Progress Towards Trachoma Elimination in West Africa

Introduction

Trachoma is the world's leading cause of infectious blindness. It is a progressive disease, marked by frequent infections with the bacterium *Chlamydia trachomatis* during childhood. The infections cause inflammation of the inner eyelid, a condition known as trachomatous inflammation-follicular (TF). The infections lead to scarring of the inner eyelid, eventually causing the eyelashes to turn in towards and rub against the eyeball. This painful condition, known as trachomatous trichiasis, or TT, can lead to irreversible blindness [1]. A total of 40 countries are known to be trachoma endemic in one or more health districts, with an estimated 115.7 million persons living in districts where TF is over the elimination threshold and 1.5 million persons with TT [2].

Elimination of Trachoma as a Public Health Problem

The World Health Assembly has called for the elimination of trachoma "as a public health problem" via WHA Resolution 51.11 [3]. To eliminate trachoma, the World Health Organization (WHO) recommends the SAFE strategy: **S**urgery for TT to ensure that eyelashes no longer rub against the eyeball; **A**ntibiotics distributed through mass drug administration (MDA) campaigns to clear infections with *C. trachomatis* in districts where TF is over the elimination threshold; and **F**acial cleanliness and **E**nvironmental improvements to prevent *C. trachomatis* transmission [4].

Figure 1. A grader examines a child for signs of trachoma during a trachoma prevalence survey in Côte d'Ivoire. Photo credit: Act | West, FHI 360.

To support endemic country National Programs to reach their trachoma elimination goals, the WHO Alliance for the Global Elimination of Trachoma by the Year 2020 (GET2020) was formed as a partnership among governments, non-governmental organizations (NGOs), universities, and other stakeholders to work together towards global trachoma elimination. WHO's Roadmap for NTDs 2021–2030 reiterates that all trachoma endemic countries reach the elimination "as a public health problem" targets by 2030 [5].

Trachoma is currently endemic throughout most of Sub-Saharan Africa, as well as in parts of Asia, the Middle East, Central and South America, the Pacific Island nations, and Australia. To date, a total of 18 countries have been validated by the WHO as having eliminated trachoma as a public health problem [2,6].

For the WHO to recognize (or validate) that a country has reached elimination as a public health problem, countries must document the implementation and impact of the SAFE strategy and achieve three targets: 1) Each endemic health district in the country must reach a prevalence (as assessed by persons trained and certified to identify TF and TT, also known as "clinical graders") of TF <5 percent among children ages one to nine; 2) each endemic health district must attain a TT prevalence of <1 case of TT "unknown to the health system" per 1,000 population; and, 3) provided written evidence that the health system is able to identify and manage TT cases even after elimination validation, using defined strategies and evidence of financial resources [7].

Support from USAID

USAID began supporting trachoma elimination activities in 2006 through its initial investment, the NTD Control Program [8]. In West Africa, Burkina Faso, Mali, Niger, and Ghana were all recipients of this initial technical and financial support. Through the subsequent project investments, END in Africa (2010–2018; led by FHI 360) and ENVISION (2011–2019; led by RTI International), the remaining countries in West Africa began receiving technical and financial support for trachoma elimination (Benin, Cameroon, Côte d'Ivoire, Guinea, Senegal, and Togo). Collectively, these projects focused heavily on completing baseline trachoma mapping to determine MDA needs, supporting National Programs and NGOs to conduct MDA, and monitoring the impact of MDA through surveillance activities in accordance with WHO guidance. USAID has continued its support to eliminate trachoma in West Africa through the Act to End NTDs | West program (2018–2026; led by FHI 360), primarily enabling countries to scale down MDA by documenting the significant MDA impact through trachoma impact and surveillance surveys (TIS and TSS, respectively) and to develop their trachoma elimination dossiers for WHO validation. Through these projects from 2006 to the present, USAID support has been consistent and widespread and has touched almost all districts in USAID-supported countries (Figure 2a and 2b).

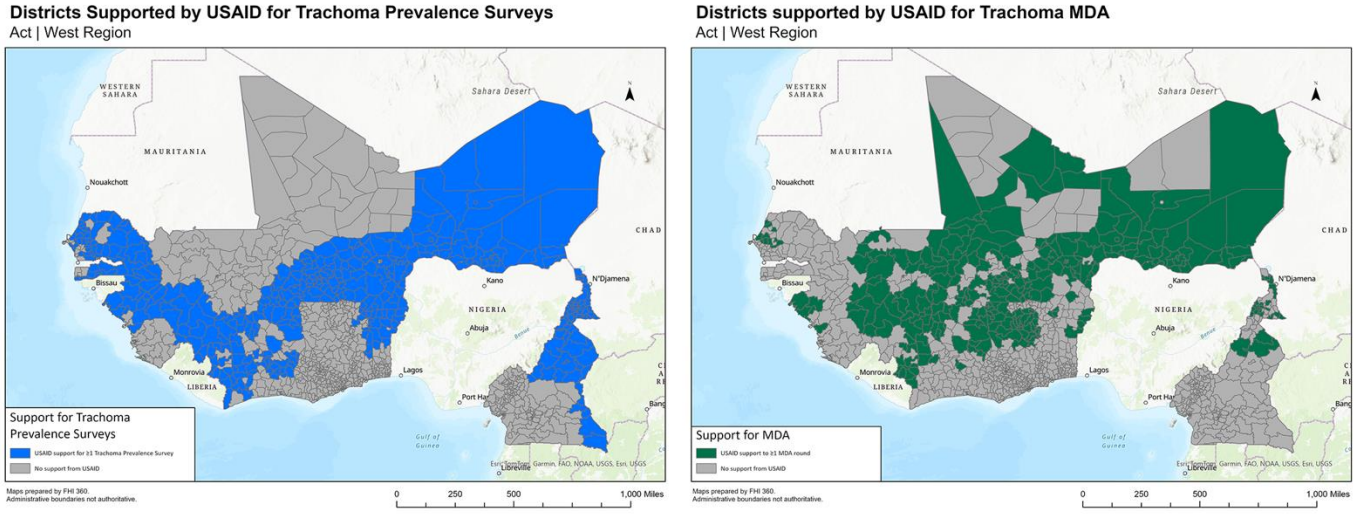

Figure 2a and b. Districts that have ever received USAID support for DSA or MDA

Prevalence of Trachoma in West Africa[1]

Baseline

In much of West Africa, National Programs conducted the first mapping surveys to estimate the prevalence of trachoma in the late 1990s and early 2000s with support from WHO, the *Institut d'Ophtalmologie Tropicale de l'Afrique* (Tropical Ophthalmology Institute of Africa [IOTA]), and various partners and donors [9-12]. In many cases, overall prevalence was estimated by administrative region rather than by individual health districts. Trachoma was a widespread public health problem throughout these countries, with high TF and TT prevalence hindering agricultural and occupational productivity and overall economic development [13]. Prevalence was particularly high in the three Sahelian countries (Mali, Burkina Faso, and Niger), though lower in the coastal countries (Figure 3a).

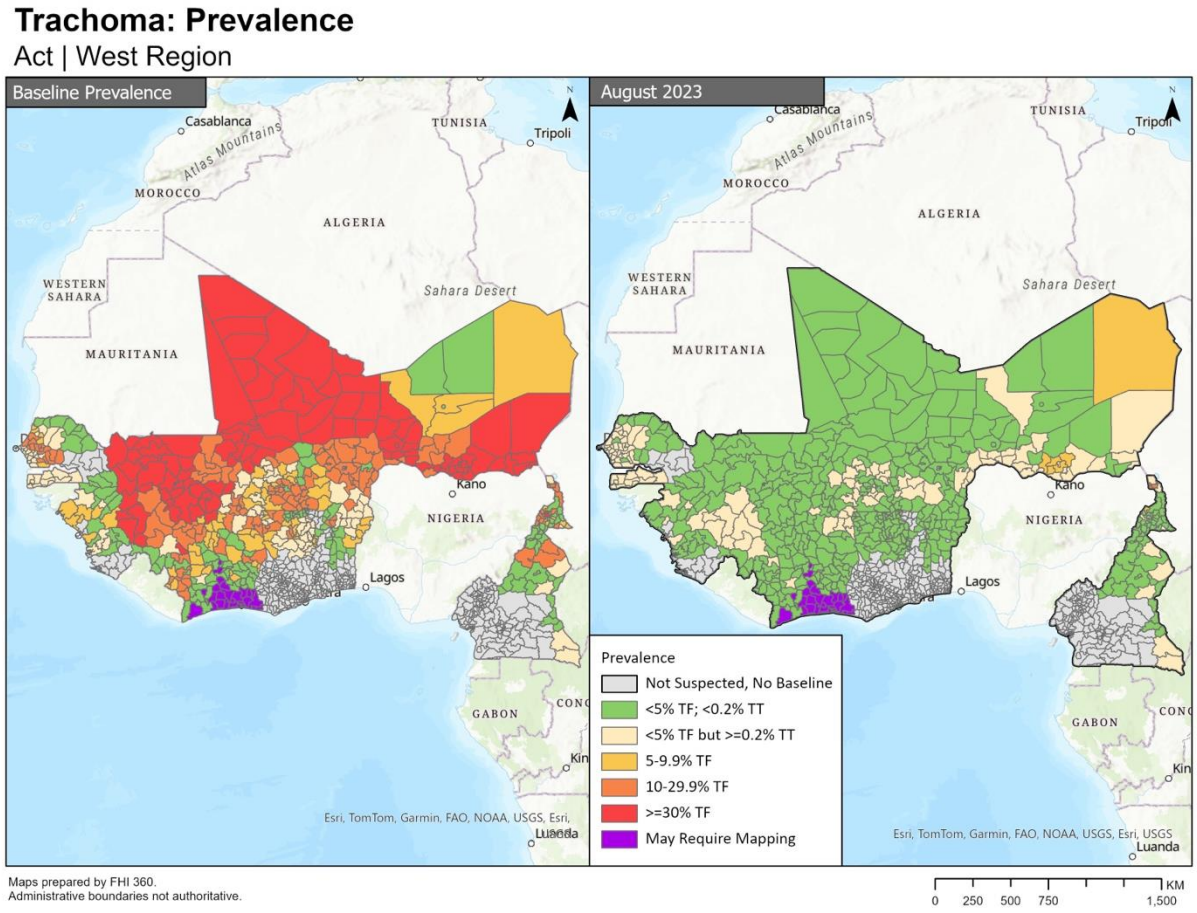

Figure 3a and b. Trachoma prevalence at baseline mapping (3a) and present (3b)

[1] West Africa generally refers to the countries in the Economic Community of West Africa States (ECOWAS), which includes Cabo Verde, Senegal, The Gambia, Guinea Bissau, Guinea, Sierra Leone, Liberia, Mali, Burkina Faso, Niger, Cote d'Ivoire, Ghana, Togo, Benin, and Nigeria. Cameroon, on the other hand, is typically considered part of Central Africa. For the purposes of this technical brief, where "West Africa" is used, it includes the ECOWAS countries supported by Act | West as well as Cameroon.

Present Day

Of the 18 countries that have been validated by the WHO as having eliminated trachoma as a public health problem, five are in West Africa: Benin, The Gambia[2], Ghana, Mali, and Togo. Overall, TF prevalence has greatly decreased in all countries (Figure 3b). Of the 227 health districts where TF was ever ≥5 percent in the countries supported by Act | West, only 12 of these districts have not yet reached the <5 percent TF threshold after successive rounds of MDA with Zithromax® donated by Pfizer, Inc.

At least two years after TIS are conducted and demonstrate that TF<5 percent, a TSS must be conducted to determine if TF remains under the elimination threshold in the absence of MDA. All countries in West Africa supported by Act | West are projected to complete their TSS by the end of 2026 (thus achieving the most significant goal of demonstrating that TF has stayed below the elimination threshold in the absence of MDA nationwide) except those where insecurity currently does not allow access to a subset of health districts (Figure 4).[3]

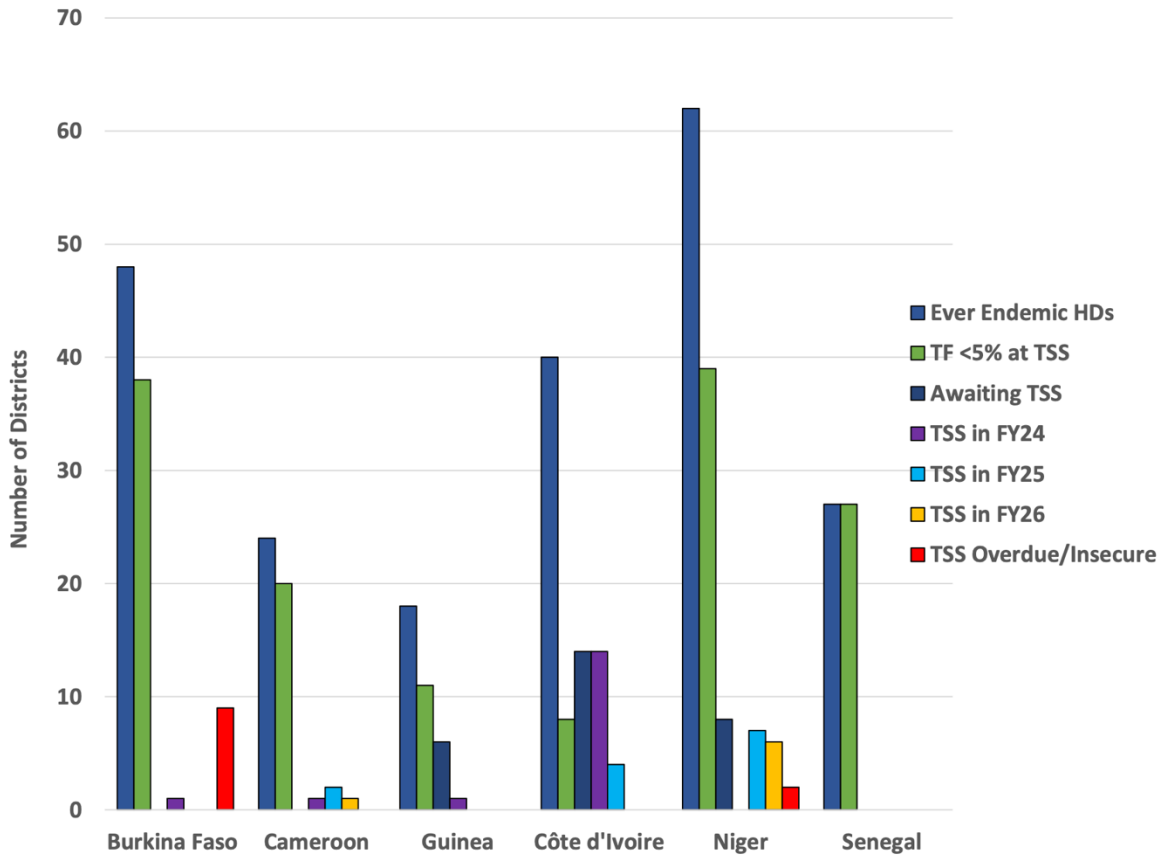

Figure 4. Progress towards completion of TIS and TSS by country

[2] Not supported by USAID/Act | West.

[3] "Insecure" in Figure 4 for Burkina Faso and Niger indicates that districts completed their TIS with TF<5% but since then, insecurity has not enabled the TSS to be conducted. "Overdue" is when it has been ≥2 years since TIS were conducted but the TSS has not. In the cases of these two countries, TSS are overdue by 3-10 years.

Challenges to Trachoma Elimination in West Africa

Persistent and Recrudescent Trachoma

In 2021, USAID conducted a peripheral analysis of overall progress toward elimination, then asked the following questions: "Why are some trachoma endemic districts not reaching TF<5 percent despite multiple years of successive MDA rounds?" and "Is our overall MDA implementation strategy adequate to achieving the WHO targets established nearly two decades ago in a very diverse group of countries?" A key result of this analysis led to an Act | West portfolio-wide "deep dive" to examine districts that were experiencing what was later defined as "persistent" and "recrudescent" TF[4] to better understand which countries are affected, identify the common and contrasting characteristics of these districts, and ultimately, potentially identifying specific challenges and their putative solutions related to the effective delivery of high-coverage MDA.

In West Africa, only Niger and Cameroon had districts considered persistent or recrudescent. In Niger, a total of 17 evaluation units (EUs) had persistent TF and still required MDA. Nine EUs reached the criteria to stop MDA, but two or more years later, the TSS indicated TF had recrudesced to ≥5 percent. These EUs were primarily in the Diffa, Maradi, and Zinder regions. In Cameroon, three EUs were identified with recrudescent trachoma, all in the Far North region.

Figure 5. A girl is measured to see how much Zithromax she should receive during MDA for trachoma in Niger. Photo Credit: Act | West, Helen Keller Intl.

After the deep-dive consultation, it was concluded that most of these HDs had high baseline TF (most of these EUs had TF ≥20 percent), and certain EUs had not achieved the 80 percent programmatic coverage for MDA during multiple rounds of MDA. Likewise, these EUs had low access to clean water and sanitation (which can impact hand and face washing). In many of these EUs, some populations were designated as "special populations," such as nomadic groups, internally displaced persons, or refugees who may not have previously been treated or had adequate access to clean water or sanitation.

In December 2021, WHO held an informal consultation on trachoma "endgame challenges" [15] that resulted in defining the cause and impact of persistent and recrudescent TF, enabling the national programs to enhance MDA strategies (such as conducting more annual rounds of MDA before TIS, or more frequent than annual MDA). It also encouraged national programs to conduct operational research to evaluate enhanced MDA monitoring strategies, including the use of additional objective indicators as part of TIS/TSS (such as antibody serology and PCR for detection of *C. trachomatis*).

[4] Per the *WHO Informal Consultation on Trachoma Endgame Challenges* [15], the working definition of an EU with "persistent" TF is an EU with at least two TIS at which TF_{1-9} is ≥5%, without ever having had TF_{1-9}<5%; the working definition for an EU with "recrudescent" TF is an EU with at least one TSS at which TF_{1-9} is ≥5%.

The Programme Nationale de Santé Oculaire (National Eye Health Program, or PNSO) of Niger has since modified its MDA strategy per recommendations from the informal consultation through support from Act | West. The PNSO selected six EUs where two rounds of MDA were conducted in short succession in 2022 and 2023. The goal of this strategy is to increase both the overall number of persons receiving at least one round of MDA coverage and to increase antibiotic treatment pressure on the pathogen in these endemic areas. These EUs had high baseline prevalence, were known to have poor access to water and sanitation or had been affected by insecurity and had large influxes and displacement of populations from elsewhere. Four of these EUs have now completed TIS. TF is now <5 percent in these four EUs, and TSS will be conducted in 2025. In the two other EUs where two rounds of MDA were conducted in short succession, TIS is planned for 2024. Finally, in another EU, the PNSO enacted a "wait and watch" strategy. The hypothesis behind this strategy is that in districts like this, where TF has consistently hovered between 5–5.9 percent for a number of years, TF will decrease in the absence of additional MDA. More specifically, the TF prevalence at baseline in this district has remained between 5-9.9 percent after two rounds of MDA, and the district is surrounded by districts where TF<5 percent. Therefore, the National Program determined that additional MDA likely was not needed to bring the prevalence to below 5 percent, as has been observed elsewhere [16].

Cameroon has three districts considered to be recrudescent. In one of these districts, no modified strategy was applied; a single round of MDA was conducted, and TIS in 2023 indicated that TF is now <5 percent. For the other two districts, TF ≥10 percent during TSS, the Programme National de Lutte Contre la Cécité (PNLCé) determined that it would conduct the requisite three rounds but in short succession (six months between each round), with support from Act | West. These districts will conduct TIS in 2024.

Both Niger's and Cameroon's national programs are planning to employ the previously mentioned enhanced monitoring strategies in 2024 by adding serological (antibody) and infection testing (PCR) as part of the TIS or TSS in prioritized districts. Collectively, these data will help to triangulate the more subjective clinical data from clinical graders and objective additional analyses to determine whether these EUs have met the elimination targets for trachoma.

Insecurity and Cross-border Issues

Insecurity has been growing in the Sahel area of West Africa due to violent extremism and political instability and their impacts and interactions on climate change, food insecurity, and lack of socioeconomic opportunities [17]. In Mali, Niger, Burkina Faso, and Cameroon, this has led to millions of refugees and internally displaced persons and made it difficult for national programs to access populations in some trachoma endemic areas. This violence is also spilling over into the coastal countries. At present, no MDA is needed in any currently inaccessible areas, but insecurity is causing delays in conducting trachoma surveys. Insecurity and population movement may also play a role in the persistent and recrudescent trachoma situation described above, and cross-border solutions may be necessary to help resolve them.

To mitigate these issues, Act | West is supporting several initiatives in collaboration with various national programs. First, Act | West helped to organize the first-ever Lake Chad Basin (Figure 6) cross-border meeting with representatives from the national programs from Niger, Cameroon, Nigeria, and Chad in October 2023 in collaboration with other partners such as the International Trachoma Initiative, the Organization for the Prevention of Blindness, and Sightsavers.

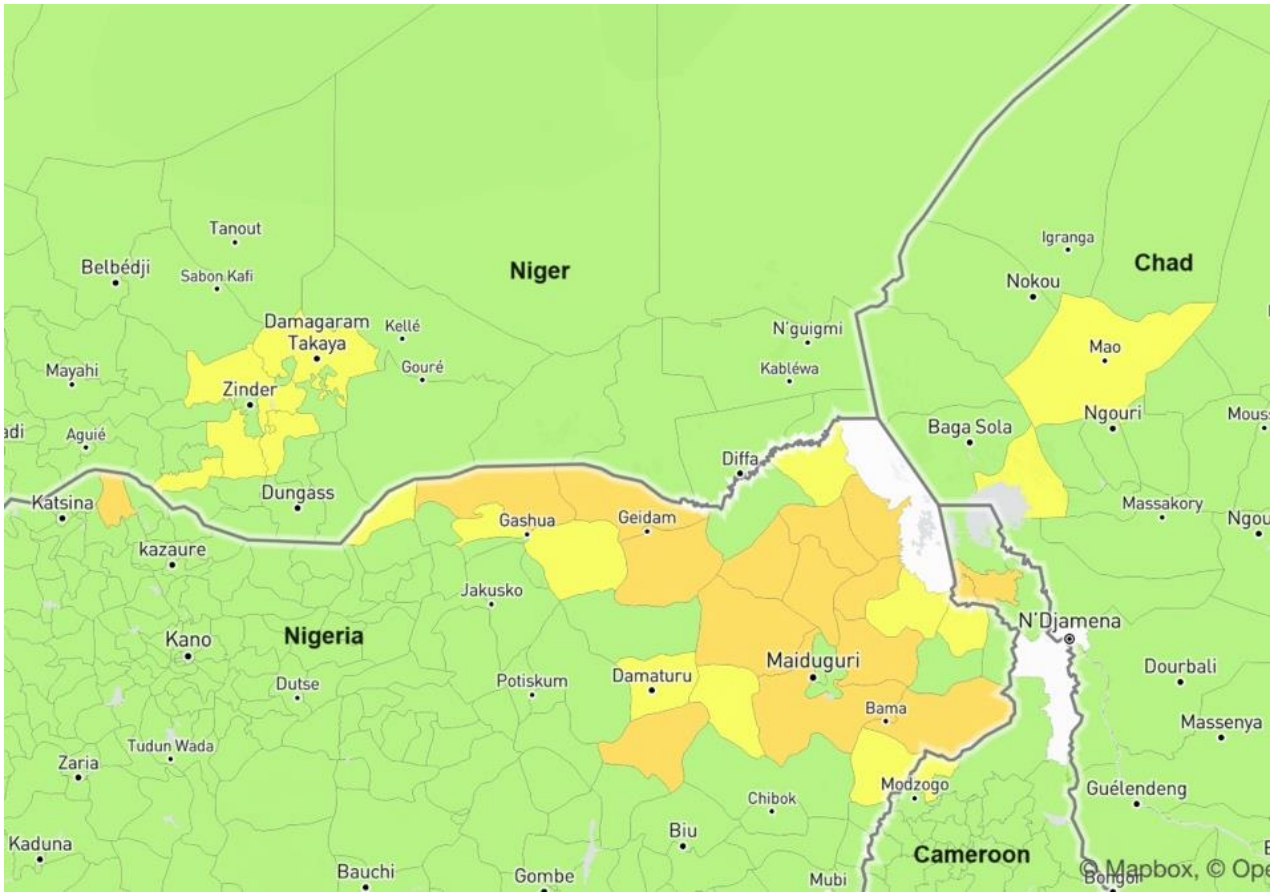

Figure 6. Current TF prevalence in Lake Chad basin countries. Map courtesy of www.trachomaatlas.org, *accessed on May 29, 2024*

In this area, there has been an ongoing security crisis since 2013 linked to non-state armed groups (e.g., Boko Haram), which has terrorized communities, led to large population movements [18], and made implementation of the SAFE strategy and M&E difficult or impossible. The purpose of the meeting was to enable these countries to exchange on the epidemiological situations of their respective countries, discuss lessons learned, such as how to conduct MDA or surveys, given the insecurity, and discuss ongoing common challenges, such as TT case management and quality assurance in this challenging landscape. Finally, as a large number of the persistent and recrudescent EUs in Niger and Cameroon are found in this region, country coordination of activities and data-sharing may enable these national programs to share strategies for reducing trachoma prevalence in these areas.

Second, Act | West plans to work with the Niger and Burkina Faso national programs to identify solutions to gathering epidemiological data in currently inaccessible areas. There is promise with new methods and technology, such as model-based geostatistics (MBG), serology, and photography. For example, the use of MBG may make it unnecessary to conduct primary data collection. Instead, available survey data can be reanalyzed and provide an analysis on the likelihood of whether TF is <5 percent. Utilization of serology or photography may enable data collection to take place by local health care workers who are familiar with the situation on the ground but are not trained to be trachoma graders.

Third, Act | West is supporting trachoma elimination work in refugee camps, where national programs have asked for assistance and where an approach to implementing the WHO strategy is less clear. As an example, Act | West supported Niger's PNSO to conduct baseline trachoma mapping in the Sayam Forage refugee camp in Diffa, Niger. The population in this camp is primarily from northern Nigeria, from areas that had not been mapped until recently due to insecurity, and no trachoma interventions had taken place. The survey indicated that TF is ≥5 percent; Act | West subsequently supported MDA, and the camp is due for TIS in 2024.

Long-term trachoma surveillance

One important next step on the horizon is to protect the gains national programs have made toward the elimination of trachoma as a public health problem and the investments made by USAID and other donors and partners by ensuring trachoma does not come back. Presently, guidance for long-term trachoma surveillance is not yet available; however, a WHO guidelines development process is currently underway for the use of serology. As part of its Learning Agenda, Act | West is conducting a literature review on post-validation surveillance strategies that validated countries have included in their trachoma elimination dossiers and strategic plans or conducted through operational research. Act | West is also collaborating with USAID and Act | East to develop a potential framework for countries to consider as they begin to develop long-term surveillance plans. The literature review and framework are being incorporated into a peer-reviewed paper.

Conclusions

Trachoma has been a severe public health problem in much of West Africa, but great progress has been made in the sub-region in the last two decades. Most countries will have reached the TF elimination criterion by the end of USAID's current investment, which is projected through the year 2026. While challenges remain due to insecurity, and data are outstanding to determine whether current efforts to address persistent and recrudescent trachoma are working, national programs remain committed to addressing these issues and assisting their countries to eliminate trachoma as a public health problem.

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