals, the predictive probability provides more tangible quantification of uncertainty.

Based on the evidence of using MBG for trachoma and other neglected diseases, a project was designed to investigate the feasibility of incorporating MBG as standard into the Tropical Data service. This project started in June 2023, with five main deliverables: 1) Develop a set of guidelines for determining when MBG approach is preferred and feasible compared with standard survey approach; 2) Development of a modelling framework to identify the most predictive set of covariates for trachoma prevalence; 3) Development of standardized training materials; 4) Development of data management and analysis processes; and 5) Development of user-friendly interface that is integrated with Tropical Data. The long-term goal is to be able to provide MBG as a standard tool as part of the Tropical Data service.

The first deliverable focused on MBG feasibility. A set of crucial criteria were identified for running MBG; some were country-specific, some were data-specific. A decision tree, which outlines when MBG can be used and not necessarily when it should not be used, was developed with these criteria

in mind. The decision tree criteria used as well as the steps to follow when deciding whether to use MBG.

Before exploring the possibility of using MBG for data analysis, the relevant MOH must give permission for the use of all data. This decision tree covers both data analysis and survey design, with the differences related to survey design. The first section of the tree lists mandatory criteria for using geostatistical models; if the answer to any question is "no" it is not possible to use MBG and standard data analysis methods are the default option. These questions can be asked at the very beginning of the process before the data needs to be accessed. The second section also has necessary criteria; however, these can only be answered with access to the data. The third section outlines possible complications that may need to be considered; if the answer to any question in this section is "yes", it is recommended that those interested in pursuing MBG to analyze trachoma data should contact Lancaster and/or the Tropical Data team directly to discuss the best steps forward, as a more specialized model may be required. If it is possible to run MBG for survey design, the model output is a geostatistical survey design; If it is MBG for data analysis, the model output is a probability of being below the elimination threshold (PBT) and point prevalence; if the PBT is close to 50%, this indicates a high level of uncertainty, and the recommendation is to default to the standard data analysis method.

The study was carried out to better understand the importance of spatially referenced covariates in improving the predictive performance of geostatistical models. Based on previous published work, a set of variables were identified, which were grouped together into different risk domains: environment, accessibility, water, and sanitation accessibility to and acceptance of health services, and ruralness. These domains were utilized to develop geostatistical models that would include at least one covariate from each of these domains to ensure that the main known spatial risk factors for trachoma would be used to carry out the predictions.

The association between the covariates and TF prevalence varies both across and within countries. The inclusion of the covariates can help reduce the uncertainty of the predicted TF prevalence, although in the considered case studies the inferential gains were mostly modest. Evidence shows that the difference between the predictions of a model with and without covariates can, in some cases, be substantial. When considering the routine use of MBG methods to support national trachoma programs, the recommendation would be to avoid using covariates in low prevalence settings to ensure the interpretation of the results is the same across EUs.

The last three deliverables require input from the wider trachoma community. A technical consultation was held in Lancaster in March 2024 to discuss possible solutions to the challenges facing the effective use of MBG for trachoma. These include setting the acceptable level of PBT and determining what to do when MBG gives a different result to the standard survey data analysis, as well as discussing considerations for Tropical Data when integrating MBG.

The main discussion points of the technical consultation included the rationale for implementing MBG, where and when to apply MBG, the use of covariates, including whether to use them in the models, the PBT limit, and the potential impact of implementing MBG on tropical data.

Many questions were raised during the meeting, but two key questions and next steps are important to highlight: 1) What do we do regarding different survey protocols between the standard approach

and MBG? Optimal sample sizes for MBG survey designs may be smaller than the standard approach. The original plan was to analyze all data using both MBG and the standard approach for consistency- if MBG survey design has smaller sample sizes than required for the standard approach this may not be possible. Next step: can we use an MBG survey design for standard data analysis without a loss of precision?

The second key question was 2) Do we offer MBG as standard, or do we treat it as a targeted approach? The answer is dependent on the outcome of question one, because if use of MBG survey design sample sizes for the standard approach is not possible, then cannot be offered as standard. Next step: What would be the criteria for using MBG as a targeted approach? Define use cases.

Whilst supporting countries in their analysis of trachoma using geostatistical models, it was evident that the use of these models is infeasible. Further research should be carried out to understand under which scenarios this phenomenon occurs. However, several factors affect the feasibility of using MBG, including number of sample clusters; number of sampled individuals per cluster; how well the sampled locations cover the area encompassed by the boundaries of the EU; the strength of the spatial correlation in the data; and the prevalence level.

In summary, there are several strengths of MBG: it is more statistically efficient than the standard approach, it enables predictions at unsampled locations, and it generates measures of uncertainty for the assessment of elimination. The limitations of MBG are that it requires advanced skills, it can be computationally intensive, and specific criteria need to be met to use it.

Multi-Country Operational Research on Persistent and Recrudescent Trachoma

Presented by Mr. Mohamed Bah, Associate Public Health Advisor, The Task Force for Global Health

Many remaining challenges to reaching trachoma elimination revolve around the few districts in which delivery of currently recommended course of treatment has not resulted in elimination. When these districts fail two or more TIS they are considered 'persistent' and when they pass a TIS but later fail a TSS they are considered 'recrudescent'. The NTD Support Center of the TFGH worked closely with an expert committee comprising representatives from WHO, ITI, ESPEN, Bill & Melinda Gates Foundation, and USAID to select six strong proposals from 44 registrations. Each proposal adhered to an expert-generated generic protocol but allowed for customization with the addition of qualitative tools and/or locally relevant survey questions. The six selected countries were Cameroon, Ethiopia, Kenya, Nigeria, Uganda, and Zambia. All six countries had investigators or co-investigators working for the ministries of health to ensure diverse perspectives and expertise, aiming for comprehensive and well-informed outcomes.

The goal of the operational research in these countries is to identify standardized tools that trachoma programs can use to understand and address the underlying causes of persistent and recrudescent active trachoma, generate data on the cost and feasibility of implementing country-led trachoma impact surveys, conduct laboratory analyses in-country, and support countries in addressing domestic challenges related to trachoma elimination.

The core protocol elements advised by the expert group for the six countries to include are: 1) a standardized TIS for children ages one to nine, 2) collection of DBSs for pgp3 antibody testing, and 3) collection of eye swabs for possible PCR detection of current *Ct* infections in children ages one to five years. Additionally, there is a standardized qualitative questionnaire collecting information on household WASH, travel and migration history, and household MDA coverage history to investigate potential drivers of persistent and recrudescent trachoma. Ethiopia, Kenya, and Nigeria also included specific additional protocol elements such as the coverage evaluation survey, the trachoma survey investigatory tool, participatory qualitative investigations, and the Leave No One Behind Tool. These tools aim to better understand behavior change, WASH, reasons for high TF prevalence, and populations at risk of being left out of trachoma interventions.

Implementation of these multi-country studies is at different stages in each country. Field work has been completed in Kenya, Uganda, and Zambia. Data collection is ongoing in Nigeria, and field work is planned for Cameroon and Ethiopia in May 2024.

Preliminary findings from the study have been reported for Kenya, Uganda, and Zambia. In Kenya, five EUs with TF had prevalence (≥5%) above the WHO threshold. Depending on the outcome of the serology and PCR results, these five EUs may require additional rounds of MDA. Even though Narok East had a prevalence <5%, if the serology and PCR results indicate otherwise, this EU will also require additional rounds of MDA.

In Uganda, TF prevalence is well below the 5% WHO threshold. The SCR are borderline, very close to the proposed threshold (between 1-2%) in children ages one to five years. The age-specific seroprevalence signal in Nebbi East highlights why PCR analysis on the stored samples is critical to better understand the true prevalence in this EU. It was recommended from the data review meeting

by the expert group to conduct PCR analysis on ocular swabs, which will be beneficial for programmatic decisions.

In Zambia, TF prevalence is above the WHO <5% threshold, but SCR are low and consistent with settings that have eliminated transmission. Recommended action steps include conducting PCR analysis and putting a "hold" on MDA planning while waiting for the *Ct* infection results.

Preliminary findings in these three countries have shown that discordant results offer a great opportunity to examine the relationship between TF, serology, and infection testing, and how these complementary indicators can improve decision-making for trachoma programs.

These studies have identified several areas for improvement and learning. Collaboration among stakeholders has been crucial, and regular meetings have facilitated progress and cross-learning. Training personnel on the study protocols, especially in first-time countries, is crucial. Shipping of supplies has presented challenges, and understanding of regulatory requirements and addressing logistical challenges is essential.

The next steps for the operational research studies include a post-study data review meeting to review results, discuss the experience of implementing the study, and develop recommendations to WHO on use of these tools to address persistent and recrudescent trachoma. These studies will provide important evidence on the feasibility of including infection testing and serology in trachoma impact and surveillance surveys.

Importance of Compassion in Global Health

Presented by Dr. David Addiss, Director, Focus Area for Compassion and Ethics, The Task Force for Global Health

As we come to the close of the Twenty-Fifth Annual Trachoma Program Review, it's fitting that we spend a few moments reflecting on the importance of compassion. Indeed, this Trachoma Program Review is itself a powerful manifestation of the compassion that each of you bring to your work.

Psychologist Paul Gilbert's definition of compassion is a good one for us in global health: "sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it.[1]" Another useful framing, favored by Dr. Shams Syed and his colleagues at the World Health Organization, is that compassion is composed of three key elements: awareness of suffering, empathy, and action to alleviate or prevent that suffering.

I'd like to suggest four reasons why compassion is important for our work to eliminate blinding trachoma. First, compassion is essential to who we are as humans. After studying the world's major religions, scholar Karen Armstrong concluded that, "The principle of compassion lies at the heart of all religious, ethical, and spiritual traditions."[2] Even Charles Darwin recognized the importance of compassion for human survival and flourishing. In The Descent of Man, he wrote, "Communities with the greatest number of the most sympathetic members would flourish best…We are impelled to relieve the sufferings of another in order that our painful feelings may be at the same time relieved."[3]

A second reason for the importance of compassion is that it motivates our work. As noted by a gathering of eminent global health leaders at The Carter Center 14 years ago, "Global health is rooted in the value of compassion and grounded in an awareness of our interconnectedness."[4] Compassion has been a strong and explicit motivation in the NTD community, in particular.[5] And compassion motivates us individually. Many of us entered the field of global health after a powerful personal experience of compassion – often an encounter with a particular individual, perhaps a patient – that shifted the trajectory of our lives.

This leads us to a compassion paradox. It is often these individual personal encounters that shape and motivate us. But in global health, we operate through complex systems and bureaucracies – which are sometimes impersonal. In his autobiography, Larry Brilliant recounts how, as a young clinician in India, distraught by his inability to save the lives of individuals who were dying of smallpox, Bill Foege advised him, "As a public health doctor, your satisfaction comes quietly, alone, late at night when you are analyzing *numbers*. You won't be able to watch the curve of a child's fever on a hospital chart go

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[1] Gilbert P, Catarino F, Duarte C, Matos M, Kolts R, Stubbs J, et al. (2017). The development of compassionate engagement and action scales for self and others. J. Compassionate Health Care 4:4. doi: 10.1186/s40639-017-0033-3 2. Armstrong K, 2024. Charter for Compassion. http://charterforcompassion.org

[2] Darwin C, 2004. The Descent of Man, and Selection in Relation to Sex. London, England: Penguin Books. (Original work published 1871).

[3] Task Force for Global Health. 2011. Compassion in Global Health. Richard Stanley Productions. http://www.taskforce.org/press-room/videos/compassion-global-health-video.

[4] Addiss DG. Global elimination of lymphatic filariasis: A "mass uprising of compassion." PloS Negl Trop Dis 2013; 7(8): e2264.

[5] Brilliant L, 2016. Sometimes Brilliant: The Impossible adventure of a spiritual seeker and visionary physician who helped conquer the worst disease in history. New York: HarperCollins.

down and feel good about yourself. You have to look at charts and graphs of hundreds of anonymous cases, watching the epidemic curve instead."[6]

But the challenge is that, when we focus solely on the numbers, we lose connection with the motivating power of individual relationships, we risk losing our moral bearings, and our motivation dissipates. So, when speaking to a *public health* audience at CDC in 1984, Bill Foege famously said, "If we are to maintain the reputation this institution now enjoys, it will be because in everything we do, behind everything we say, as the basis for every program decision we make—we will be willing to see faces."[7] Not more modern laboratories or smarter epidemiologists, but the willingness to see the faces of suffering. In global health, we need to see the faces to regain our perspective, restore our human connection, and reinforce our motivation – even while we attend to the numbers. To have compassion for populations – to have "compassion on the multitudes," in the words of the New Testament – we need to see the faces and the numbers at the same time. Characteristically, Dr. Foege doesn't tell us how to do this – he leaves it to us to figure out. The presentations and discussions during the past two days reveal that many, if not all of you, already have this ability.

Third, compassion leads to better health outcomes. In his recent book, *Compassionomics*, Steven Trzeciak has detailed the benefits of compassion in health care settings: for patients, providers, even health systems.[8] Our experience tells us that this also applies to global health.

And finally, compassion sustains us. When the flame burns low – when we ourselves suffer – we rely on the compassion of our colleagues, families, and friends. Theologian Paul Knitter was referring to this sustaining power of compassion when he wrote, "Unless the tree of justice grows in the soil of compassion, its roots will not go deep enough to bear lasting fruit."[9]

President Carter noted that compassion is a choice. He and Mrs. Carter chose the way of compassion throughout their entire lives. In President Carter's Nobel Prize speech, he said, "We can choose to alleviate suffering. We can choose to work together for peace. And we *must*."[10] Thank you all, for choosing compassion, and for your amazing, inspiring, consequential, compassionate work.

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[6] Foege, W, 1984. Smallpox, Gandhi and CDC. Fifth Annual Joseph Mountin Lecture. Atlanta, GA: Centers for Disease Control, October 26.
[7] Trzeciak S, Mazzarelli A, 2019. Compassionomics: The Revolutionary Scientific Evidence That Caring Makes a Difference. Pensacola, FL: Studer Group.
[8] Knitter P, Haight R, 2016. Jesus and Buddha, Friends in Conversation. New York: Maryknoll.
[9] Carter J, 2002. Acceptance speech: Our nation's past and future. https://www.jimmycarterlibrary.gov/sites/default/files/pdf_documents/assets/documents/speeches/acceptance_speech.pdf
[10] Carter J, 2002. Acceptance speech: Our nation's past and future. https://www.jimmycarterlibrary.gov/sites/default/files/pdf_documents/assets/documents/speeches/acceptance_speech.pdf

Achievements Against the NTD Road Map Targets

Presented by Dr. Anthony Solomon, Chief Scientist, Neglected Tropical Disease, World Health Organization

There are now 21 diseases and disease groups classified by WHO as NTDs. Noma, the most recent addition, was added to the NTD list in December 2023 by the WHO Director-General, following review by WHO's Strategic and Technical Advisory Group on NTDs. Things that connect his set of diseases together as a group include their strong association with poverty and the similarity in interventions developed to combat them. These interventions include individual disease management, MDA, vector control, veterinary public health, and improvement in access to water, sanitation, and hygiene.

Following a two-year period of global consultation, WHO published the NTD road map 2021-2030 in 2020. The road map aligns with the UN's sustainable development goals. It includes overarching, cross-cutting and disease-specific targets for 2030. Progress against these targets has been significant but uneven.

Overarching target one is a 90% fall in the number of people requiring interventions against NTDs between 2010 and 2030. By 2022, a 26% fall had been achieved, including a decline of ~80 million people between 2020 and 2021, and a further decrease of 34 million between 2021 and 2022. Overarching target two is a 75% reduction in disability-adjusted life years (DALYs) related to NTDs between 2015 and 2030; unfortunately, current DALY data are only available for 14 NTDs, and we are therefore unable to give an account of recent progress. Overarching target three is for 100 countries to have eliminated at least one NTD by 2030; by April 2024, 50 countries had achieved such success. Overarching target four is for the eradication of dracunculiasis and yaws. Only 14 human cases of Guinea-worm disease were recorded in 2023. Present work against yaws relates to intensified surveillance, capacity strengthening, and antibiotic MDA in several countries in WHO's African, American, South-East Asia, and Western Pacific regions; there were 168,239 suspected cases in 2022.

Challenges facing the Global NTD Programme include a slow recovery from disruptions caused by the COVID-19 pandemic, changing funding landscape, lagging country ownership, insufficient capacities and expertise, uneven progress across NTDs, insufficient data, gaps in knowledge & operational tools and processes (e.g. diagnostics, medicines), migration, climate change, and conflict.

WHO's current strategic priorities include (1) the creation of a research and development blueprint for NTDs; (2) the development of a costed implementation plan for the NTD road map; and (3) work on the intersection of NTDs and climate change.

WHO/ESPEN Updates

Presented by Dr. Amir Bedri Kello, Medical Officer Trachoma, World Health Organization–Regional Office for Africa

The Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN) was established in 2016 by WHO African Region (AFRO) as a public-private partnership in collaboration with Member States, donors, pharma, and NTD partners. Its mission is to contribute towards disease burden reduction through control and elimination of the five most prevalent NTDs amenable to PCT-NTDs. These are lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiases, and trachoma. The five preventive chemotherapy (PC)-NTDs account for nearly 90% of the NTD burden in the African Region. ESPEN covers 47 countries in the WHO African Region and five countries in EMRO (Djibouti, Egypt, Somalia, Sudan, and Yemen). About 60% of countries in the WHO African Region are co-endemic for four to five PC-NTDs.

ESPEN is focusing on five main strategic priorities: i) scaling up MDA to achieve 100% geographic coverage; ii) scaling down MDA toward PC-NTD elimination when elimination thresholds are reached; iii) strengthening information systems for evidence-based, implementation-level decision-making; iv) promoting effective use of donated medicines through improved supply chain management and v) advancing progress on sustainability through efforts to enhance country ownership and strengthen health systems.

The African Region is the most affected by trachoma. As of April 2023, an estimated 99.6 million people were living in at-risk areas in the WHO African Region, which represented 86% of the global burden of trachoma. There are an estimated 1.2 million TT cases (80% of the global burden) in the African Region. Ethiopia, one of the countries supported by The Carter Center, is the most affected country by trachoma in the world. Ethiopia has 64.1 million people living in at-risk areas and carries over 50% of the global TT burden.

There has been significant progress in trachoma control in the WHO African Region. Currently, 22 countries are endemic to trachoma and are known to require interventions. The results of the baseline surveys conducted in December 2023 in two EUs in Namibia have shown that the prevalence of TF and TT is below the elimination threshold. Currently, three countries (Botswana, Burundi, and Mauritania) are thought not to require interventions and claim to have eliminated trachoma as a public health problem. Burundi has already officially submitted its trachoma dossiers to WHO/AFRO for validation, which is under review. To date, six countries have achieved elimination of trachoma as a public health problem in the WHO African Region: Ghana (June 2018), Gambia (April 2021), Togo (May 2022), Malawi (September 2022), Benin and Mail (May 2023).

ESPEN's support for trachoma control includes provision of technical support as well as financial support to fill gaps depending on availability of budget for surveys, MDA as well as technical support for trachoma elimination dossier development and finalization.

Focus on Enhancing the "A" in SAFE (ETAS)

Presentation 1. Study Overview

Presented by Dr. Scott Nash, Senior Associate Director, Research, Trachoma Control Program, The Carter Center

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Presentation 2. Treatment Coverage and Electronic Data Capture

P*resented by Mr. Nicholas Presley, Research Coordinator, Trachoma Control Program, The Carter Center*

Background

Due to recent guidelines from a WHO Informal Working Group on Endgame Challenges, a number of countries are moving forward with using MFTA MDA for trachoma. Currently data are still needed to understand the additional cost burden on Trachoma Control Programs that come with multiple doses, and the acceptability to enhanced MDA regimens among the recipient population.

The Enhancing the A in SAFE study was a randomized control trial designed to understand the cost, feasibility, and community acceptance of two enhanced MDA regimes within the Republic of South Sudan (NCT05634759). The two treatment regimens were 1) a community-wide MDA, followed by two additional rounds of targeted treatment to children ages six months to nine years distributed two weeks and four weeks after the community-wide treatment, and 2) a community-wide biannual MDA approximately six to eight months apart.

To determine the feasibility of the two enhanced MDA interventions, treatment coverage and compliance data were collected via directly observed treatment during MDA distributions. A house-to-house census was performed prior to MDA distribution to provide the denominator for coverage and compliance calculation. Based upon the census, the triple dose arm included 17,626 participants across 15 study villages, of whom 8,644 (49.0%) were children ages six months to nine years. The biannual treatment arm enumerated 16,974 participants across 15 study villages, including 7,852 (46.3%) children.

Treatment coverage was defined by the proportion of the eligible population that received treatment during a round and demonstrated heterogeneity between distribution rounds and communities. In the triple dose arm, 7,390 (85.5%) children were treated during community-wide MDA, and 6,101 (70.6%) and 6,615 (76.5%) received treatment in the second and third child-only rounds. In the biannual arm, 5,583 (74.5%) and 6,354 (80.9%) children were treated during the two community-wide MDA rounds. Mean coverage in children across all rounds of treatment was 79.5% for both study arms.

Treatment compliance was defined as the proportion of treatment rounds an individual received, in agreement with the protocol. This trial demonstrated that children in both treatment arms achieved similar per-protocol treatment completion (triple dose: 63.8%, biannual: 60.4%), and in both arms over 90% of children received at least one dose (triple dose: 92.1%, biannual: 95.1%). Although the triple dose arm had more opportunities for individuals to receive treatments, the distributions were in quick succession (two to four weeks apart) compared to the timing of the biannual treatment rounds (approx. six months apart). These results suggest that program managers could consider their programmatic needs and local context when evaluating which of these two enhanced MDA treatment regimens could achieve the highest coverage and compliance.

The WASH Upgrades for Health in Amhara or WUHA software was used for electronic data collection during the census and for the tracking of MDA treatments across the study population.

This study found that electronic data collection for coverage and compliance calculations provides the benefit of having a clear denominator, can generate lists of those not treated for mop-up campaigns, and can calculate treatment compliance. However, it added significant time to MDA distributions, and challenges around the naming and age conventions in this implementational context led to inconsistencies in the census, which in turn could have inflated the study population size and artificially reduced coverage calculations. Therefore, although electronic data capture was necessitated by the research setting of this trial, it would not be recommended as a programmatic tool for MDA distributions in the Republic of South Sudan at this time.

Focus on Enhancing the 'A' in SAFE (ETAS)

Presentation 3. Acceptability of Enhanced MDA Strategies

Presented by Dr. Angelia Sanders, Senior Associate Director, Trachoma Control Program, The Carter Center

Purpose

Focus group discussions (FDGs) were conducted among trachoma MDA drug distributors (DDs), MDA supervisors, and community members to generate insights on the acceptability and feasibility of two enhanced MDA strategies for trachoma in Kapoeta North county, South Sudan. The enhanced MDA was conducted in study arm 1: triple dose consisting of community-wide MDA followed by two additional rounds of MDA targeted to children ages six months to nine years (two weeks apart); and study arm 2: biannual dose consisting of community-wide MDA (six months apart).

There were three time points when FGDs were conducted, with specific participants in each FGD: 1) Pre-MDA FGDs with DDs and supervisors; 2) Post-MDA FGDs in study arm one with DDs, supervisors, and community members; and 3) Post-MDA FGDs in study arm two with DDs, supervisors, and community members (Table 1).

Table 1: Number of FGD for each participant group shown by month conducted

	May 2022 (time point 1)	**August 2022 (time point 2)**	**January 2023 (time point 3)**
Drug Distributors	2	2	2
Supervisors	1	1	1
Caregivers	N/A	3	3
Chiefs	N/A	1	1
Total	3	7	7

Participants

To gain insights on the MDAs conducted as part of the study, purposive sampling was used to select participants for each FGD. For the DDs, they had to have completed the MDA distribution training and planned to participate in the upcoming MDA (time point 1), had participated in the MDA conducted in study arm one (time point 2), and had participated in the MDAs conducted in both study arms one and two (time point 3). For the supervisors, they had to have participated in the training of the DDs (time point 1), participated in the MDA conducted in study arm one (time point 2) and had participated in either study arm one or two, with a preference for participating in the MDAs conducted in both study arms (time point 3). For both the DD and supervisor FGDs, at least one woman was in each FGD. The community member FGDs were divided into two groups. The first included mothers and caregivers and the second group included chiefs. These community FGDs were conducted with representatives living in villages that were part of study arm one (time point 2) and villages that were part of study arm two (time point 3).

Analysis

All FGDs with DDs and supervisors were conducted in English. All FGDs with community members and chiefs were conducted in the local Toposa language. Permission was gained from participants to

audio record the FGDs. The Toposa language recordings were translated from Toposa to English and transcribed in English. All final DD, supervisor, and community transcripts were coded in MAXQDA and then analyzed using a thematic approach based on study aims and themes that emerged during transcription. Analysts cross-checked findings using an inter-coder agreement.

Results

Community acceptability

Across the mother/caregiver and chief FGDs there was a positive attitude towards the enhanced MDA. Community members acknowledged the importance of the drugs in treating and preventing trachoma and other diseases. Community members from both study arms were supportive of enhanced MDA whether it was biannual or triple dose targeted to children; however, they slightly favored the biannual treatment. There was very little negative feedback about MDA in general or enhanced MDA. Most of the negative comments related to others who might misunderstand the purpose of MDAs or people missing the MDA because they were away from the village at the time of treatment such as in the cattle camps or gardens.

DD and supervisors' perceptions of acceptability and feasibility

The DDs and supervisors felt that having enhanced MDA increased the likelihood that people who missed the first round would be able to receive the next round. Both groups favored the biannual round more than the targeted triple doses, but for different reasons. The DDs did not deem the triple dose appropriate because it only allowed children one to nine years of age to receive the second or third treatment. This meant that those older than nine years of age who missed the first round and were in the village the second or third round would not be eligible for treatment. They favored the biannual method because it treated everyone regardless of age. For the supervisors, they favored the biannual treatments because it allowed the Program to work on other activities and in other geographical areas in between the first and second treatments. They did not like how the triple dose kept them in one area for extended periods of time because of the multiple rounds of treatment within weeks of each other.

Most of the challenges reported by the DDs and supervisors with implementing the enhanced MDA were connected to implementing the MDA using a census and electronic data collection. For example, as part of the initial census, villagers inflated the number of people within their household because they thought a higher population would get them more goods or services. Many villagers also could not remember which name they had used on the census. Due to the challenges of the census and electronic data collection, supervisors felt they would be willing to conduct enhanced MDA if it was done using paper or a tally system like their current annual MDA method.

Both DDs and supervisors felt it was feasible to do the enhanced MDA, but it would take an upwards scaling of resources, including human, to implement across many different counties at once. Additionally, striving for a high coverage rate increases the time to complete treatments since it requires DDs to walk to gardens and cattle camps that can be far from villages. This would increase staff and costs for the program.

Focus on Enhancing the 'A' in SAFE (ETAS)

Presentation 4. Costing Analysis of Enhanced MDA

Presented by Mr. Tim Jesudason, Health Economist and Communications Consultant, Partners in Global Health

Background

The primary aim of this study is to assess the cost of bi-annual and triple MDA through the ETAS study and utilize this knowledge to estimate the cost of each intervention in a typical implementation scenario in Kapoeta North county, South Sudan. This presentation provided an overview of the study, methodology, and draft results.

Triple MDA consisted of community-wide MDA followed by two rounds of targeted treatment to children approximately two weeks and four weeks after each other, reaching 17,626 people in 15 villages. Bi-annual MDA consisted of two community-wide MDAs approximately six to eight months apart, reaching 16,136 people in 15 villages. Both arms were supported by 10 teams, consisting of a recorder, measurer, and dispenser.

*Method*s

We developed a Microsoft Excel-based costing tool to conduct a bottom-up micro-costing analysis. We used a payer perspective, identifying the quantity and costs of all required resources incurred by The Carter Center to implement MDA in these settings. We estimated both financial and economic costs. Financial costs represent actual monetary flows on goods and services purchased, while economic costs account for opportunity costs, such as the value of donated medicines. We included capital and recurrent costs across six cost categories: central administration, training, community sensitization, drug transportation, drug administration, and supervision. This presentation included the draft financial cost only, which refers to the actual expenditures incurred by The Carter Center.

Results

The total financial cost for triple MDA was $166,288, at a cost of $5.78 per round of treatment. The total cost per person to receive at least one round of treatment was $9.43 for triple MDA. Bi-annual treatment was relatively lower with a total financial cost of $66,769, at a cost of $2.57 per round of treatment. The total cost per person to receive at least one round of treatment was $4.14 for bi-annual MDA.

The cost to scale up triple MDA to the whole of Kapoeta North is estimated at $73,179, at a cost per treatment round of $0.68, and a cost per person treated of $1.18. The total cost to scale-up bi-annual MDA to the whole of Kapoeta North is estimated at $73,672, at a cost per treatment round of $0.60, and a cost per person treated of $1.19.

Limitations

The results presented are draft results. Further analysis, including sensitivity analyses, is ongoing, and final results will be published in due course.

Discussion

The study shows that research costs have a significant impact on the total costs. In the research setting, drug distributors received $50 per day, compared to approximately $5 per day in a typical implementation setting. Additionally, the time to implement the MDA was significantly longer in the research setting than in typical settings. As such, the research costs should not be used for budgeting trachoma programs.

Our scenario analyses estimate that the cost per treatment round ranges from 60–68 cents for triple and bi-annual MDA when a typical implementation setting is assumed. This range reflects our study population, which was estimated to include 37% children. In other settings with lower numbers of children, the cost per treatment round for triple MDA is likely to reduce, so the results of this study should be interpreted carefully when applied to other settings.

The cost per person treated ranged from $1.18 for triple MDA and $1.19 for bi-annual MDA, both lower than the cost of annual MDA in Kapoeta North in 2020 ($1.22 per person treated), highlighting the variability of costs across years in South Sudan. Given that the cost of triple MDA and biannual MDA are relatively similar, it will be important to determine the efficacy of each intervention to guide decision-making. If the efficacy of each intervention arm is relatively similar, a cost-effectiveness study would further aid in this decision-making process.

Focus on Global Trachoma Program Gaps

Presentation 1. Update: International Coalition for Trachoma Control (ICTC) Update and Gap Introduction

Presented by Ms. PJ Hooper, Deputy Director, International Trachoma Initiative

The ICTC has had another productive year in 2023 and 2024. The current ICTC Executive Group includes PJ Hooper from the International Trachoma Initiative as Chair until 2025; Michaela Kelly from Sightsavers as Vice Chair; and Angelia Sanders from The Carter Center as Immediate Past Chair. Later this year, ICTC will be contacting membership to request volunteers for a new Vice Chair to rotate on when Michaela becomes Chair.

Aparna Barua Adams, who had served as ICTC Project Manager since 2017 decided to join Unlimit Health as Senior Advocacy Advisor as of March 2023. Therefore, ICTC is excited to welcome Sangjan Newton from Sightsavers as part-time Project Manager. Tim Jesudason remains with ICTC to support special projects and partnerships.

ICTC was established in 2004 as a platform of collaboration with a membership composed of 42 members including implementing organizations, research, and academic institutions. ICTC also has a body of 14 observers including donors, WHO, and non-implementing partners that have an interest in the work of ICTC and trachoma programs. ICTC implementing members currently work across 43 countries in all five endemic WHO regions and work across a range of activities through this coalition to support national trachoma elimination plans. ICTC responds to needs identified by health ministries in affected countries through the GET2020 (Global Elimination of Trachoma 2020) Alliance. ICTC's Strategic Plan was released in 2022. To guide the way in which ICTC supports trachoma endemic countries, ICTC has four key strategic objectives:

1. **Increasing advocacy efforts to strengthen political will for, and commitment to, elimination of trachoma as a public health problem among donors and decision makers.** Advocacy plays a key role in effectively communicating progress as well as shared challenges within the global trachoma program. This objective includes ensuring ICTC can effectively develop advocacy messaging that can be used by all its membership to raise the visibility of common challenges, such as expanding access to SAFE strategy interventions among vulnerable populations and contributing to raising political will and investment from donors.

- **Increasing investment in trachoma elimination programs and the full implementation of the SAFE strategy.** ICTC recognizes that over the last four years there have been significant changes in the resources available to support the needs of national health ministries. Last year, ICTC's membership worked together to develop new tools, gather evidence, and formulate resources that will help to meet these challenges.

2. **Coordinating the provision of technical assistance and the sharing of knowledge among ICTC members to support high quality outcomes in trachoma programs.** ICTC preferred practices are a crucial area where the community can provide technical support to implementers, by sharing knowledge of what works well and refining how we collectively ensure high quality delivery of the SAFE strategy. Last year, ICTC commenced work to update our preferred practices for TT and will continue to do so for MDA and F&E components this year.

3. **Ensuring an effective coalition model and way of working that is adaptive and proactive in responding to changing contexts.** Strategic communications also play a key role in sharing information from trachoma programs with a wider community of eye health stakeholders which helps forge new relationships as trachoma elimination programs succeed and trachoma interventions and services are transitioned within health systems.

Each year, ICTC's membership identifies and contributes to annual priorities for the coalition to move forward with. These include participation in task teams on specific topics, working together on advocacy opportunities and resource mobilization, and documenting preferred practices.

Looking to the Year Ahead

1. Analyzing gaps within the global trachoma program to launch a **resource mobilization approach to address gaps.**
2. **Continuing advocacy** to sustain momentum of political will.
3. Framing more clearly the approaches that ICTC members can prioritize in the areas of **facial cleanliness and environmental improvement**.
4. Developing **new preferred practices**, including one on Special Populations
5. **Updating existing ICTC preferred practices**.
6. **Holding Knowledge Broker webinars**, including an upcoming one focused on shared experiences using the WASH/NTD toolkit to provide a platform for stakeholders to discuss its implementation and lessons learned.
7. Collaborating with the WASH Working Group to propose a **workshop at the 2024 NNN meeting.**
8. Launching a **new ICTC website**.
9. **In-person ICTC meetings** on May 17 in Hammamet immediately following the GET 2020 Alliance meeting and then in October at NNN.

ICTC Gap Analysis Task Team

This task team was developed to support ICTC's strategic plan by conducting a gap analysis of the global trachoma program, to better understand the resources required to reach global elimination by 2030. This information will be utilized in two ways:

- To provide a global estimate of resources required for elimination to support fundraising and advocacy, and
- To regularly provide a district level update of gaps and funding for the following 12 months, highlighting where there is an urgent lack of financing or other resources.

The outputs of the gap analysis will inform our advocacy and communications materials and activities, raising awareness of gaps among trachoma stakeholders and mobilizing resources through the development and use of key messages and evidence-based technical resources informed by the gap analysis. The Task Team is approaching the analysis by subdividing into four groups: surgery, MDA and surveys combined, F&E, and operational research priorities.

2020 INSight (2011) and *Accelerating Towards 2020* (2016) were foundational documents in the estimation of the funds needed for trachoma elimination and in support of our joint efforts for

fundraising. A lot has changed since these documents were created, however. As a community, we have achieved so much through surveys, scaling up program implementation, and building on our programmatic efficiencies and knowledge since the last time we estimated the funding gaps.

Methodologies used, assumptions made, and caveats were presented, along with very preliminary estimates. Important feedback was given by meeting participants, and these are now being incorporated into a revised draft analysis, to be presented at GET 2020 in Tunisia in May 2024. The Gaps Task Team is also developing country profiles/case studies to highlight countries that are chronically unfunded and require urgent resources and will create an advocacy and resource mobilization strategy to fill identified gaps.

Focus on Global Trachoma Program Gaps

Presentation 2. Gaps in Access to SAFE Interventions

Presented by Dr. Amir Bedri Kello, Medical Officer, Trachoma, World Health Organization – Regional Office for Africa

Despite significant progress in the control and elimination of trachoma within the WHO African Region, there are still notable shortcomings in ensuring access to SAFE interventions across the Region. These gaps manifest in various ways:

Limited Access to Trachomatous Trichiasis (TT) Surgical Services:

In remote and underserved areas of trachoma-endemic countries, there is a deficiency in access to TT surgical services. This is primarily due to a shortage of adequately trained human resources in TT surgery, insufficient infrastructure, lack of equipment and consumables. Additionally, factors such as low awareness and acceptance of surgery, as well as challenges in post-operative follow-up, exacerbate the situation. Furthermore, the lack of funding and insecurity in these regions further impede access to TT surgery.

Incomplete Baseline Mapping:

Certain districts in countries known to be endemic for trachoma, such as Angola, the Central African Republic, the Democratic Republic of the Congo, South Sudan, and Sudan, still lack complete baseline mapping for the disease. This absence of accurate endemicity data deprives populations of access to trachoma MDA programs. Reasons for incomplete mapping include insufficient funding and insecurity in some regions.

Limited Access to Trachoma MDA:

In some known trachoma-endemic districts, there are gaps in access to MDA interventions. These gaps stem from a lack of funding, shortages of Zithromax, and security challenges. Suboptimal therapeutic coverage and incomplete geographic reach further compound the issue.

Obstacles to Facial Cleanliness and Environmental Improvement (F&E) Interventions:

Access to F&E interventions is impacted by barriers such as low awareness, limited access to clean water and sanitation facilities, especially in schools where behavioral change initiatives are crucial. Misconceptions, socio-cultural barriers, and inadequate resources for water and environmental improvements also contribute to these gaps.

Weak Health Infrastructure and Integration:

Rural and underserved areas suffer from weak health infrastructure, insufficient funding, and limited integration of trachoma services into primary healthcare systems. Inadequate community engagement, participation, and involvement in program planning exacerbates the situation. Communication barriers, including linguistic and cultural diversity, hamper efforts, alongside insufficient resources for community mobilization and coordination among stakeholders.

Geographical and Socioeconomic Barriers:

Geographical barriers, such as remote and hard-to-reach areas, impede access to interventions. Socioeconomic disparities lead to unequal access to healthcare services, further exacerbating the gaps in access to SAFE interventions.

Addressing these multifaceted challenges requires comprehensive strategies that prioritize capacity building, resource allocation, community engagement, and cross-sector collaboration to ensure equitable access to SAFE interventions across trachoma-endemic regions.

Focus on Global Trachoma Program Gaps

Presentation 3. Special and Vulnerable Populations

Presented by Dr. Angelia Sanders, Senior Associate Director, Trachoma Control Program, The Carter Center

According to the ICTC special populations task team, "special populations" are those populations that due to various factors require programs to be tailored to ensure equitable access to trachoma interventions. This definition includes (but is not limited to): refugees; IDPs; indigenous and nomadic populations; people living with disabilities; and people who experience homelessness. These populations have been referred to as "statistically invisible" as disease prevalence among these populations is often obscured by the dominant population in population-based surveys.

Unfortunately, human displacement continues to increase globally. As of the end of 2023, 110 million people were forcibly displaced because of persecution, conflict, violence, human rights violations, or events seriously disturbing public order. Of this, approximately 63 million are IDPs and 36 million are refugees. Forty percent of those displaced are children despite making up only 30% of the world population. Political instability and armed conflict in Central, East, and West Africa are expected to increase the number of displaced and stateless people. Some of these conflicts overlap with trachoma endemic areas or are causing refugees and IDPs to move into trachoma endemic areas. Some of the challenges around displaced populations include changing denominators as populations move in and out of an area; insecurity and inaccessibility of both sending and receiving countries; added bureaucratic and administrative policies for camp-based interventions; and possible changes in reliability/applicability of previous survey data.

Seasonal migration, especially related to moving with cattle, requires unique approaches by the trachoma community. There are many challenges when implementing components of the SAFE strategy in cattle camps. These can include insecurity; unclear population figures which make it difficult to determine drug quantities and number of days needed to treat; inaccessibility for vehicles which causes drug distributors to walk for long hours or for multiple days; unpredictability of where camps will be at a given time; and higher costs associated with hiring guides and porters to work with distribution teams. Despite these challenges, The Carter Center and the MOH South Sudan Trachoma Control Program had success reaching cattle camps in five assisted counties in Eastern Equatoria state. During 2023, 361 cattle / hunting camps were reached resulting in 23,606 people receiving treatments. Of those treated 8,945 (40%) were children between the ages of 0-14 years. It is worth noting that these cattle / hunting camp treatments made up 7% of all treatments across these five counties.

To help document the knowledge gained by various ministries of health and supporting implementing partners, ICTC's special populations task team is currently collecting case studies and conducting interviews. This information will be used to develop a programmatic document that can be used as a reference as programs seek to ensure special populations are not left behind.

Focus on Global Trachoma Program Gaps

Presentation 4. Unknown Challenges to the Elimination of Trachoma as a Public Health Problem

Presented by Dr. Paul Emerson, Director, International Trachoma Initiative

Describing the unknown challenges to trachoma elimination by its very nature is a faith-based thought exercise rather than an evidence-based one. To take it one step further, most will agree that the 'unknown' challenges are widely known. The following are some of the known 'unknown' challenges to elimination:

1. Anti-microbial resistance (AMR). This has been a known challenge with no evidence of risk in the target organism (i.e., animals or aquaculture). Mitigating AMR risk boils down to countries and regions monitoring for primary treatment failure and conducting periodic genomics. Incorporating an AMR surveillance system for multiple antibiotics will also be paramount.
2. Donor Fatigue. Many were surprised when the Foreign, Commonwealth & Development Office or FCDO, pulled funding to NTD programs in 2021 and many programs were pulled backwards. Indeed, there is a real risk that the drug donor (Pfizer) will withdraw, or that current funding agencies will shift their focus and priorities. Diversification of donor base, continuation of progress reports and presentations, and ensuring donor engagement are all key to alleviating this risk.
3. The SAFE strategy, when implemented accordingly, is not sufficient to eliminate trachoma. This has been observed and brought up in discussions about persistence and recrudescence. When an intervention is implemented, there is a risk of creating a new dynamic equilibrium between treatments that drives threshold levels up. Further interventions may perpetuate this cycle. Counteracting this risk will involve identifying high transmission areas and populations and contextualizing intensified intervention efforts.
4. Statistically invisible and marginalized populations. At times these populations are marginalized by accident, other times they are done so deliberately. As a result, countries and partners leave them behind, increasing their risk of blindness. Identifying and intentionally focusing on marginalized populations is imperative to combating the risk.
5. Conflict and insecurity. Many areas experience short-term insecurity, followed by periods of stability, then instability. Knowing when to intervene remains a challenge for these areas. High costs and risk of failure make it difficult to fund activities. Aiding country programs to implement whenever they are able is key to successfully mitigating this risk. Partners can do more to offer flexibility in support and be willing to accept the risk of failure.

Climate change is a global challenge that has affected people's health and livelihoods. It has also affected trachoma program activities in various countries. Countries that contribute the least to climate change experience the brunt of climate disasters such as drought, flooding, wildfires, and excessive heat. Political fragility in conjunction with climate change goes together with the magnitude of the events. When it comes to the elimination timeline, both flooding and water scarcity increase the risk of outbreaks like cholera, dengue, and diarrhea, and affect migration patterns from rural to urban areas. The impact migration will have on elimination timelines is not yet known.

Lessons from the COVID-19 pandemic remain true when it comes to preparing for the unknown. When the world shut down and implementing partners and donors were unable to ship medications and travel to program areas, countries stepped up and continued to deliver programs. To ensure better future preparation of the unknown, collaborative efforts within countries and among implementing partners and donors should focus on the following:

- *Preparedness* in health systems (e.g. digitization of records, sharing, and transparency)
- *Resilience* in health systems (e.g. health capacity development with transferable skills that can respond to unknown needs)
- *Predicting the future* (e.g. use of existing and emerging surveillance tools to predict areas of greatest risk)
- *Patient-centered approach* to what's needed (e.g. compassion and love in epidemiology to respond to the felt needs and priorities of communities)
- *Measurement and metrics* over time to document impact and show changes

Pfizer Inc. Update

Presented by Miss. Julie Jenson, Director Product Access, Pfizer Inc.

To increase trachoma production, Pfizer continues to review all global options for azithromycin powder for oral suspension and tablets to meet our commitment to provide antibiotics for trachoma elimination through 2030. So that all of the products look as similar as possible, Pfizer is changing the label to read "azithromycin" and adding the "ITI" logo. Tablets will remain pink and the first supply with the new label is expected to ship to some countries in June and will be gradually rolled out in 2024.

Pfizer is celebrating its 175th anniversary this year! Earlier this year, Pfizer Inc. successfully completed the acquisition of Seagen Inc., a global biotechnology company specializing in transformative cancer medicines. The company also launched the Let's Outdo Cancer campaign. This initiative aims to improve the quality of patients' lives by making cancer a thing of the past.

International Trachoma Initiative (ITI) Update

Presented By Dr. Paul Emerson, Director, International Trachoma Initiative

To date, 110 million people, 62% of which are from Ethiopia, live in trachoma endemic districts. For 25 years, ITI has supported global trachoma control programs in their efforts to eliminate trachoma as a public health problem. Since then, 218 million people are currently living in formerly endemic districts, indicating a 66% decline since baseline. In the calendar year 2023, ITI donated and shipped 51 million doses of Zithromax® to 14 countries, bringing the total shipped to more than 1,060,000,000. The number of countries receiving Zithromax has been fluctuating over the years due to demand and progress made in the global program. The actual number of doses shipped in 2023 exceeded the target for the year, a reflection of country and partner efforts towards trachoma elimination. As the global program scales down, the number of shipments remains the same; complexity is increasing, while the shipment size goes down. Ethiopia is the exception to this rule.

The trachoma atlas serves as a tool to visualize progress towards eliminating trachoma as a public health problem. At baseline most countries in Africa had TF ≥50% in children ages one to nine. Significant milestones have been achieved since then, particularly in West Africa. Trachoma elimination programs are no longer needed in Mali, Ghana, and parts of Nigeria because of the collaborative efforts of countries, partners, and donors. The Southern African region has also made tremendous progress towards elimination since baseline. Most areas, except small clusters in southwest Angola and southwest Zambia, have TF prevalence <5% in 2023.

Based on progress made thus far and program adaptations, the independent Trachoma Expert Committee of ITI (TEC) has made the following recommendations to ITI:

- Supply Chain close outs: As countries near the end of azithromycin MDA for trachoma elimination we will want to collaborate closely to ensure that the final shipment and in-country inventory minimize waste
- Complementary indicators such as serology and *Ct* infection, for program decision making: In addition to the prevalence of TF_{1-9} TEC is increasingly reviewing azithromycin applications supported by complementary indicators

Until supply catches up with demand again, ITI will continue to:

- Ship 95% of approved azithromycin for use in operational research allocations and trichiasis surgeries
- Ship 80% of azithromycin approved for MDA, which includes one round of community-wide and another of MTFA. An exception is made for MFTA targeting children only, where we ship to treat the full target population of children requested for the MFTA MDA

Finally, ITI has moved away from the 'program year' to the calendar year. Districts will be allocated one round of treatment in a calendar year unless approved for MFTA MDA (subject to available azithromycin).

2024 Trachoma Control Program Review Recommendations

General Recommendations:

1. The National Programs should continue to look for opportunities to finance WASH interventions, considering the impact they have not only on trachoma but all NTDs as well as the overall health of communities.
2. As trachoma continues to disappear, it will be harder to find individuals presenting with clinical signs of trachoma for training purposes. In that, Programs should consider incorporating the use of photography for training and participating in the collection of photography as part of survey data collection.
3. As an alternative strategy to surgery, National Programs should consider including epilation as a management option, in response to the decreasing severity of TT and the potential for increasing PTT cases that require management.
4. As severity may impact the acceptance as well as the outcome of surgery, National Programs may consider including severity of TT cases in surgical provision registers.
5. The National Programs should consider continued opportunities to conduct MFTA MDA, if such campaigns are financially and logistically feasible and there is appropriate drug supply.
6. As National Programs employ MFTA, the following should be considered:
    a) Present cost-to-treat in MFTA as "per district" treated in addition to per person; and
    b) Present, if possible, the proportion of children ages one to nine who received zero, one, or two of azithromycin treatments during MFTA.
7. National Programs should continue to utilize end-game strategies, such as MFTA and enhanced monitoring with complementary indicators (serology and *Ct*), using results from MFTA to consider further enhancements (e.g. additional treatment rounds).
8. As districts reach elimination thresholds and active outreach / services end (i.e., MDA or TT surgical outreach), National Programs should consider how this change will be communicated to the communities served.

Country-Specific Recommendations:

Ethiopia

1. The National Program should finalize the TT case finding full geographic coverage (FGC) guidelines that provide robust yet realistic thresholds to establish when a district is considered "finished" for active TT outreach and can transition to managing future TT cases through the static health centers within the existing health system.
2. The National Program should finalize epilation guidelines and training materials as a viable TT case management tool for minor TT and for those that refuse surgery.
3. The Wait and Watch approach utilized in the Amhara Region should be considered by the National Trachoma Program for expansion in the Amhara Region, as well as other regions in Ethiopia, to ultimately reduce survey costs, use of drug, and human resources over time.
4. The National Programs should continue to utilize end-game strategies, such as MFTA and enhanced monitoring with complementary indicators (serology and *Ct*), using results from MFTA to consider further enhancements (e.g., additional treatment rounds).

Amhara Regional State, Ethiopia

1. Given the insecurities in Amhara, the Amhara Regional Trachoma Program should develop plans to provide interventions in accessible areas and further develop plans and be prepared to deliver interventions whenever and wherever able as security and access change over time.
2. The Amhara Regional Trachoma Program should utilize the MFTA MDA pilot conducted in two districts in Amhara to inform a feasible scale-up to other districts in the region, considering human and financial resources required, while also focusing on monitoring and evaluation processes.
3. The Amhara Regional Trachoma Program should consider concentrating the school water provision activities in known hyperendemic areas to maximize and assess impact on trachoma.
4. Noting that the results of FGC and service provision in Amhara contributed around 40% of the global output of surgery in 2023, the ARHB and partners are urged to continue the exercise, collecting complete data to demonstrate a district has "finished" and can transition surgery activities to static centers.

Niger

1. If the elimination threshold of TT has been achieved, yet additional surveys are still required to demonstrate achievement of the TF threshold, the National Program should consider alternative survey options in consultation with Tropical Data.
2. As the National Program nears the elimination of trachoma as a public health problem, they should begin collating the necessary data and historical program information required for inclusion in the elimination dossier. The National Program should begin to involve various stakeholders who have years of experience with the Program to benefit from their tremendous knowledge of this decades-long program.
3. As an alternative strategy to surgery, the National Program should consider including epilation as a management strategy, in response to decreasing severity of TT and the potential for increasing PTT cases that require management.
4. The National Program should ensure TT case finding is implemented and completed systematically, targeting FGC to "finish" each targeted area; detailed case finding data should be collected to document these activities, so they can be utilized in the elimination dossier as evidence for the targeted areas that TT thresholds have been met.
5. While TT-only surveys may be a desired approach for a district, there is a risk that the 0.2% threshold will not be achieved; if programmatic data are not sufficient to suggest a district has done enough to complete a TT-only survey, the National Program should consider conducting complete ratissage in these districts.
6. As the Niger program will soon scale up the complete ratissage (door-to-door case finding) approach, and the data from complete ratissage will be used in the elimination dossier, the Niger Program should ensure that the data collection and archiving procedures are established and confirmed with all stakeholders, so data are comprehensive and complete.

South Sudan

1. The National Trachoma Program should consider exploring opportunities to conduct MFTA MDAs, if such MDAs are financially and logistically feasible and there is appropriate drug supply.
2. The National Program should consider developing a supply chain management plan to strengthen and build on existing systems for drug inventory management.

3. The National Program should utilize the county-level Shipment Allocation Tool shared by ITI to guide the quantity of drugs (azithromycin tablets and powder for oral suspension) shipped to each county for MDA.
4. To support stronger inventory management and timely azithromycin shipments, the National Program should share distribution and inventory reports with ITI as soon as MDA has been completed in each county.
5. The National Program should advocate for adequate funding for reverse logistics to ensure azithromycin can be recovered and used in future MDA campaigns and/or MDA campaigns in other counties.
6. The National Trachoma Program should consider advocating for closer collaboration between the NTD and WASH sectors.
7. The National Trachoma Program should consider continuing with integrated cataract and trachoma surgical camps where financially and programmatically feasible.
8. The National Program should develop a TT patient follow-up plan beyond the one-day follow-up.
9. The National Program should develop a TT surgeon audit plan and pilot this plan on/with at least three surgeons.
10. The National Program should develop a plan to re-open the Juba Teaching Hospital Ophthalmic Clinical Officer Program.
11. The National Program should pilot the provision of TT surgery to children, with appropriate measures, and document lessons learned to increase provision over time.
12. The National Program should create an updated Trachoma Action Plan to reflect the now known prevalence of TF/TT across the country.

Sudan

1. The National Program should identify how to provide TT surgical services in the states and localities where TT surgeons are now living given significant displacement (from Khartoum).
2. If logistically feasible, the National Program should consider including serology in the Sawakin locality impact survey.

Trachoma: The Disease

Trachoma, the world's leading cause of infectious blindness, is caused by repeated infections of the conjunctiva (the lining of the eye and eyelid) by the bacterium *Ct*. As of April 2024, the WHO estimates that 1.5 million people, the majority of whom are women, are blind due to trachoma, and another 103.2 million people are at risk of blindness or severe visual impairment due to trachoma in 39 countries.[1] 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. 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: i) by contact with hands, towels, and clothing or ii) by flies, which are attracted to ocular and nasal discharge. As individuals are repeatedly infected with *Ct*, 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, physically abrades the cornea, and can lead to corneal opacity and blindness if not corrected.

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 (WHA) 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. The SAFE strategy stands for: Surgery to correct TT, the advanced, blinding stage of the disease; Antibiotics to clear *Ct* infection; and Facial cleanliness as well as Environmental improvement to reduce transmission. In 2004, ICTC, a coalition of non-governmental organizations, donors, academic institutions, and other partners, was created to support the GET2020 Alliance 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 six weeks of daily treatment with TEO, the previously recommended therapy. Pfizer Inc., manufacturer of Zithromax®, maintains a commitment to supporting the GET2020 Alliance goal of eliminating trachoma as a public health problem by the year 2030. Since the beginning of the donation in 1998, more than one billion 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 reinforce global support for the elimination of trachoma. In 2016, WHO published the dossier template for the validation of the elimination of trachoma as a public health problem. Since 2017, 18 countries fulfilled the criteria to be validated by WHO to have eliminated trachoma as a public health problem. In 2018, the global trachoma community celebrated three 20th anniversary milestones: The Carter Center began its pioneering work in 1998; WHA 51.11 called for the elimination of blinding trachoma; and Pfizer Inc. created ITI to lead the drug donation program.

[1] WHO, Weekly Epidemiological Report, Published July 12th, 2024.

TT and TF Thresholds for Disease Elimination

The achievement of the ***elimination of trachoma as a public health problem*** is defined by the WHO through two proxy indicators:

1) a prevalence of TT "unknown to the health system" of <0.2% in adults ages ≥15 years (approximately one case per 1,000 total population); and
2) a prevalence of TF in children ages one to nine years of <5% in each (formerly) endemic district.

Through WHA resolution 51.11, trachoma can be eliminated as a public health problem through the implementation of the WHO-endorsed SAFE strategy. The surgery, or S component, should be offered to any individual that is diagnosed with TT to benefit from the surgical treatment. The surgery component also includes case finding activities, which are recommended when prevalence of TT is ≥ 0.2% among individuals who are ≥15 years old. The A, F, and E components of the strategy are recommended for areas in which TF prevalence is ≥5% in children of ages one to nine.

To meet the criteria mentioned above, population-based prevalence surveys, amongst other activities, must be conducted in districts (enumeration units) suspected of being endemic at baseline and then at specified intervals after the start of interventions. Below are the success indicators and procedures often used to determine whether a district or region has achieved thresholds for the elimination of trachoma as a public health problem:

Trachoma Impact Survey: Must be conducted at least six months after final implemented MDA. If the TF prevalence threshold has been met, the district enters a two-year hold period (no MDA required).

TT activities: If TF prevalence threshold is met, but not TT threshold, then the program must conduct case searching and management activities.

Trachoma Surveillance Survey: At the conclusion of the two-year hold period, after the final impact survey, a surveillance survey is undertaken. If TT and TF thresholds are met, then the district is considered as "transitioned" and no longer warrants interventions. If thresholds are not met, then the district is re-enrolled in TT activities and MDA as appropriate.

Persistent Trachoma: According to the recent WHO endorsed "Informal Consultation on Endgame Challenges for Trachoma Elimination (2021)", persistent trachoma is defined as an enumeration unit with at least two impact surveys at which $TF_{1–9}$ is ≥ 5%, without ever having had a $TF_{1–9}$ < 5%.

Recrudescent Trachoma: According to the same endgame challenges report, recrudescent trachoma is defined as an enumeration unit with at least one surveillance survey at which $TF_{1–9}$ is ≥ 5%.

[¥]The Endgame Challenges Informal Consultation included several recommendations to address the problems of persistence and recrudescence. These include the delivery of MDA more frequently than annually (MFTA), with the possibility that additional MDA rounds be delivered just to demographic subgroups with the highest prevalence of conjunctival *Ct* infection. For districts with lower levels of trachoma, a wait and watch approach was recommended whereby a program discontinues MDA and continues surveillance if there is a justifiable expectation that $TF_{1–9}$ will regress to <5%. In terms of monitoring, the consultation recommended the inclusion of collection of samples to monitor conjunctival *Ct* infection and exposure to *Ct* infection.

Monday, April 22		
7:30	*Shuttle depart hotel for The Carter Center*	
8:00 – 8:30 *30 mins*	Breakfast	
8:25 – 8:30	MYT Virtual Room Welcome	MYT
8:30 – 8:45 *15 mins*	Chairperson Welcome, Meeting Management & A Tribute to Mrs. Rosalynn Carter	Ms. Kelly Callahan Director, Trachoma Control Program The Carter Center
8:45 – 8:50 *5 mins*	The Legacy of The Carter Center Founders	
8:50 – 8:55 *05 mins*	Welcome Remarks	Ms. Paige Alexander Chief Executive Officer The Carter Center
8:55 – 9:00 *05 mins*	Opening Remarks	Dr. Kashef Ijaz Vice-President, Health Programs The Carter Center
9:00 – 9:15 *15 mins*	Trachoma Control Program Overview	Ms. Kelly Callahan Director, Trachoma Control Program The Carter Center
9:15 – 10:15 *60 mins*	Niger SAFE Update (Q&A) (Video)	Dr. Ibrahim Almou Deputy Coordinator, National Eye Health Program Ministry of Health – Niger
10:15 – 10:45 *30 mins*	Break	
10:45 – 11:45 *60 mins*	Ethiopia SAFE (Q&A)	Mr. Fikre Seife National Neglected Tropical Disease Program Coordinator Ministry of Health – Ethiopia
11:45 – 12:45 *60 mins*	Amhara SAFE (Q&A)	Mr. Adisu Abebe Neglected Tropical Disease Case Team Leader Amhara Regional Health Bureau
12:45 – 1:00 *15 mins*	Amhara, Ethiopia: Kebele Elimination of Trachoma for Ocular Health Study Update	Ms. Hadley Burroughs Study Coordinator Francis I. Proctor Foundation
1:00 – 2:15 *75 mins*	Lunch	
2:15 – 2:30 *15 mins*	Lateral Flow-based Assay (LFA)	Ms. Sarah Gwyn Microbiologist, Global Neglected Tropical Diseases Team Laboratory Science and Diagnostics Branch, Division of Parasitic Diseases and Malaria, U.S. Centers for Disease Control and Prevention
2:30 – 2:45 *15 mins*	Amhara, Ethiopia Child MDA Pilot	Mr. Eshetu Sata Trachoma Control Program Manager The Carter Center – Ethiopia
2:45 – 3:00 *15 mins*	Tanzania Enhanced MDA	Dr. Jeremiah Ngondi Regional Neglected Tropical Disease Technical Advisor RTI
3:00 – 3:15 *15 mins*	Niger Enhanced MDA	Ms. Elisabeth Chop Monitoring and Evaluation Associate Helen Keller Intl

The End is in Sight: Bridging the Gaps

The Twenty-Fifth Annual Trachoma Control Program Review
The Carter Center
April 22 - 23, 2024

3:15 – 3:45 *30 mins*	Q&A	
3:45 – 4:00 *15 mins*	Break	
4:00 – 4:15 *15 mins*	WHO NTD Road Map Achievements	Dr. Anthony Solomon Chief Scientist, Neglected Tropical Diseases World Health Organization
4:15 – 4:30 *15 mins*	WHO/ESPEN Updates	Dr. Amir Bedri Kello Medical Officer, Trachoma World Health Organization – Regional Office for Africa
4:30 – 4:45 *15 mins*	International Trachoma Initiative Update	Dr. Paul Emerson Director International Trachoma Initiative
4:45 – 5:00 *15 mins*	Pfizer Updates	Miss Julie Jenson Director Product Access Pfizer Inc.
5:00 – 5:15 *15 mins*	Q&A	
5:15 – 5:30 *15 mins*	Closing Remarks & Group Photo	Ms. Kelly Callahan Director, Trachoma Control Program The Carter Center
5:30 – 7:30 *120 mins*	Reception	Museum Lobby
7:30	*~Depart The Carter Center for the hotel~*	

**Time subject to change. Bus will depart The Carter Center shortly after the conclusion of the reception.*

The End is in Sight: Bridging the Gaps

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Tuesday, April 23		
7:30	*Shuttle depart hotel for The Carter Center*	
8:00 – 8:30 *30 mins*	Breakfast	
8:25 – 8:30	MYT Virtual Room Welcome	MYT
8:30 – 8:40 *10 mins*	Meeting Management, & Chairperson Welcome	Ms. Kelly Callahan Director, Trachoma Control Program The Carter Center
8:40 – 9:40 *60 mins*	South Sudan SAFE Update (Q&A)	Mr. Yak Yak Bol Director, Preventative Chemotherapy-Neglected Tropical Diseases Ministry of Health – South Sudan
9:40 – 10:30 *50 mins*	**Focus on Enhancing the 'A' in SAFE (ETAS)**	
9:40 – 9:45 *05 mins*	Study Overview	Dr. Scott Nash Senior Associate Director, Research, Trachoma Control Program The Carter Center
9:45 – 9:55 *10 mins*	Treatment Coverage and Electronic Data Capture	Mr. Nicholas Presley Research Coordinator, Trachoma Control Program The Carter Center
9:55 – 10:10 *15 mins*	Acceptability of Enhanced MDA Strategies	Dr. Angelia Sanders Senior Associate Director, Programs, Trachoma Control Program The Carter Center
10:10 – 10:20 *10 mins*	Costing-Analysis of Enhanced MDA (Video)	Mr. Tim Jesudason Health Economics and Communications Consultant Partners in Global Health
10:20 – 10:30 *10 mins*	Q&A	
10:30 – 11:00 *30 mins*	Break	
11:00 – 11:15 *15 mins*	Innovative Surgery Campaigns in South Sudan	Dr. Albino Nyibong Ajang Director of Eyecare Ministry of Health – South Sudan
11:15 – 11:30 *15 mins*	A Novel Surgery for Managing Post-Operative Trachomatous Trichiasis" (Virtual)	Dr. Emily Gower Associate Professor University of North Carolina – Chapel Hill
11:30 – 11:45 *15 mins*	Q&A	
11:45 – 12:15 *30 mins*	Using Model-Based Geostatistics for Informing Trachoma Elimination	Dr. Emanuele Giorgi & Dr. Anna Harte Associate Professor in Biostatistics, Lancaster University & Research Fellow, London School of Hygiene & Tropical Medicine
12:15 – 12:30 *15 mins*	Multi-Country Operational Research on Persistent and Recrudescent Trachoma	Mr. Mohamed Bah Associate Public Health Advisor The Task Force for Global Health

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12:30 – 12:45 *15 mins*	Q&A	
12:45 – 2:00 *75 mins*	Lunch	
2:00 – 2:45 *45 mins*	Sudan SAFE Update (Q&A)	Dr. Sara Lavinia Brair for Dr. Balgesa Elshafie Senior Country Representative, The Carter Center, Sudan & National Coordinator for Trachoma Control Program Federal Ministry of Health – Sudan
2:45 – 4:30 *105 mins*	**Focus on Global Trachoma Program Gaps**	
2:45 – 3:15 *30 mins*	International Coalition for Trachoma Control Update and Gap Introduction	Ms. PJ Hooper Deputy Director International Trachoma Initiative
3:15 – 3:30 *15 mins*	Break	
3:30 – 3:45 *15 mins*	Access to SAFE Interventions	Dr. Amir Bedri Kello Medical Officer, Trachoma World Health Organization – Regional Office for Africa
3:45 – 4:00 *15 mins*	Special and Vulnerable Populations	Dr. Angelia Sanders Senior Associate Director, Programs, Trachoma Control Program The Carter Center
4:00 – 4:15 *15 mins*	Unknown Challenges to the Elimination of Trachoma as a Public Health Problem	Dr. Paul Emerson Director International Trachoma Initiative
4:15 – 4:30 *15 mins*	Q&A	
4:30 – 4:45 *15 mins*	Importance of Compassion in Global Health	Dr. David Addiss Director, Focus Area for Compassion and Ethics The Task Force for Global Health
4:45 – 5:00 *15 mins*	Closing Remarks	Ms. Kelly Callahan Director, Trachoma Control Program The Carter Center
5:00	*~Depart The Carter Center for the hotel~*	

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