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Highlighted Signals and Events

During epidemiological week 29 (13 July to 19 July 2026), WHO Public Health Intelligence (PHI) teams conducted digital event-based surveillance (DEBS) to support the early detection and assessment of potential public health threats. During the reporting period, approximately 701,000 raw signals were scanned and triangulated through DEBS. From this large pool of signals, 26 signals and/or events met assessment thresholds and underwent further analysis and categorization. Of the 26 categorized signals, 17 represented unique signals. 17 signals and/or events were escalated for operational attention.

In the reporting week, nine new events were verified through PHI activities. One Disease Outbreak News (DON) was published during this reporting week. A summary of identified raw signals, assessed signals, and published outputs is presented in the tables below.

Signal Assessment Metrics, 13 July – 19 July 2026

Signals Screened ¹	Signals Categorized ²	Unique Signals ³	Signals Escalated ⁴
701 000	26	17	17

Selected new signals of potential public health events assessed, 13 July – 19 July 2026⁵:

Region	Hazard
Africa	Lassa fever Cholera Not yet diagnosed disease
Americas	Cyclospora Cholera Leishmaniasis Yellow fever Mpox Oropouche virus disease
Eastern Mediterranean	Crimean-Congo Haemorrhagic Fever
Europe	Malaria
South-East Asia	Measles Chandipura virus Floods
Western Pacific	Botulism Influenza due to identified avian or animal influenza virus Japanese encephalitis Zika virus disease

¹ **Signals screened:** Total volume of raw signals reviewed from across multiple sources during the reporting period.

² **Signals categorized:** Number of signals categorized for further detailed WHO assessment and actions during the reporting period.

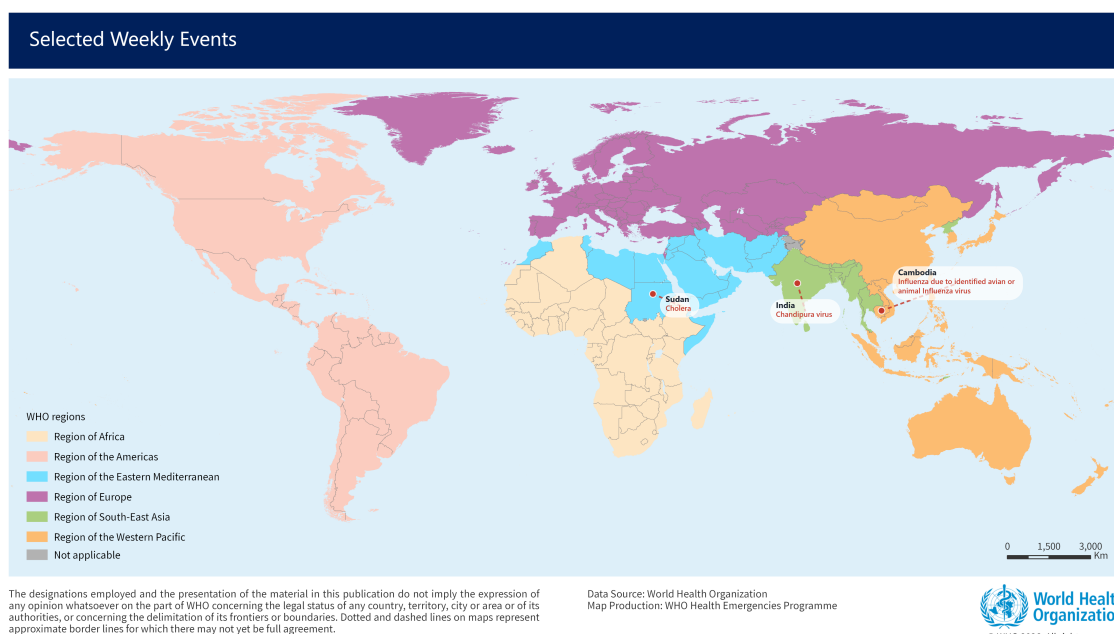
³ **Unique signals:** Count of distinct signals after removing duplicate or repeated entries from different sources within the same epidemiological week.

⁴ **Signals escalated:** Subset of categorized signals that triggered escalation actions.

⁵ The absence of listed signals indicates that no publicly available signals were identified during the reporting period and does not imply absence of signal activity overall.

Selected Weekly Events, 13 July – 19 July 2026

Figure 1: Map of Selected Weekly Events



Published Information Products

Disease Outbreak News

[Ebola disease caused by Bundibugyo virus, Democratic Republic of the Congo and Uganda](#)

Global Dengue Update

Data as of end of June 2026

Dengue virus is transmitted mainly through *Aedes aegypti* and *Aedes albopictus* mosquitoes, which thrive in tropical and sub-tropical urban areas. Key drivers of dengue transmission include rapid urbanization and climate change, both of which are resulting in an increase in permissive environments for mosquitoes, as well as expanded global travel and trade, moving the virus, mosquitoes and infected humans across borders. Circulation of multiple dengue serotypes also raises the risk of severe disease due to secondary infections with a different serotype.

The World Health Organization (WHO) has been monitoring dengue incidence since 1954, with Member States reporting cases and deaths to WHO on an annual basis. In response to the changes in the abovementioned drivers of transmission, and the need to better understand changes in intra-annual trends and seasonality patterns, WHO established an almost real-time global surveillance system for dengue in 2024. Currently, this includes monthly data from 185 countries, territories and areas, presented in the global [dashboard](#). This tool also brings together other relevant information for interpreting the global situation such as genomic data available through GenBank, modelled estimates of risk and visualizations of seasonality patterns.

WHO surveillance data showed that dengue reached its highest recorded levels in history globally in 2024, when over 14.2 million dengue cases were recorded, including over 7.5 million confirmed cases, over 52 000 severe cases, and more than 10 000 deaths. The previous highest incidence year was 2023, when 6.5 million cases and 7500 deaths were recorded (Figure 2). To date in 2026, case numbers indicate cumulative dengue case totals of smaller magnitude than 2025 (Figure 3).

Figure 2: Trends in total number of cases and deaths reported to WHO annually at the global level from 2010 to 2025

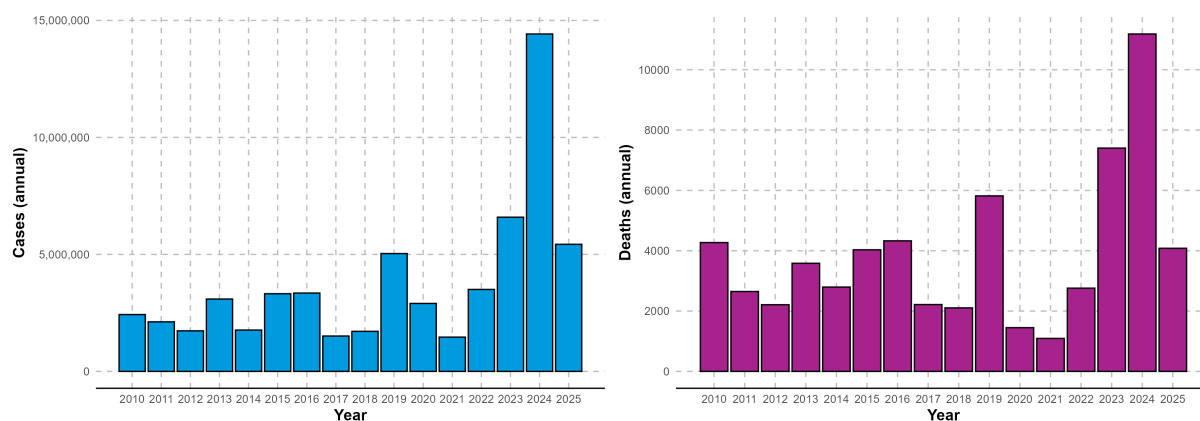
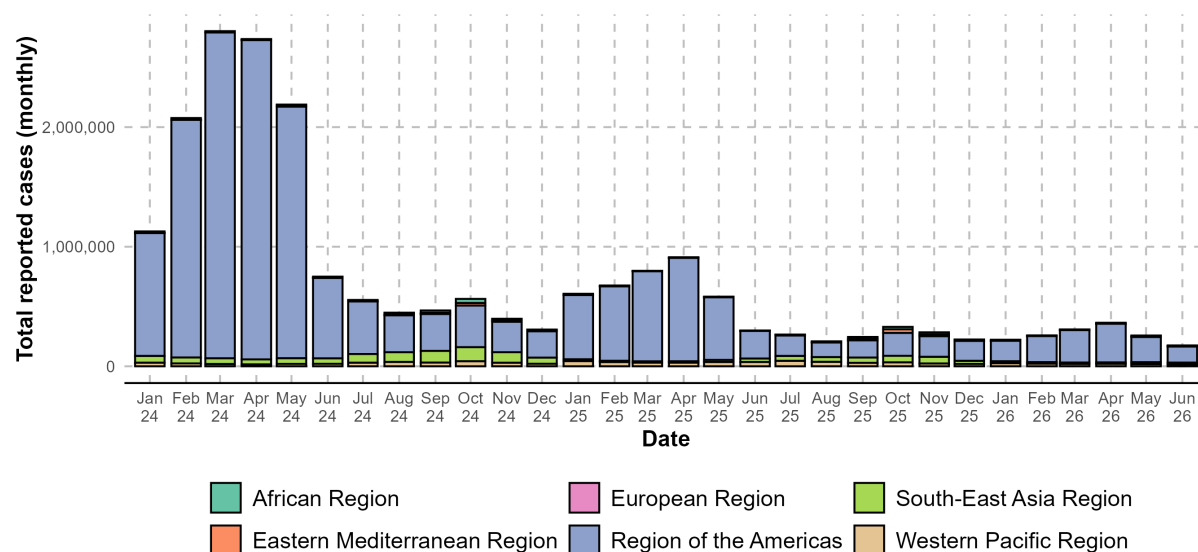


Figure 3: Epidemic curve of total reported cases from Jan 2024 – Jun 2026



Between January and June 2026, 1.6 million cases and over 700 deaths have been reported from 89 countries, territories and areas, with the majority (81%) originating from the Region of the Americas, where more than 1.3 million cases were recorded (Table 1, Figure 4). However, as surveillance systems outside this region remain at varying stages of development, cross-regional comparisons should be interpreted with caution. Seasonality also differs by region: the African, Eastern Mediterranean, South-East Asian, and Western Pacific regions typically experience their peak season in the latter half of the year and have therefore not yet reported their peak case numbers for 2026 (Figure 5).

Table 1: Total cases, confirmed cases and deaths reported to WHO January – June 2026 by WHO region. Note in the European Region, an additional 223 cases and 0 deaths were recorded in the French overseas territories of Mayotte and Réunion and the Autonomous Region of Madeira, Portugal and are not shown in the table which reflects mainland Europe.

WHO region	Cases	Confirmed cases	Deaths
African Region	35 740	5443	52
Eastern Mediterranean Region	16 833	3965	0
European Region	0	0	0
Region of the Americas	1 327 434	381 910	367
South-East Asia Region	84 725	50 753	124
Western Pacific Region	120 436	58 357	205

Figure 4: Geographical distribution of total reported cases January to June 2026. Note the cases reported from Australia include both autochthonous and imported cases. Source: WHO global surveillance dashboard https://worldhealthorg.shinyapps.io/dengue_global/

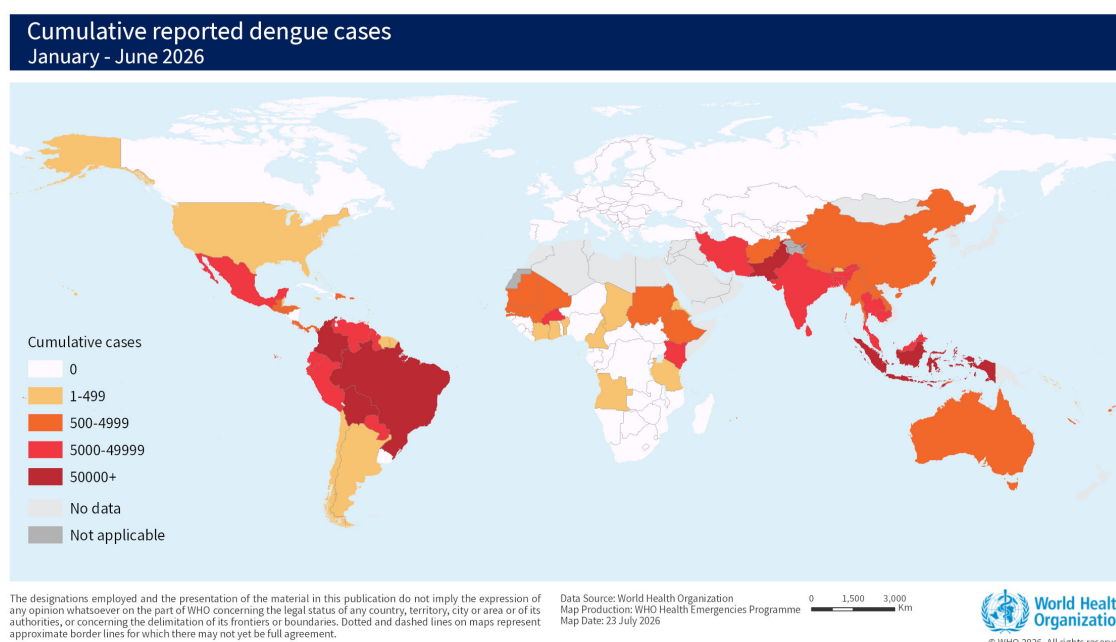
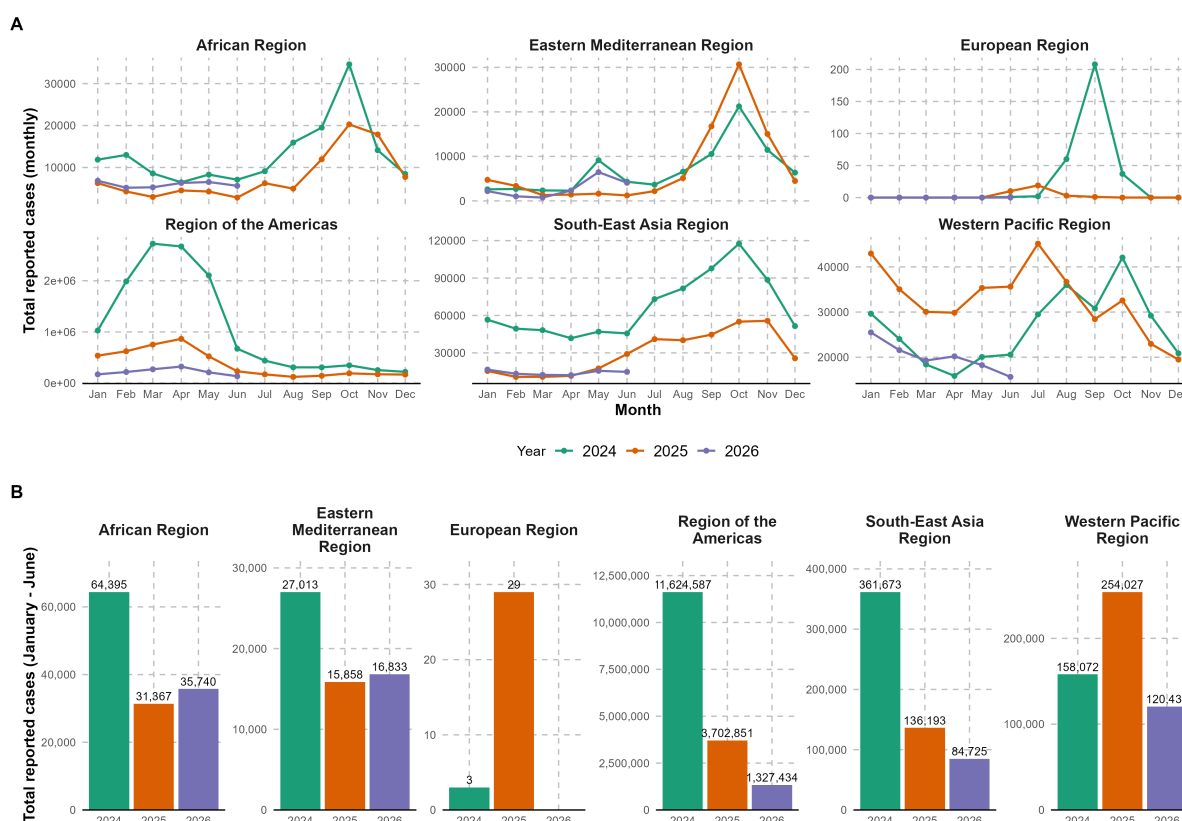


Figure 5: (A) Trends in monthly total cases reported to WHO between January 2024 and June 2026 shown by WHO region; (B) Cumulative total reported cases by region in the period January – June across 2024, 2025 and 2026. Note in both figures the y axis differs by region in order to see the trends. The trends in the European Region reflect only autochthonous transmission in mainland Europe and do not include the cases reported from the French overseas territories of Mayotte, Réunion.



Comparing reported cases from January to June across 2024–2026, all regions recorded their highest case numbers in 2024, with the exception of the European and Western Pacific Regions. However, this exception reflects surveillance changes rather than changes in disease incidence. Indonesia was reassigned to the WHO Western Pacific Region under resolution WHA78.25 (2025),

effective 27 May 2025, whereby all data from Indonesia have been recorded under the Western Pacific Region from January 2025 onwards. When the approximately 170,000 cases reported by Indonesia in 2025 are excluded, the Western Pacific Region also recorded its highest case numbers in 2024.

At the country level, Brazil has reported the highest number of cases so far in 2026, consistent with previous years and reflecting its large population relative to other countries in the region. It has reported over 1 million cases, of which 276 304 are confirmed (Table 2), followed by Indonesia (58 357) and Colombia (54 438). When expressed as incidence, Cook Islands report the highest rate, with 849 cases equivalent to approximately 5000 cases per 100 000 population, followed by Guyana (approximately 4200 per 100 000) and Brazil (500 per 100 000). Case definitions and ascertainment vary substantially across countries, as detailed on the global dashboard, and these data should be interpreted accordingly.

Table 2: Countries, territories and areas reporting the highest number of total cases in the period January to June 2026

Country	Cases	Cases per 100 000 population	Confirmed cases	Severe cases	Deaths
Brazil	1 064 958	498.6	276 304	519	246
Indonesia	58 357	21.3	58 357	-	152
Colombia	54 438	101.9	37 909	561	37
Bolivia (Plurinational State of)	50 778	403.6	562	443	1
Guyana	35 768	4 283.6	12 154	418	0
Sri Lanka	33 872	155.6	-	-	17
Malaysia	33 697	100.3	-	-	24
Peru	33 207	96.0	24 901	143	35
Mexico	29 977	22.5	2 847	113	4
India	22 938	1.6	22 938	-	31

While at a global level, 2026 is reporting relatively few cases compared with the 2024 epidemic, some countries are experiencing large outbreaks and the largest across the three-year interval. Between January and June 2026, 18 countries recorded higher cumulative totals than the same interval in 2024. These include 6 countries in the African Region, 5 in the Western Pacific Region, 3 in the Region of the Americas, 2 in the Eastern Mediterranean Region, and 2 in the South-East Asia Region. Countries reporting the largest number of cases in 2026 relative to previous years include Cambodia, Kenya and Iran (Islamic Republic of). For more information, please refer to the WHO global surveillance [dashboard](#).

WHO supports countries for dengue prevention and control through the implementation of the Global Arbovirus Initiative and focusing on:

- **Preventive Measures:** during the low mosquito activity season it is essential to strengthen preventive actions, such as vector surveillance, larval source management and other vector control measures, public education, community engagement and sanitation efforts. All of these elements are intended to keep the mosquito population as low as possible for as long as possible, delaying any increase in virus transmission and dengue cases in the process.
- **Early Detection and Response:** By ensuring case surveillance is maintained through the health sector, even in the low transmission season, countries can detect cases early, follow trends, and respond quickly to any increase in cases, preventing outbreaks before they start.
- **Capacity building:** Continuous/ongoing training of health professionals, enhancement of diagnostic, clinical management, surveillance, vector control and RCCE capacities, and development of response plans, ensures readiness for high transmission periods to reduce dengue associated mortality.
- **Community Engagement:** Sustained outreach and awareness campaigns help communities remain vigilant about preventive practices, such as removing stagnant water, even when case incidence is low.
- **Climate and Environmental Changes:** With unpredictable weather events due to climate changes, dengue transmission patterns are shifting, and outbreaks can occur outside what are the typical high transmission seasons. Year-round support helps countries stay prepared for these changes.
- **Resource Optimization:** activities conducted during low transmission periods are generally less resource-intensive than emergency responses. By supporting countries year-round, investments are used more effectively, reducing the need for costly emergency interventions once the epidemic curve has started growing.

Summary of the 41st Meeting of the International Task Force for Disease Eradication: Elimination of Trachoma as a Public Health Problem

The 41st meeting of the International Task Force for Disease Eradication (ITFDE) was convened at The Carter Center, Atlanta GA, USA April 21–22, 2026, to discuss the elimination of trachoma as a public health problem. The ITFDE is an international body hosted by The Carter Center, comprised of experts in the fields of infectious and neglected tropical diseases (NTDs). The ITFDE previously reviewed trachoma in 1993, 2005, 2010, and 2016. Trachoma was further reviewed in 2023 as part of a meeting on climate change and health. This report summarizes the 2026 meeting, which focused on global progress and validation successes, remaining challenges and insecurity considerations, strategies to address those challenges, and recommendations for the global trachoma program.

Background

Trachoma is an NTD and the leading infectious cause of blindness worldwide. It is caused by repeated infection with the bacterium *Chlamydia trachomatis* (Ct) and is closely linked to poverty, poor sanitation, limited access to clean water, and weak health systems. The disease is transmitted through person-to-person contact via fingers, fomites (objects or materials that carry infection) or eye-seeking flies that have been in contact with the ocular and nasal discharge of an infected individual.⁶ *C. trachomatis* infection is most often found in young children and is associated with clinical signs of active trachoma: trachomatous inflammation—follicular (TF) and trachomatous inflammation—intense (TI). Repeated infection leads to scarring of the conjunctivae, eventually resulting in the eyelid and eyelashes turning inward (entropion) in some individuals causing trachomatous trichiasis (TT). This causes pain, corneal opacity, and eventually visual impairment and blindness if untreated.⁷

In 1998 the World Health Assembly (WHA) adopted resolution WHA51.11, calling for the elimination of trachoma as a public health problem (EPHP) by 2020. After EPHP was not achieved by 2020, the WHA endorsed the 2021–2030 NTD road map, setting 2030 as the new target date. The elimination criteria for trachoma EPHP are defined as: (i) a prevalence of TT “unknown to the health system” of <0.2% among people aged ≥ 15 years, in each formerly endemic district and (ii) a prevalence of TF <5% among children aged 1–9 years sustained for more than two years without mass antibiotic drug administration (MDA) in each formerly endemic district, and (iii) the existence of a system able to identify and manage incident TT cases, using defined strategies, with evidence of appropriate financial resources to implement those strategies.⁸

SAFE strategy

WHO developed an integrated framework for treatment and prevention of trachoma called the SAFE strategy. The strategy combines four components: Surgery (S) to correct TT, antibiotics (A) to clear infection and reduce community transmission, and Facial cleanliness (F) and Environmental improvement (E) to address underlying conditions associated with poverty, particularly limited access to water, sanitation, and hygiene (WASH).

TT surgery repositions the lid margin to correct entropion. Cases requiring surgery are often detected through public health approaches such as case searches and surgical campaigns. Surgeries are delivered primarily by integrated eye care workers or TT surgeons, mostly general nurses trained in effective TT surgery techniques (bilamellar tarsal rotation [BLTR] or posterior lamellar tarsal rotation [PLTR]). From 2014–2024, more than 1.5 million TT surgeries were performed worldwide, the majority in Ethiopia.

MDA of azithromycin remains a significant factor in reducing the global trachoma burden. Since 1999, the International Trachoma Initiative (ITI) has managed Pfizer’s donation of over 1.15 billion doses of azithromycin to 41 countries, a global health contribution valued at approximately \$27.8 billion and counting.

The F and E components of the SAFE strategy encompass behavior-change and infrastructure-related activities, making them more complex and resource-intensive to implement and evaluate.⁹ Programmatic activities typically focus on improving water access, expanding latrine coverage, reducing fly breeding sites, and promoting behavior change related to facial cleanliness, hygiene, and environmental sanitation.^{10,11} These interventions require close coordination across sectors and stakeholders beyond health, including water, sanitation, education, community development, and local government.

⁶ Taylor HR, Burton MH, Haddad D, West S, Wright H. Trachoma. *Lancet* 2014; 2141–2152.

⁷ Report of the 4th Global Scientific Meeting on Trachoma, Geneva, 27–29 November 2018 (WHO/CDS/NTD/PCT/2019.03). Geneva: World Health Organization; 2019 <https://apps.who.int/iris/handle/10665/325121>

⁸ Report of the 3rd global scientific meeting on trachoma, Johns Hopkins University, Baltimore (MA), 19–20 July 2010. World Health Organization, Geneva, 2010.

⁹ World Health Organization. (2026, March 4). *Trachoma*. Who.int; World Health Organization. <https://www.who.int/news-room/factsheets/detail/trachoma?utm>

¹⁰ Ebert CD, Ngondi J, Emerson PM, et al. Impact of a School Trachoma Program Emphasizing Facial Cleanliness and Environmental Improvement in Oromia, Ethiopia. *American Journal of Tropical Medicine and Hygiene*. 2024;111(3 Suppl):114–121.

¹¹ Stocks ME, Ogden S, Haddad D, Addiss DG, McGuire C, Freeman MC. Effect of Water, Sanitation, and Hygiene on the Prevention of Trachoma: A Systematic Review and Meta-Analysis. *PLoS Medicine*. 2014;11(2):e1001605.

Evidence supporting the need for SAFE interventions is generated through population-based surveys. These include baseline surveys and trachoma impact surveys (TIS) conducted after one or more years of interventions to gauge whether the S and A components of SAFE should be continued or can be safely stopped. Once elimination thresholds have been reached, trachoma surveillance surveys (TSS) are used to determine whether a TF prevalence <5% has been sustained.

Global progress

The global program has made significant progress toward trachoma EPHP. In 2002, an estimated 1.5 billion people qualified for the A, F, and E components of SAFE,¹² and 7.6 million people needed surgery to prevent blindness from TT. As of March 2026, this has dropped to 92 million people living in areas qualifying for A, F, and E for trachoma elimination purposes, a 95% reduction, and only 1.2 million people require surgery, an 85% decrease. Over 80% of the remaining global TT burden is concentrated in just ten countries. Ethiopia continues to bear the highest burden of disease, accounting for 36% of TT cases. In 2024 alone, 87,349 TT surgeries were performed and 44 million people received azithromycin. In 2009, it was noted that 56 countries were endemic for trachoma.¹³ As of April 2026, 30 countries were validated as having achieved trachoma EPHP. WHO's African region remains the most trachoma-affected region, with 20 countries still known to require interventions as of April 2025.¹⁴

In WHO's Region of the Americas, there is evidence of trachoma as a public health problem in 4 countries. In several others, efforts are ongoing to determine the trachoma burden.¹⁵ The Trachoma Elimination Initiative in the Americas, implemented by trachoma-endemic and trachoma-suspected Member States in collaboration with the Pan American Health Organization (PAHO), with support from the Government of Canada, has contributed to regional progress toward trachoma EPHP. It operates through context-specific technical cooperation in 12 countries, with a strong focus on surveillance and evidence generation through standardized assessments and protocols, supporting countries advancing validation dossiers, and reinforcing the sustainability of achievements, including post-validation surveillance in Mexico. The initiative also promotes integrated delivery models and community engagement, while incorporating equity, gender, and intercultural approaches. Notwithstanding these advances, persistent operational and financial constraints—compounded by difficult geographic access and country-level instability—underscore the need for sustained strategic investment, robust surveillance systems, and adaptive, evidence-informed approaches to consolidate EPHP across the region.

Validation

Validation is the process by which WHO confirms that a country has achieved trachoma EPHP and has the capacity to sustain those gains over time. Under WHO's standard operating procedures,¹⁶ countries are eligible to request validation when all three criteria for EPHP have been met.¹⁷ There are three modalities for validation dossier development: working groups led by health ministries, workshops, and consultant-supported processes.^{18,19} Countries that have submitted a validation dossier have distilled key lessons learned for a successful and streamlined process. Preparing data early is essential. Where data gaps exist, countries should be prepared to conduct additional data collection, generating the required evidence to substantiate trachoma EPHP. Dossier development must also be sufficiently financed through national resources.

Challenges

Persistent and recrudescence trachoma

Despite progress, endgame challenges affect efforts at the last mile and require additional operational research to inform programmatic decisions. In 2021, these challenges were more formally defined. There are populations where elimination thresholds for the TF indicator have not been achieved despite years of intensive interventions. This is termed persistent TF, defined as the epidemiological situation in an evaluation unit with at least two TIS with TF prevalence $\geq 5\%$, without the prevalence of TF ever having been below 5%. In other areas, TF has returned above the elimination threshold after stopping interventions based on

¹² WHO. (2026, January 6). *Global population requiring interventions against trachoma falls below 100 million for the first time*. Who.int; World Health Organization: WHO. <https://www.who.int/news/item/06-01-2026-global-population-requiring-interventions-against-trachoma-falls-below-100-million-for-the-first-time>

¹³ Burton, M. J., & Mabey, D. C. (2009). The global burden of trachoma: a review. *PLoS neglected tropical diseases*, 3(10), e460. <https://doi.org/10.1371/journal.pntd.0000460>

¹⁴ World Health Organization. *WHO Alliance for the Global Elimination of Trachoma: progress report on elimination of trachoma, 2024–2025*. *Weekly Epidemiological Record*. 2025;100(29–30):285–302

¹⁵ World Health Organization. *WHO Alliance for the Global Elimination of Trachoma: progress report on elimination of trachoma, 2024–2025*. *Weekly Epidemiological Record*. 2025;100(29–30):285–302

¹⁶ World Health Organization. (2016). *Validation of Elimination of Trachoma as a Public Health Problem*. World Health Organization.

¹⁷ World Health Organization. (2016). *Validation of Elimination of Trachoma as a Public Health Problem*. World Health Organization. pp. 4–5

¹⁸ RTI International (2018). *Validating Elimination of Trachoma and Lymphatic Filariasis: Lessons Learned for Dossier Development*, URL: <https://www.ntdtoolbox.org/toolbox-search/validating-elimination-trachoma-and-lymphatic-filariasis-lessons-learned-dossier>

¹⁹ RTI International (2024). *Navigating the Path to Elimination: Lessons from Lymphatic Filariasis and Trachoma Dossiers*. URL: <https://www.ntdtoolbox.org/dossier-lessons-learned>

results of TIS. Known as recrudescence TF, this refers to the epidemiological situation in an evaluation unit with at least one TSS with TF $\geq 5\%$.²⁰

Persistent TF has been found in at least 12 countries worldwide, and is especially evident in Ethiopia.²¹ Specifically, in Amhara there had been signs that TF prevalence was not as responsive to interventions as expected. Data from randomized controlled trials, as well as serial TIS, have demonstrated that TF prevalence in the region dropped initially in response to MDA, but those decreases were slow. Some districts (evaluation units) failed to reach a TF prevalence $< 30\%$ after a decade or more of MDA and other interventions.^{22,23,24} Over the last 10 years the trachoma control program in Amhara has worked to better understand contributors to persistent TF through development and widespread use of two complementary indicators—*C. trachomatis* infection and serology, as well as MDA coverage surveys, focusing on key populations (infants), and monitoring population genetics and antimicrobial resistance through whole genome sequencing and other techniques.^{25,26,27,28,29,30} Complementary indicators have become important tools to better understand evaluation units experiencing persistent and recrudescence TF, and are now used in conjunction with TF to make MDA start/stop decisions.

Among districts experiencing recrudescence TF, the Amhara program has demonstrated that many districts with a TF $\geq 5\%$ at TSS tend to have a TF prevalence between 5–10%, possibly due to sampling variability rather than true return of transmission.³¹ In two recrudescence districts, a strategy of *Wait and Watch* allowed the program to opt for additional monitoring with complementary indicators of transmission rather than restart MDA campaigns.³² This strategy may be useful for other districts experiencing recrudescence TF. Addressing persistent and recrudescence TF is necessary to reach trachoma elimination by 2030.

Pediatric TT

Pediatric TT—TT among children under 15 years of age—is rare globally and poorly characterized clinically and within surveillance systems.^{33,34} However, in 2023–2025, in South Sudan—Jonglei State and the Greater Pibor Administrative Area (GPAA)—over 170 pediatric TT cases were detected during surgical outreach campaigns.³⁵ To further characterize this phenomenon, the trachoma elimination program in South Sudan enrolled children ages 1–14 presenting with suspected TT during two surgical camps in Pibor County, GPAA into a cross-sectional study. Within that study, 32 cases of pediatric TT were confirmed by a sur-

²⁰ World Health Organization. Informal consultation on end-game challenges for trachoma elimination, Task Force for Global Health, Decatur, United States of America, 7–9 December 2021. 2022

²¹ Renneker, K. K., Emerson, P. M., Hooper, P. J., & Ngondi, J. M. (2022). Forecasting the elimination of active trachoma: An empirical model. *PLOS Neglected Tropical Diseases*, 16*(7), e0010563. <https://doi.org/10.1371/journal.pntd.0010563>

²² Ngondi J, Gebre T, Shargie EB, Adamu L, Ejigsemahu Y, Teferi T, Zerihun M, Ayele B, Cevallos V, King J, Emerson PM. Evaluation of three years of the SAFE strategy (Surgery, Antibiotics, Facial cleanliness and Environmental improvement) for trachoma control in five districts of Ethiopia hyperendemic for trachoma. *Trans R Soc Trop Med Hyg*. 2009 Oct;103(10):1001–10.

²³ King JD, Teferi T, Cromwell EA, Zerihun M, Ngondi JM, Damte M, Ayalew F, Tadesse Z, Gebre T, Mulalew A, Karie A, Melak B, Adugna M, Gessesse D, Worku A, Endashaw T, Admassu Ayele F, Stoller NE, King MR, Mosher AW, Gebregabher T, Haileysus G, Odermatt P, Utzinger J, Emerson PM. Prevalence of trachoma at sub-district level in Ethiopia: determining when to stop mass azithromycin distribution. *PLoS Negl Trop Dis*. 2014 Mar 13;8(3):e2732.

²⁴ Keenan JD, Tadesse Z, Gebresilasie S, Shiferaw A, Zerihun M, Emerson PM, Callahan K, Cotter SY, Stoller NE, Porco TC, Oldenburg CE, Lietman TM. Mass azithromycin distribution for hyperendemic trachoma following a cluster-randomized trial: A continuation study of randomly reassigned subclusters (TANA II). *PLoS Med*. 2018 Aug 14;15(8):e1002633.

²⁵ Nash SD, Stewart AEP, Zerihun M, Sata E, Gessese D, Melak B, Endashaw T, Chanyalew M, Chernet A, Bayissasse B, Moncada J, Lietman TM, Emerson PM, King JD, Tadesse Z, Callahan EK. Ocular Chlamydia trachomatis Infection Under the Surgery, Antibiotics, Facial Cleanliness, and Environmental Improvement Strategy in Amhara, Ethiopia, 2011–2015. *Clin Infect Dis*. 2018 Nov 28;67(12):1840–1846.

²⁶ Nash SD, Astale T, Nute AW, Bethea D, Chernet A, Sata E, Zerihun M, Gessese D, Ayenew G, Ayele Z, Melak B, Haile M, Zeru T, Tadesse Z, Arnold BF, Callahan EK, Martin DL. Population-Based Prevalence of Chlamydia trachomatis Infection and Antibodies in Four Districts with Varying Levels of Trachoma Endemicity in Amhara, Ethiopia. *Am J Trop Med Hyg*. 2021 Jan;104(1):207–215.

²⁷ Astale T, Sata E, Zerihun M, Nute AW, Stewart AEP, Gessese D, Ayenew G, Melak B, Chanyalew M, Tadesse Z, Callahan EK, Nash SD. Population-based coverage survey results following the mass drug administration of azithromycin for the treatment of trachoma in Amhara, Ethiopia. *PLoS Negl Trop Dis*. 2018 Feb 16;12(2):e0006270.

²⁸ Nash SD, Chernet A, Astale T, Sata E, Zerihun M, Nute AW, Jensen KA, Gessese D, Ayele Z, Melak B, Haile M, Zeru T, Tadesse Z, Kelly Callahan E. Population-Based Prevalence of Ocular Chlamydia trachomatis Infection among Infants in the Trachoma Endemic Amhara Region, Ethiopia. *Am J Trop Med Hyg*. 2021 Oct 25;106(1):62–65.

²⁹ Pickering H, Chernet A, Sata E, Zerihun M, Williams CA, Breuer J, Nute AW, Haile M, Zeru T, Tadesse Z, Bailey RL, Callahan EK, Holland MJ, Nash SD. Genomics of Ocular Chlamydia trachomatis After 5 Years of SAFE Interventions for Trachoma in Amhara, Ethiopia. *J Infect Dis*. 2022 Mar 15;225(6):994–1004.

³⁰ Harte AJ, Ghasemian E, Pickering H, Houghton J, Chernet A, Sata E, Yismaw G, Zeru T, Tadesse Z, Callahan EK, Nash SD, Holland MJ. Unravelling Chlamydia trachomatis diversity in Amhara, Ethiopia: MLVA-ompA sequencing as a molecular typing tool for trachoma. *PLoS Negl Trop Dis*. 2024 Apr 25;18(4):e0012143.

³¹ Sata E, Presley NA, Le P, Nute AW, Ayele Z, Shiferaw A, Gessese D, Chernet A, Melak B, Gonzalez TA, Jensen KA, Dawed AA, Zeru T, Tadesse Z, Callahan EK, Nash SD. Correlates of Trachoma Recrudescence: Results from 51 District-Level Trachoma Surveillance Surveys in Amhara, Ethiopia. *Trop Med Infect Dis*. 2024 Dec 5;9(12):298.

³² Sata E, Seife F, Ayele Z, Murray SA, Wickens K, Le P, Zerihun M, Melak B, Chernet A, Jensen KA, Gessese D, Zeru T, Dawed AA, Debebe H, Tadesse Z, Callahan EK, Martin DL, Nash SD. Wait and watch: A trachoma surveillance strategy from Amhara region, Ethiopia. *PLoS Negl Trop Dis*. 2024 Feb 22;18(2):e0011986.

³³ Solomon, A. W., Burton, M. J., Gower, E. W., et al. (2022). Trachoma. *Nature Reviews Disease Primers*, 8, 32. <https://doi.org/10.1038/s41572-022-00359-5>

³⁴ King, J. D., Ngondi, J., Gatpan, G., Lopidia, B., Becknell, S., et al. (2008). The burden of trachoma in Ayod County of Southern Sudan. *PLoS Neglected Tropical Diseases*, 2(9), e299. <https://doi.org/10.1371/journal.pntd.0000299>

³⁵ Sanders, A., Abony, M., Callahan, B., Nyibong, A., & Bol, Y. Y. (2024). Ensuring safety for children with trachomatous trichiasis: Experiences from South Sudan. *Community Eye Health*, 36(121), 24–25.

geon, with children ranging from ages 3 to 14 years. Of these confirmed cases, 94% had major TT (five or more lashes touching the globe), 66% presented with corneal opacity, and 12% had eyelids that could not be everted due to severe entropion. Ongoing work includes serologic testing and photographic grading to characterize patients' exposure history and disease progression. All 32 pediatric TT cases were detected through self-referral, suggesting a significantly under-documented burden of pediatric TT and highlighting the need for population-level epidemiological studies and case detection in South Sudan. The extensive efforts required to identify, evaluate, and provide surgery for these children demonstrate both the severity of unmet need and the critical importance of scaling up access to specialized, vision-saving trichiasis surgery, usually under general anesthesia, for pediatric patients.

Insecurity

Insecurity across trachoma-endemic countries is an increasing threat to elimination requiring adapted interventions. In certain contexts, whole regions or districts require an adapted approach. In others, special populations require tailored programs to ensure equitable access to trachoma interventions. These populations can include, but are not limited to, refugees, internally displaced persons (IDPs), and indigenous and nomadic populations. Adaptations to programmatic surveys, MDAs, and surgery provide examples of how national programs have implemented these activities in insecure settings or in regions with nomadic populations.³⁶ Many lessons learned by national programs have been documented in the recently published International Coalition for Trachoma Control (ICTC) Special Populations Toolkit.³⁷ Key takeaways include:

- *Feasibility:* Trachoma surveys, MDA, and TT surgery can be implemented in insecure and challenging contexts when programs adapt approaches to local conditions.
- *Preparation:* Detailed micro-planning and scenario-based decision making are essential to ensuring programs are ready when access becomes available.
- *Localization:* Engaging local stakeholders is key to tailoring interventions based on community knowledge, local realities, and trusted relationships.
- *Flexibility:* Flexible and iterative planning, with clear decision gates and risk mitigation strategies, allows programs to adapt activities to changing security conditions, access constraints, and community needs.
- *Time and Money:* Activities in insecure settings often take longer and require additional resources for transportation, security, logistics, and staffing.
- *People First:* The safety and security of staff, volunteers, and communities is the highest priority. Programs should be prepared to suspend activities when there is an unacceptable risk.

Strategies to address challenges

Enhanced interventions

New approaches to the A component of the SAFE strategy may yield more effective results in addressing challenges related to persistent and recrudescing TF. Mathematical models, and lack of other proven interventions, suggest that in the most severely affected locations more frequent than annual MDA might be required.³⁸ Proving biannual MDA is superior to annual MDA after several years has been difficult. Further operational research is needed to ensure robust evaluation of more frequent than annual MDA, including strengthened monitoring of implementation, coverage, and impact. However, biannual MDA reduces infection more rapidly than annual MDA, and quarterly MDA is more effective than annual MDA.^{39, 40}

Recent surveys in Amhara suggest that 10-20 districts may require more frequent than annual MDA to achieve elimination within the next 5 years.⁴¹ Through randomized control trials, the program tested biannual treatment and strategies targeting young children, including the Child MDA strategy targeting the whole community followed by a second MDA offered to children

³⁶ Sanders AM, Abdalla Z, Elshafie BE, Nute AW, Long EF, Aziz N, Weiss P, Callahan EK, Nash SD. Prevalence of trachoma within refugee camps serving South Sudanese refugees in White Nile State, Sudan: Results from population-based surveys. *PLoS Neglected Tropical Diseases*. 2019;13(6):e0007491.

³⁷ International Coalition for Trachoma Control (ICTC). (2025). *Delivering trachoma interventions to special populations: A toolkit for program managers*. <https://www.trachomacoalition.org/resources/delivering-trachoma-interventions-to-special-populations-a-toolkit-for-program-managers>

³⁸ Lietman T, Porco T, Dawson C, Blower S. Global elimination of trachoma: how frequently should we administer mass chemotherapy? *Nature Medicine*. 1999;5(5):572-6.

³⁹ House JJ, Ayele B, Porco TC, et al. Assessment of herd protection against trachoma due to repeated mass antibiotic distributions: a cluster-randomised trial. *Lancet*. Mar 28 2009;373(9669):1111-8.

⁴⁰ Lietman TM, Ayele B, Gebre T, et al. Frequency of Mass Azithromycin Distribution for Ocular Chlamydia in a Trachoma Endemic Region of Ethiopia: A Cluster Randomized Trial. *Am J Ophthalmol*. Jun 2020;214:143-150. doi:10.1016/j.ajo.2020.02.019

⁴¹ Nash SD, Sata E, Chernet A, et al. The Epidemiology of Ocular Chlamydia trachomatis Infection within Districts Persistently Endemic for Trachoma in Amhara, Ethiopia. *Am J Trop Med Hyg*. Sep 3 2024;111(3_Suppl):105-113. doi:10.4269/ajtmh.23-0876

4 weeks later.^{42,43} The program worked with Ethiopia's Ministry of Health to start scaling Child MDA treatment in districts with persistent TF.⁴⁴ While more frequent than annual MDA is a promising approach, and could prove cost-effective in shortening intervention years, questions remain around feasibility, given the insecurity and remote nature of many districts that still have a TF prevalence $\geq 5\%$.

Recent randomized control trials have tested new and innovative approaches for the F and E components of SAFE. Both trials, the WASH Upgrades for Health in Amhara (WUHA) trial and the Stronger SAFE trial, were conducted in Ethiopia. The WUHA trial was a cluster-randomized trial conducted in 40 rural communities in Amhara, in populations that previously received 7 years of annual MDA for trachoma.⁴⁵ The 20 communities randomized to the intervention arm received an integrated WASH intervention with school-based (i.e., primary school hygiene curriculum), community-based (i.e., community water point, home visits from hygiene promotion workers), and household-based (i.e., household wash stations, soap provision, educational hygiene book) components. The 20 control communities received ongoing government services, but no additional hygiene promotion as part of the study. MDA was not performed over the initial 3 years, but both intervention and control communities received 6 rounds of azithromycin MDA over the final 6 years.

Results showed significantly improved hygiene infrastructure and behaviors in the intervention arm, including increased face-washing with soap and latrine use, though behavioral changes were slow and of limited magnitude. *C. trachomatis* infection among 0–5-year-old children increased in both arms over the initial 3 years without MDA (from approximately 11% to approximately 32% in each arm) and decreased in both arms over the final 6 years of the study with MDA (final prevalence was approximately 3%). The prevalence of *C. trachomatis* infection among 0–5-year-olds and 6–9-year-olds was not different between the treatment arms in either study period.⁴⁶ These results suggest that WASH interventions, even when inducing meaningfully changed hygiene behaviors, may have a limited impact on trachoma in hyperendemic settings over the studied timeframe. In these settings, WASH interventions may not be the most cost-effective way to bring about trachoma elimination. Continued antibiotic MDA will likely be needed for trachoma elimination.

The Stronger SAFE trial was an open-label, cluster randomized controlled trial conducted in the trachoma-endemic region of Oromia.⁴⁷ Sixty-eight clusters, each approximately 90 households, were randomly assigned to (1) standard A plus standard F and E (Standard SAFE; control group), (2) standard A plus enhanced F and E, (3) enhanced A plus standard F and E, or (4) enhanced A plus enhanced F and E (Stronger SAFE group). Standard A consisted of annual, single-dose, azithromycin MDA. Enhanced A included two height-based doses of oral azithromycin (equivalent to 20 mg/kg) given as single doses in two MDA campaigns, 2 weeks apart, annually. Standard F and E involved promotion of latrine construction and facial hygiene, whereas enhanced F and E used additional fly control measures (permethrin-treated headwear and odor-baited traps)^{5,6} and a household-level, facial hygiene behavior change intervention.¹⁸ Interventions were implemented and reinforced over 3 years.

Although there was substantial reduction in *C. trachomatis* infection and TF in all arms, enhanced A, F, and E (Stronger SAFE) had no additional effect compared with standard of care on reducing the prevalence of conjunctival *C. trachomatis* infection at 3 years.¹⁹ Importantly, double-dose MDA had no additional impact over single-dose MDA. The results of this trial suggest that, in this setting, the Stronger SAFE intervention measures are unlikely to accelerate trachoma elimination. The enhanced intervention increased face washing with soap but had a smaller effect on overall face-washing prevalence. The hygiene behavior change potential will likely remain limited in water-scarce settings without strengthened WASH systems. Although face washing may reduce *C. trachomatis* on faces, it rarely fully removes *C. trachomatis*. Even with sizeable behavior change, there remains limited evidence of efficacy of the F component of SAFE.

Together, the results of these trials emphasize the critical need for further research into the interplay between SAFE components. Integrating water insecurity monitoring into programmatic surveillance could help target and evaluate facial cleanliness inter-

⁴² Gebre T, Ayele B, Zerihun M, Genet A, Stoller NE, Zhou Z, House JI, Yu SN, Ray KJ, Emerson PM, Keenan JD, Porco TC, Lietman TM, Gaynor BD. Comparison of annual versus twice-yearly mass azithromycin treatment for hyperendemic trachoma in Ethiopia: a cluster-randomised trial. *Lancet*. 2012 Jan 14;379(9811):143–51. doi: 10.1016/S0140-6736(11)61515-8. Epub 2011 Dec 20. PMID: 22192488.

⁴³ Melo JS, Aragie S, Chernet A, Tadesse Z, Dagnew A, Hailu D, Haile M, Zeru T, Wittberg DM, Nash SD, Callahan EK, Arnold BF, Porco TC, Lietman TM, Keenan JD. Targeted Antibiotics for Trachoma: A Cluster-Randomized Trial. *Clin Infect Dis*. 2021 Sep 15;73(6):979–986.

⁴⁴ Jesudason T, Ahmed S, Turner HC, Sata E, Shiferaw A, Demmelash T, Abebe A, Sanon A, Callahan EK, Jensen KA, Nash SD. The Cost of Annual and More Frequent Than Annual Mass Drug Administration for Trachoma in Two Districts in Amhara, Ethiopia. *Am J Trop Med Hyg*. 2026 Jan 20;114(3):445–452.

⁴⁵ Aragie S, Tadesse W, Dagnew A, Hailu D, Dubie M, Wittberg DM, Melo JS, Haile M, Zeru T, Freeman MC, Nash SD, Callahan EK, Tadesse Z, Arnold BF, Porco TC, Lietman TM, Keenan JD. Changing hygiene behaviors: a cluster-randomized trial, Ethiopia. *Bull World Health Organ* 2021; 99:762–772A. PMID: PMC8542271.

⁴⁶ Aragie S, Wittberg DM, Tadesse W, Dagnew A, Hailu D, Chernet A, Melo JS, Aiemojoy K, Haile M, Zeru T, Tadesse Z, Gwyn S, Martin DL, Arnold BF, Freeman MC, Nash SD, Callahan EK, Porco TC, Lietman TM, Keenan JD. Water, sanitation, and hygiene for control of trachoma in Ethiopia: a two-arm, parallel-group, cluster-randomized trial. *Lancet Glob Health* 2022; 10:e87–95. PMID: PMC9360557.

⁴⁷ A. Last, O. Shafi Abdurahmans, K. Greenland, A. Robinson, C. Collin, A. Czerniewska, E. Sinba Etu, B. Versteeg, R. Butcher, M. Guye, D. Legesse, K. Temam Nur, G. Shuka, M. Haji-Mohammed Yusuf, G. Dheressa, G. Dumessa, M. Akalu, M. Tadesse, D. Adugna Kumsa, F. Seife Gebretsadik, A. Abashaw, E. Habtamu, V. Sarah, W. Alemayehu, A.W. Solomon, H.A. Weiss, J.G. Logan, David Macleod, Matthew J. Burton. Cluster randomised controlled trial of double-dose azithromycin mass drug administration, facial cleanliness and fly control measures for trachoma control in Oromia, Ethiopia: The Stronger SAFE trial protocol. *BMJ Open*, 2024, 14:e084478.

ventions, alongside strengthening WASH systems. Sustainable elimination might require the optimization of SAFE alongside multi-sectoral collaboration to improve structural determinants including poverty, insecurity, and housing conditions, as well as novel interventions, including *C. trachomatis* vaccines.

Population-level diagnostics

Reaching the last mile of trachoma elimination requires innovative approaches, such as the incorporation of complementary diagnostic indicators in trachoma surveillance. Decades of research have examined how clinical grading, conjunctival *C. trachomatis* infection, and more recently, serological responses, relate across transmission settings.^{48,49} Early studies from Ethiopia,⁵⁰ Nepal,⁵¹ and Tanzania⁵² demonstrate how these indicators respond differently to MDA. Infection often declines rapidly after treatment while TF and antibody responses persist longer. Building on these findings and additional operational research in diverse settings, a global collaboration of researchers and stakeholders formed to determine whether decision thresholds could be developed for complementary indicators to guide programmatic action. Surveys incorporating complementary indicators can be thought of as diagnostic tests at the population level, with estimated antibody seroconversion rates (SCR) measured via Pgp3 serology or Ct infection prevalence via PCR informing action needed or no action needed decisions among target populations.

To create a decision framework for serology, experts classified 48 evaluation units (n=63,911 children) as action needed or no action needed populations, based on multiple metrics. In models constructed with uninformative prior, the posterior probability that no further action is needed exceeds 90% when $SCR \leq 1.6$ per 100 person-years, while $SCR \geq 3.8$ corresponds to 90% certainty that action is needed. The approach used for serology was extended to PCR using 86 surveys classified by 41 experts, yielding analogous thresholds of $\leq 0.8\%$ and $\geq 2.0\%$ PCR prevalence. Limitations with this framework include reliance on expert judgment to classify reference surveys (though a 2025 re-classification showed near-perfect agreement with original 2023 ratings for SCR), use of a non-random convenience sample of available surveys to define likelihood, and the need for judgment in selecting a certainty level (e.g., 90%) at which to set thresholds. The method generalizes to other assays and decision categories (including elimination of transmission), and future work will integrate multiple biomarkers and prospectively validate model predictions through repeated surveys. WHO is working on guidance for programmatic use of these two complimentary indicators.⁵³

Field-deployable diagnostic tools are in development for incorporation into trachoma surveillance. Drugs & Diagnostics for Tropical Diseases is finalizing development of a dipstick test to detect human antibodies specific for Pgp3. The test is based on a prototype elaborated by the US Centers for Disease Control and Prevention (CDC), with modifications to improve ease of use and stability upon shipment/storage. The dipsticks are meant for laboratory use, using dried blood spots as a matrix, and should be run in a 96-well plate. Eighty thousand prototypes were delivered in the first quarter of 2026 and validated by CDC. Users in 5 African countries were trained in view of local laboratory evaluations of the tests. Exploratory work is ongoing on a multiplexed bead assay format, to leverage a format already extensively validated at CDC.

Pediatric TT approaches

The discovery of pediatric TT cases at surgical camps likely represents the tip of the iceberg. The findings of the cross-sectional study underscore the substantial work remaining in hard-to-reach areas where consistent SAFE interventions have been limited despite known or suspected high TF prevalence. The control program in South Sudan is working hard to roll out the SAFE strategy throughout Jonglei and GPAA. This may include more frequent than annual MDA in the highest prevalence counties. As population-level TIS are conducted in these areas, special attention should be paid to detecting TT among the youngest participants.

In 2025–2026, the control program in South Sudan, working with Buluk hospital in Juba and other partners, began delivering pediatric TT surgery to children identified in the surgical camps. Though logistically challenging, this approach proved successful in delivering the needed surgeries. Treating patients for pediatric TT requires not only skilled TT surgeons but also trained pediatric anesthesiologists. This additional specialization requirement is a core challenge to meeting the needs of all patient

⁴⁸ Ramadhani AM, Derrick T, Macleod D, Holland MJ, Burton MJ. The Relationship between Active Trachoma and Ocular Chlamydia trachomatis Infection before and after Mass Antibiotic Treatment. *PLoS Negl Trop Dis*. 2016 Oct 26;10(10):e0005080. doi: 10.1371/journal.pntd.0005080. PMID: 27783678; PMCID: PMC5082620.

⁴⁹ Martin DL, Saboyà-Díaz MI, Abashaw A, Alemayeh W, Gwyn S, Hooper PJ, Keenan J, Kalua K, Szwarcwald CL, Nash S, Oldenburg C, West SK, White M, Solomon AW. The use of serology for trachoma surveillance: Current status and priorities for future investigation. *PLoS Negl Trop Dis*. 2020 Sep 24;14(9):e0008316. doi: 10.1371/journal.pntd.0008316. PMID: 32970672; PMCID: PMC7514076.

⁵⁰ Keenan JD, Lakew T, Alemayehu W, Melese M, House JI, Acharya NR, Porco TC, Gaynor BD, Lietman TM. Slow resolution of clinically active trachoma following successful mass antibiotic treatments. *Arch Ophthalmol*. 2011 Apr;129(4):512–3.

⁵¹ West SK, Munoz B, Mkocha H, Holland MJ, Aguirre A, Solomon AW, et al. Surveillance Surveys for Reemergent Trachoma in Formerly Endemic Districts in Nepal From 2 to 10 Years After Mass Drug Administration Cessation. *JAMA Ophthalmol*. 2017 Nov 1;135(11):1141–1146.

⁵² Gwyn S, Mitchell A, Dean D, Mkocha H, Handali S, Martin DL. Lateral flow-based antibody testing for Chlamydia trachomatis. *J Immunol Methods*. 2018;457:1–8. doi:10.1016/j.jim.2018.02.004.

⁵³ Kamau E, Ante-Testard PA, Gwyn S, et al. Characterizing trachoma elimination using serology. *Nature News*. July 1, 2025. Accessed May 28, 2026. <https://www.nature.com/articles/s41467-025-60581-z>.

groups. This underscores the need for a health systems approach to strengthening surgery programs as the extent of this challenge is more fully understood in South Sudan and elsewhere.

Recommendations

The ITFDE recognizes the achievements of the global trachoma program and recommends the following actions to address challenges in the final stages of EPHP:

- 1) Optimize MDA strategies in persistent trachoma transmission settings. Consider increasing MDA to 4 times annually in high transmission settings to assess and possibly accelerate progress toward trachoma EPHP to meet the 2030 target.
- 2) Prioritize the urgent need to detect and manage pediatric TT. Ensure systematic identification and referral for appropriate care of pediatric TT within current and future health systems structures, programming, and funding efforts.
- 3) Where pediatric TT has been detected, indicating a high force of infection, MDA should begin as soon as possible. More frequent than annual MDA (4 times per year) should be considered.
- 4) Having observed the benefits of complementary indicator data guiding program decision making, apply both serological and Ct detection indicators to improve transmission assessments and inform focused intervention strategies.
- 5) Continue support to WHO to formalize and finalize guidelines on the use of serological and Ct detection indicators and thresholds for programmatic decision-making.
- 6) Advance diagnostic tool development. Support the development and evaluation of appropriate diagnostic tools with consideration of feasibility, deployability, and appropriate use in different trachoma epidemiological settings.
- 7) Adapt “last mile” intervention strategies. Develop specific innovative and adaptive interventions, specifically delivering TT surgery, MDA and WASH, to enhance effectiveness among hard-to-reach populations and in settings experiencing insecurity.
- 8) Continue supporting countries to develop and evaluate post-validation surveillance methodologies and platforms. Address research gaps. Identify and incorporate research questions related to the last mile of trachoma EPHP into ongoing programmatic activities.
- 9) Reassess the relationship between WASH interventions and trachoma, with specific emphasis on government leadership in WASH strategies.
 - Prioritize WASH interventions in at-risk areas, recognizing the central role of government in the required infrastructure development.
 - Continue monitoring WASH progress within the WHO/UNICEF Joint Monitoring Programme (JMP).
 - Continue research to understand local transmission dynamics, including the development of more precise WASH indicators and contributors to transmission.
- 10) Promote integrated surveillance opportunities. Leverage serological platforms, integrated surveys, and other disease program data to inform coordinated interventions and improve efficiency.
- 11) Mobilize sustainable national investments. Promote country-led efforts to examine opportunities for domestic resource mobilization.
- 12) Sustain research and development for vaccines. Maintain investment in the development of a vaccine for conjunctival *C. trachomatis* infection, recognizing its potential role in addressing residual transmission, and the additional benefit towards sexually transmitted chlamydia.

How to obtain the WER through the Internet

- (1) WHO WWW server: Use WWW navigation software to connect to the WER pages at the following address:
<http://www.who.int/wer>
- (2) An e-mail subscription service exists, which provides by electronic mail the table of contents of the *Weekly Epidemiological Record* (WER). To subscribe, please go to the home page of the WER and click on “Subscribe to the WER mailing list” or go directly to <https://confirmsubscription.com/h/d/4759AAD079391CCC>. A request for confirmation will be sent in reply.