REPORT OF THE 21ST MEETING OF THE WHO ALLIANCE FOR THE GLOBAL ELIMINATION OF

TRACHOMA BY 2020

GENEVA, SWITZERLAND, 20–22 APRIL 2017

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The Alliance thanks Victor V. Florea for his work as meeting rapporteur, and Karen Ciceri-Reynolds, Anthony W. Solomon and Patrick Tissot for report editing and design

Abbreviations and acronyms

DFID	Department for International Development
ESPEN	Expanded Special Project for Elimination of Neglected Tropical Diseases
ITI	International Trachoma Initiative
MDA	mass drug administration
NTD	neglected tropical disease
SAFE	Surgery, Antibiotics, Facial cleanliness, Environmental improvement
TEMF	Trachoma Elimination Monitoring Form
TF	trachomatous inflammation–follicular
USAID	United States Agency for International Development
WASH	water, sanitation and hygiene
WHO	World Health Organization

Introduction

The 21st meeting of the World Health Organization (WHO) Alliance for the Global Elimination of Trachoma by 2020 (GET2020) took place at the InterContinental Hotel Geneva, Switzerland, from 20–22 April 2017, as part of the 2017 Neglected Tropical Disease (NTD) Summit jointly hosted by the World Health Organization and Uniting to Combat Neglected Tropical Diseases.

Dr Dirk Engels, Director, Department of Control of NTDs, WHO, welcomed participants to Geneva and congratulated the Alliance on the progress being made towards the GET2020 target (*1*). He noted that the stage was set for going to full scale. This was attributable in part to the work of the Global Trachoma Mapping Project (*2*), which was a massive effort to understand the epidemiology of trachoma worldwide, and served as a model for efforts to map other NTDs (*3*). Further evidence of hard work by members of the Alliance could be found in the success of several countries—Oman, Morocco and Mexico by the date of the meeting's opening—in being validated as having eliminated trachoma as a public health problem. Other countries were making progress, he noted, and more countries were expected to undergo validation in 2017 and beyond (*1*).

Dr Anthony Solomon, Medical Officer, Department of Control of NTDs, WHO, nominated Chairs and officers for the meeting, who were then confirmed by the Alliance by acclamation. He thanked the Task Force for Global Health; United States Agency for International Development; and Uniting to Combat NTDs for their contributions to staging the meeting. Dr Solomon reminded participants that the purpose of the meeting was to monitor progress towards the elimination of trachoma at global level, exchange information and experience on implementation of the SAFE strategy (surgery, antibiotics, facial cleanliness and environmental improvement), review partnership opportunities at global, regional and national levels, and discuss obstacles

and barriers to the achievement of the GET2020 goal. Expected outcomes of the meeting were: global monitoring of progress towards the elimination of trachoma; exchange of information on SAFE implementation at global and regional level; refinement of approaches for optimal impact, where possible; identification of opportunities for increased collaboration with efforts against other NTDs; and a report of the meeting to share progress towards the WHA51.11 target (*4*) with all endemic countries and partners.

The agenda (*Annex 1*) and list of participants (*Annex 2*) for the meeting are found at the end of this report.

SESSION 1
Opening

Dr Ren Minghui, Assistant Director-General, HIV/AIDS, Tuberculosis, Malaria and NTDs, WHO, opened the meeting

Trachoma causes blindness in the world's poorest people. Those affected by trachoma typically live in the poorest countries; within those countries they live in the poorest communities; and in those communities, the people who go blind from trachoma are proven to be poorer than their neighbors (*5*). Going blind keeps them poor, and keeps their children poor, too.

Since 1993, WHO has recommended the SAFE strategy to prevent trachoma blindness (*6*). SAFE is an integrated package of interventions, delivered at community level, that prevents blindness from trachoma at multiple stages of its pathogenesis. In 1996, with partners, WHO established the WHO Alliance for GET2020 to help countries use the SAFE strategy to eliminate trachoma as a public health problem (*7*). Dr Ren noted that the April 2017 meeting was the 21st Meeting of the Alliance, and commented that the number of participants in the room suggested that the sense of commitment from its members and their energy to see trachoma eliminated had never been stronger. The fact that this Meeting was being held as part of the multi-disease NTD Summit showed, he felt, the willingness of the Alliance to collaborate externally, create efficiencies, and share knowledge within the broader NTD community.

Thanks to the efforts of the Alliance, Dr Ren noted that trachoma was progressively being eliminated. In 2011, 325 million people were living in areas that required the SAFE strategy (*8*). As of April 2017, that number had dropped to 182 million, a 44% decrease (*9*). Dr Ren felt that this was remarkable progress, and would not have been possible without the steadfast leadership of endemic country health ministries, most of which were represented in the meeting room, and the strong collaboration of civil society, academics and donors. Those donors include the United Kingdom's Department for International Development, who had doubled their commitment to NTDs in an announcement made just prior to the meeting, the Queen Elizabeth Diamond Jubilee Trust, and USAID. The donor group also included Pfizer, which by the date of the meeting had contributed more than 625 million doses of the antibiotic azithromycin (Zithromax®) to trachoma elimination programmes around the world (*10*).

Despite this unprecedented progress, more work was still required to achieve the shared

goal of a trachoma-free world. Dr Ren specified new donors, operational research to refine the way that the SAFE strategy was implemented, and renewed commitment from governments and civil society, as particular priorities (*11-13*). With these ingredients, a world free of blindness from trachoma would be within our reach; without them, he felt that we might lose the incredible gains made over recent years.

Dr Ren welcomed participants to Geneva and to the meeting, wished them every success in their discussions, and pledged WHO's steadfast, ongoing support to ensuring that no-one is left behind as a result of trachoma.

High-level Panel

Mr Bruce Gordon, Coordinator, Water, Sanitation and Hygiene, WHO, introduced the panelists and acted as facilitator for the subsequent discussion. Apologies for being unable to participate in the panel discussion were received from Professor Yifru Berhan Mitke, Minister of Health, Ethiopia; and Dr Marcos Espinal, Director, Communicable Diseases and Health Analysis, Regional Office for the Americas, WHO.

Dr Mahmoud Fikri, Regional Director, Eastern Mediterranean Regional Office, WHO

In 2016, Morocco submitted its dossier for validation of elimination of trachoma as a public health problem, and achieved formal recognition from WHO for having achieved this milestone (*14*). In the Eastern Mediterranean Region, trachoma was still known to be a public health problem in Afghanistan, Egypt, Pakistan, Somalia, Sudan and Yemen. Trachoma mapping has been completed in Yemen; is ongoing in Egypt, Pakistan and Sudan; and is planned for Afghanistan and Somalia. The Islamic Republic of Iran claims to have eliminated trachoma as a public health problem, but has not yet submitted a dossier for formal evaluation by WHO.

Trachoma elimination is prioritized in the 2017–2021 roadmap for WHO's Eastern Mediterranean Region. Intersectoral programmes are being used to improve water supplies and sanitation, and to provide eye care, including trichiasis surgery. It is important that countries meeting their trachoma elimination targets continue to receive support for post-validation surveillance, and that interventions are scaled up in countries where trachoma remains a public health problem. Countries with low burdens of trachoma must be prepared to conduct impact and pre-validation surveillance surveys.

Dr Mark Jacobs, Director, Division of Communicable Diseases, Western Pacific Regional Office, WHO

Cambodia, China and Lao People's Democratic Republic all claim to have eliminated trachoma as a public health problem. Fiji, Kiribati, Solomon Islands and Vanuatu are making progress toward trachoma elimination through implementation of the SAFE strategy. Solomon Islands and Vanuatu did their first round of antibiotic mass drug administration (MDA) between 2015 and 2016 (*1*), and intend to undertake impact surveys in 2017. Kiribati (*15, 16*) plans to undertake its first round of antibiotic MDA in 2017. Solomon Islands and Vanuatu are known to have populations that are co-endemic for trachoma and yaws (*17–19*), so it is anticipated that the provision of azithromycin will reduce the prevalence of both diseases (*20*); the effect will be closely measured. Australia and Viet Nam are implementing targeted MDA in trachoma-endemic populations (*1*). Papua New Guinea implemented baseline surveys for trachoma in 2016 (*21*) and is expected to move forward with MDA in endemic districts. Nauru is suspected of having trachoma but has not yet started a programme.

It is important that there is good communication between WHO and various partners providing direct support to the countries in the Western Pacific Region. There has been limited support to date for the water, sanitation and hygiene (WASH) components of the SAFE strategy. Efforts are being made to encourage multisectoral approaches in a number of countries, in order to strengthen WASH delivery (*22*). It is important that sight is not lost of what happens after a formerly-endemic country succeeds in eliminating trachoma as a public health problem. Without post-validation surveillance, the disease could potentially become re-established, as seen previously with measles. In addition, trachoma elimination does not necessarily mean that the risk of chronic morbidity has been removed. Individuals who have received operations for trichiasis will require follow-up for several more years, and efforts need to be made to detect incident cases, too (*23*).

Dr Ren Minghui

The day is approaching when global elimination of trachoma will become a reality. More countries will reach their trachoma elimination targets (*23*), and national trachoma programmes will face new challenges related to surveillance (*24*). In the post-validation phase, there is risk that donors may leave and investments from governments may disappear as trachoma will no longer be an immediate concern.

Governments must be prepared to facilitate integration of public health programmes, provide leverage for common public health interventions and address challenges relating to broader public health issues such as the development of universal health care coverage. It will be especially challenging for governments to coordinate efforts among the many players involved.

Dr Matshidiso Moeti, Regional Director, WHO Regional Office for Africa, WHO.

The African Region is set to make considerable progress towards the elimination of trachoma in the next few years. Trachoma elimination is now a part of the remit of the Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN), a five-year project launched in May 2016 to provide national NTD programmes with technical and fundraising support to accelerate the control and elimination of the five NTDs whose management strategy employs mass drug administration or preventive chemotherapy (25). The NTD mapping portal (http://espen.afro.who.int/) was launched as part of ESPEN to enable improved access and use of mapping data, including trachoma data. There has been excellent collaboration between the AFRO mapping initiative and the Global Trachoma Mapping Project. Regional updates should become available on the ESPEN portal as approval from countries is obtained to share data. It is important to note that the African Region is the most affected by trachoma, with 27 of a total of 42 endemic countries located in Africa (*1*). The Region also has the most intensive elimination efforts for trachoma. In 2016, about 250,000 people in Africa had operations for trichiasis and nearly 83 million people were treated with antibiotics for trachoma, both of which represent significant increases from the previous year (*1*). These interventions are hugely beneficial, and relieve people of trachoma-related disability, poverty, and chronic morbidity.

Though trachoma mapping is virtually complete for countries suspected of being endemic for trachoma, thanks to the financial support of partners, improved mapping data are still needed in some countries to target interventions to the populations that need them. With additional support from ESPEN, the WHO Regional Office for Africa hopes to help to complete trachoma mapping in

currently unmapped areas, such as in South Sudan, and to introduce SAFE interventions where required. In 2016, there was a large expansion of SAFE roll-out in 16 countries in Africa (*1*). These interventions reached 40 million people in 277 districts, most of whom were children. Ethiopia has seen a tremendous scale-up of interventions, funded in part through an increase in commitment of domestic resources to support application of the SAFE strategy. Ghana and Gambia have scaled down SAFE implementation and are awaiting formal validation of elimination of trachoma as a public health problem from WHO.

Mr Iain Jones, Department for International Development (DFID), United Kingdom

The United Kingdom is committed to funding antibiotic MDA and some 400,000 surgeries for trichiasis. DFID will also provide specific support to the Coalition for Operational Research on Neglected Tropical Diseases for research and development relevant to trachoma. It is important that partners work to strengthen healthcare systems in trachoma endemic countries, in order to sustain public health interventions and achieve lasting results. It is equally important to ensure that trichiasis surgeries being delivered are of high quality. Moving forward, DFID will evaluate how support for and engagement with trachoma elimination programmes should change with the cessation of MDA, as countries approach their elimination goals. Evaluation will also be required to determine how best to use trachoma metrics in models, supported by case studies on health system strengthening, and quality and access to water and sanitation, in order to inspire domestic governments and other collaborators to continue the fight to eliminate trachoma.

Ms Emily Wainwright, United States Agency for International Development (USAID)

USAID supports MDA and/or trachoma surveys in 19 countries, most of which are in Africa. Partly as a result of this support, in 2016, the number of people receiving antibiotics for trachoma worldwide rose from 56 million to 85 million (*1*). There are several current challenges that USAID foresees. First, as success in some areas becomes documented, communication within and beyond existing stakeholders is important, in order to maximize the visibility of the programme at global level. It is important to show that countries are meeting their elimination goals, as this provides incentives for continued partner support and funding. Second, USAID supports surgical work in three endemic countries. There should be greater emphasis on quality as an integral component of surgery interventions for trichiasis (*26*). Third, it is important that trachoma interventions take advantage of structures that are already in place. For instance, monitoring of interventions for facial cleanliness and environmental improvement can be included within existing WASH monitoring and evaluation frameworks, in order to increase efficiency.

Discussion

Mr Gordon pointed out that many issues had been raised, and invited the audience to engage with the panelists.

The first question asked about the strategy for scaling down in areas where trachoma is no longer a public health problem, and whether any lessons for scaling down could be learned from campaigns to eliminate or eradicate other diseases, such as polio and malaria.

The panel agreed that this question was important. Mr Jones pointed out that health system strengthening and continued disease surveillance would be needed post-validation, in order to ensure that health systems have capacity to sustain the gains made against trachoma. Ms Wainwright reminded participants that interventions against NTDs benefited low-income communities in many ways other than specifically addressing endemicity of disease. Precipitous scale-down could remove community outreach services to the most disadvantaged. Dr Moeti said that it was important to continue to engage the people helping with surveillance, data precision and data quality in the post-elimination phase. Dr Fikri reiterated that disease monitoring must continue for many years as a component of scaling down. Dr Jacobs noted that scaling down occurs in connection with cessation of funding. He said that it is important to have a planned, measured transition from a single disease program to integration within a health system capable of sustaining the impact of previous interventions and able to continue disease monitoring. Dr Ren concluded that we should review our messaging for these processes, to help ensure smooth transitions.

World Health Organization Report

Dr Anthony Solomon, Medical Officer, Department of Control of NTDs, WHO

Highlights for the global programme over the twelve months since the previous (April 2016) meeting of the Alliance were presented:

1. Marked scale-up in interventions against trachoma (*1*) was noted (see below).
2. In June 2016, WHO published its standard operating procedures for validating national elimination of trachoma as a public health problem (*23*).
3. In July 2016, Tropical Data was launched (*27, 28*). This collaboration supports the full trachoma survey process from protocol development to data management and analysis.
4. Also in July 2016, the Alliance published Eliminating Trachoma: Accelerating Towards 2020 (*12*).
5. In August 2016, WHO's Strategic and Technical Advisory Group on NTDS convened a technical consultation to review data generated to date by the "Trachoma Alternative Indicators Study", consider the implications for global policy development on validation of trachoma elimination, and plan further work. No changes were made to current guidelines. The Group requested that national programmes continue to help implement the research agenda (*29*).
6. Also in August, the 2016 Hilton Humanitarian Prize was awarded to the Task Force for Global Health, the parent organization of the International Trachoma Initiative (ITI).
7. In September 2016, more than 300 partners came together to commemorate the 10th anniversary of the USAID NTD Program, which had by that date delivered more than 1.6 billion treatments against NTDs in 31 countries, in the process leveraging US$11.1 billion worth of in-kind donations from the pharmaceutical industry.
8. In October 2016, at its 10th General Assembly in Durban, South Africa, the International Agency for the Prevention of Blindness awarded its Global Partnership Award to the Alliance, in recognition of its remarkable work to eliminate trachoma.
9. October 2016 also saw the launch of a free online course on eliminating trachoma, developed by the International Centre

for Eye Health at the London School of Hygiene & Tropical Medicine.

10. In November 2016, WHO formally validated elimination of trachoma as a public health problem from Morocco (*14*). Validation was then undertaken in Mexico in January 2017 (*30*).
11. In April 2017, the United Kingdom announced a doubling of its support to fight NTDs, including trachoma, over the subsequent five years. The total support package was anticipated to prevent up to 400,000 cases of trachomatous blindness.

In 2017, 69 countries were asked by WHO to submit Trachoma Elimination Monitoring Forms, and 61 countries did so. Of the eight countries that did not, six did not have active trachoma programmes. Forms were still sent to countries that had already been recognized as having eliminated trachoma, in order to help encourage post-validation surveillance and to maintain visibility for data that continue to collect.

Worldwide, 260,759 people with trichiasis received corrective surgery in 2016, a 41% increase from the 185,000 people managed in 2015 (*Figure 1*). Available data showed that 54% of those receiving corrective surgery for trichiasis were female. Women are known to be affected by trichiasis up to four times as often as men (*31, 32*), so these data suggest that in 2016, women were still relatively under-served by trichiasis surgery programmes (*32, 33*).

The number of people given antibiotics for trachoma increased from 56.1 million in 2015 to 85.2 million in 2016. In Ethiopia alone, the number of people given antibiotics for trachoma increased from 32.6 million in 2015 to 47.2 million in 2016. Global antibiotic coverage (the number of people treated divided by the number living in districts that need antibiotic MDA) increased from 30% in 2015 to 45% in 2016 (*1*).

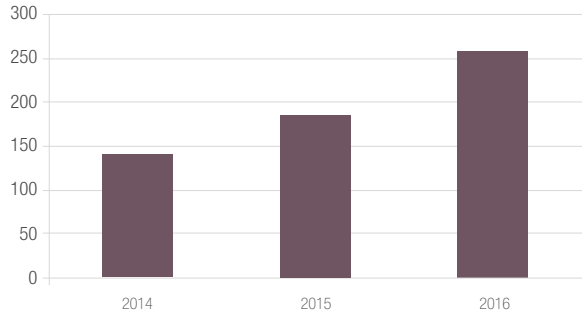

Fig. 1 Number of people operated for trichiasis annually, worldwide, 2014–2016 (thousands)

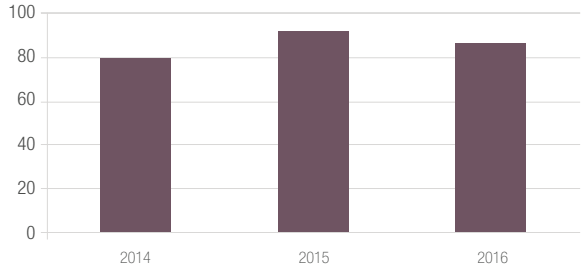

Fig. 2 Number of people given antibiotics for trachoma elimination purposes annually, worldwide, 2014–2016 (millions)

85% of treated districts achieved antibiotic coverage of ≥ 80% in 2016, an increase from 72% of districts achieving ≥ 80% coverage in 2015. Recent data (*34*) support the use of 80% as the minimum acceptable coverage in azithromycin MDA for trachoma.

The number of people living with trichiasis decreased from approximately 3.2 million in 2015 to approximately 2.8 million in 2016. The number of people living in districts in which the most recent estimated prevalence of trachomatous inflammation—follicular (TF) was ≥ 5% (and therefore need treatment with the A, F and E components of SAFE) decreased from 192 million in 2015 to 190 million in 2016 (*1*); preliminary analyses suggested that by April 2017, that number had declined further to < 182 million.

Dr Solomon noted that in the 12 months following the meeting, WHO anticipated receiving completed dossiers claiming elimination of trachoma as a public health problem from several more countries. He

expressed a hope that WHO would be able to validate elimination in these countries and continue to focus the efforts of the Alliance on populations where interventions were still required. It was also anticipated that regional elimination plans would be generated for several regions, detailing the concrete actions to be undertaken by various actors to get rid of trachoma.

Discussion

The first question related to the reasoning for sending TEMFs to countries which were not known to be trachoma-endemic. Dr Solomon said that TEMFS are sent to such countries in order to raise awareness and encourage engagement with global trachoma elimination efforts.

The second question was a request for an opinion as to why the return rate for 2017 TEMFs had been so high. Dr Solomon replied that the TEMF response rate had been very high since 2014, but agreed that this was the highest yet. He said that the TEMF format had been progressively revised to reduce the time required for its completion and to maximize the value of the data collected. Redundant questions had been removed. In addition, integration of the data collection process with the process for requesting donated azithromycin from ITI and reporting on its use in-country means that endemic countries now receive one combined form about trachoma from WHO and ITI per year, rather than the five that they received in 2013. Dr Solomon also said that the ITI team works closely with WHO and health ministries to ensure that the responsible individuals within each health ministry are supported to complete the forms. He thanked all those involved for their hard work. Dr Solomon indicated that the high response rate will make the dossier development process easier, as information shared becomes part of the database that can be used to pre-populate the spreadsheet component of a draft dossier, which can then be reviewed and finalized by the health ministry.

In response to a question asking about what needed to be done to expand trichiasis surgery output, Dr Solomon said that there was a continuing need to focus on surgeon training and supervision (*35*), quality of operations provided, and follow-up with patients to ensure that outcomes are good. He added that a protocol for a trichiasis-only prevalence survey had recently been developed and validated (*36*).

International Coalition for Trachoma Control Report

Ms Virginia Sarah, Chair, International Coalition for Trachoma Control, described the Coalition as a diverse and highly committed group of members and observers who come together to amplify support for GET2020. The Coalition's 2015–2020 strategic objectives are to: increase commitment to trachoma elimination among donors and decision makers; increase investment in trachoma elimination programmes; strengthen capacity and human resources needed to achieve trachoma elimination; coordinate the provision of technical assistance and sharing of knowledge by its membership to support high quality outcomes in trachoma elimination programmes; and ensure that the Coalition remained a strong partner within the Alliance. The Coalition's members include non-governmental organizations, research and academic institutions, donors and private sector organizations.

The Coalition supported the development of the Alliance's current plan of action, Eliminating Trachoma: Accelerating Towards 2020 (*12*), which outlines what needs to be done to scale up programmes and strengthen health systems to achieve the trachoma elimination target. The document illustrates the cost of implementing SAFE, presents a strong economic case for investment and frames momentum against trachoma within the broader sustainable development goal and universal health coverage agendas.

Published in July 2016, the document was updated in April 2017 to include 2017 global epidemiological data and other relevant statistics, to ensure that it remained a useful tool for assessing progress and advocating for support towards elimination. The updates were contained in a stand-alone Appendix that could be inserted inside the cover of the parent document.

Implementation of the SAFE strategy is being achieved through collaboration and commitment from governments and their partners. Eliminating Trachoma: Accelerating Towards 2020 includes a blueprint for action which recognizes the need for this collaboration to continue to strengthen, allowing urgent coordinated action to advance the GET2020 goals.

The updated document was approved by the Alliance by acclamation.

With less than four years left until December 2020, Ms Sarah noted the period in which the meeting was being held as a critical point in the campaign to eliminate trachoma as a public health problem. She commented that the Alliance was making astounding progress to reach its goals, and needed to ensure that it engaged new partners to sustain momentum.

Ms Sarah closed by noting that it would be her last Alliance meeting as Chair of the Coalition, and asked meeting participants to join her in welcoming Dr Serge Resnikoff as the incoming Chair.

Discussion

Dr Wilfrid Batcho, representing Benin, expressed concern that after local elimination is achieved, trachoma might spread back to Benin from Nigeria (*37–40*), a larger country immediately bordering Benin to the East. He noted that Benin had only two evaluation units (comprising four districts) in which the TF prevalence in 1–9-year-olds was ≥ 10% (*41*), though the country still had a considerable backlog of trichiasis surgery to undertake. He said that Benin was implementing antibiotic MDA, but required external support for its trichiasis surgery programme in order to reach GET2020 goals.

Ms Sarah noted that Dr Batcho had raised two very important issues: cross-border transmission and the fact that all components of the SAFE strategy need to be in place for trachoma to be fully addressed. She said that ongoing interventions in Nigeria should reduce the burden of trachoma there, and commented that eliminating trachoma in one country could have indirect benefits for neighboring countries. Ms Sarah also emphasized that some partners of the Alliance may be more specialized in one component of trachoma than another, and that creating partnerships and coordinating interventions was critical to achieving elimination.

Regional reports

In the absence of a representative from WHO's South East Asia Regional Office, Dr Promila Gupta (representing India), Dr Hla Marlar (representing Myanmar), and Mr Sailesh Kumar Mishra (representing Nepal), delivered brief country-level reports.

India, Myanmar and Nepal each previously had a public health problem from trachoma. In India, a series of surveys conducted in ten formerly-endemic districts from 2014–2017 found the district-level prevalence of TF in 1–9-year-olds to 0.1–2.1%, while the age- and gender-adjusted district-level prevalence of trichiasis in ≥ 15-year-olds was 0.1–2.4% (*42*). Trachoma rapid assessments were conducted in parallel in 17 other districts; very low proportions of children examined had active trachoma, and very low proportions of ≥ 10-year-olds had trichiasis (*43*). The country intended to strengthen its trichiasis surgery programme in order to reach elimination targets by 2020. Dr Hla reported that in Myanmar, public health-level interventions

had been successful in reducing transmission of infection. While Myanmar still has individuals with trichiasis (*44*), it no longer required implementation of the A, F and E components of SAFE to reach the elimination endpoint. Myanmar hoped to conduct prevalence surveys in 2017–2018, and to submit a dossier for validation of elimination of trachoma as a public health problem soon after those surveys are complete. Mr Mishra reported a small backlog of trichiasis in Nepal, which no longer required implementation of the A, F and E components of the SAFE strategy for trachoma elimination purposes. A request to WHO to validate elimination of trachoma as a public health problem was expected to occur in 2017 or 2018.

Dr Rabindra Abeyasinghe, Coordinator, Malaria, Other Vectorborne and Parasitic Diseases, Western Pacific Regional Office, WHO.

Trachoma was believed to be, or to have recently been, a public health problem in ten countries in the Western Pacific Region. Cambodia (*45*), China and Lao People's Democratic Republic (*46*) had all already claimed to have eliminated trachoma as a public health problem. Implementation of the antibiotic component of the SAFE strategy covers all endemic districts in Australia (*47, 48*), Solomon Islands (*15, 19*) and Vanuatu (*17*). As of April 2017, antibiotic MDA had not been started in Fiji (15, 49-51), Kiribati (*15, 16*), Papua New Guinea (*21*), or Viet Nam (*52*). Progress towards elimination in these countries may be impeded by the distribution of the affected populations, which are scattered, remote and often difficult to access; political focus on other priorities; and limited donor support for improving access to WASH.

Many Pacific Island countries have experience of undertaking successful preventive chemotherapy campaigns for the elimination of lymphatic filariasis, which should make local populations receptive to antibiotic MDA for trachoma. Countries in the region can benefit from an integrated approach for eliminating trachoma and other NTDs by combining interventions from the health, water and sanitation, education, and other sectors in a coordinated way.

Many countries nearing elimination targets have health systems that are not prepared to sustain gains made through implementation of the SAFE strategy. It is important that those countries receive external guidance on how to establish and maintain effective surveillance systems in the post-validation phase. The WHO Regional Office is planning to work with countries to achieve the health-related Sustainable Development Goals by 2030. If a country in the region eliminates trachoma by 2020, there will be more than a decade in which trachoma may resurface. The Alliance should develop a post-validation strategy for countries, which should include methods for disease surveillance.

Dr Simona Minchiotti, Medical Officer, Non Communicable Diseases, Africa Regional Office, WHO

The African Region bears the largest burden of trachoma globally (*1*). The prevalence of TF was ≥30% at most recent survey in areas of Democratic Republic of the Congo (*53*), Guinea, Kenya (*54*), South Sudan (*55*), United Republic of Tanzania (*56*) and Zambia, indicating that implementation of the A, F and E components of the SAFE strategy are needed for at least five years before re-survey. The countries with the highest national-level trichiasis backlogs include Chad, Democratic Republic of the Congo, Ethiopia and Nigeria (*1*). Gambia (*57, 58*) and Ghana (*59, 60*) claim to have eliminated trachoma as a public health problem, and plan to submit dossiers for formal validation of elimination in 2017.

Since its launch in May 2016, ESPEN has supported efforts to improve access to NTD data and enable data sharing. Increased collaboration between country governments, donors and partners has helped to coordinate

mapping and SAFE interventions. Many countries report a lack of communication between programmes for other NTDs and the trachoma programme. Insufficient coordination between these programmes may increase costs and make it more difficult to secure funding. Several countries in the region are experiencing political instability and poor security conditions which impede public health programmes. These limitations must be addressed in order to survey unmapped regions, introduce interventions, and integrate surveillance into existing health systems.

Discussion

Mr Martin Kabore, representing Burkina Faso, asked what source data were used for determining national trichiasis backlogs. Dr Minchiotti replied that trichiasis backlog estimates were determined from population-based prevalence survey data shared with WHO.

Dr Ismatullah Chaudhry, Medical Officer, Prevention of Blindness, Eastern Mediterranean Regional Office, WHO.

Six countries are believed to be trachoma endemic in the Eastern Mediterranean Region. Egypt, Pakistan and Sudan (*61, 62*) have undertaken at least some baseline trachoma mapping. In these countries, surgeons trained to undertake trichiasis surgery are beginning to address trichiasis backlogs in districts where the prevalence of trichiasis is ≥ 0.2%, and there is engagement with ITI concerning an azithromycin donation, in order to facilitate MDA in districts where the prevalence of TF is ≥ 5%. Yemen has recently completed trachoma mapping (*63*) and urgently requires surgery and antibiotics interventions, but insecurity has delayed implementation. Afghanistan and Somalia still need to undertake mapping. Based on trachoma rapid assessment data from eye outreach camps and hospital registries in Afghanistan, 25 districts across 19 provinces are prioritized for mapping. In Somalia, 12 districts from six regions are prioritized for trachoma mapping. Mapping in Afghanistan and Somalia is expected to begin in 2017. The Islamic Republic of Iran is expected to soon prepare a dossier in line with the standard operating procedures for validation published by WHO (*23*). The WHO Eastern Mediterranean Regional Office target for 2019 is to have at least four additional countries validated for trachoma elimination, possibly including Djibouti, Iraq, the Islamic Republic of Iran and Saudi Arabia. The target for 2021 is to have at least six more countries validated for trachoma elimination. These targets have been endorsed by the Regional Director.

Socio-political conflict and unrest, complex emergencies and insecurity are major challenges in about one-third of countries in the region, influencing priority-setting for health care. SAFE interventions have been mostly undertaken without external donor support. It has been a challenge to facilitate stronger networking and developing of partnerships, participatory planning and comprehensive approaches in programme implementation in order to increase productivity and create better outcomes. It is important to address weak health management information systems and compromised surveillance systems in most of the region's trachoma-endemic countries.

Dr Martha Saboya, Advisor, Neglected Infectious Diseases Epidemiology, WHO Regional Office for the Americas.

Mexico has become the first country in the Region of the Americas and the third country in the world to be officially validated as having eliminated trachoma as a public health problem (*30*). Mexico has zero new cases of trichiasis unknown to the health system.

However, trachoma remains endemic in at least 136 districts across Brazil, Colombia and Guatemala. Overall, 5 million people live in these endemic districts, and a large proportion of them live in 128 known-endemic districts in Brazil.

About 285 000 people in Brazil, some of whom live in indigenous communities, received antibiotic treatment in 2016 (*1*). Facial cleanliness interventions are being delivered as part of an integrated campaign against leprosy, schistosomiasis, soil-transmitted helminthiases and trachoma, and environmental improvement is being funded through local investments in WASH.

Colombia has expanded mapping in districts surrounding its known focus in Vaupés, delineating four newly-characterized endemic districts. It is now carrying out active case finding of trichiasis. Colombia is undertaking antibiotic MDA interventions across its six known-endemic districts, with interventions to promote facial cleanliness being delivered concurrently, both in schools and at village-level. Interventions to improve WASH are being financed by various stakeholders. Guatemala will carry out impact surveys from April to May 2017.

Guatemala is in the pre-validation surveillance phase. It had only two trachoma-endemic districts. Village health workers promote facial cleanliness, and water and sanitation improvements are led by the community.

In the Americas, it is currently recommended that, to ensure high quality, trichiasis surgeries be performed by ophthalmologists or oculoplastic surgeons. In areas suspected to be endemic for trichiasis, active case-finding is preferred to passive detection.

The Pan-American Health Organization's regional trachoma forum takes place biennially, allowing experts from various organizations to share recommendations and country representatives to share progress on SAFE implementation (*64*).

There are several challenges that still need to be addressed in the region. Mapping needs to be conducted in countries with populations at risk of trachoma but which are not currently proven to require interventions. In 2017, Peru will complete a baseline survey for trachoma that will also include collection of data on soil-transmitted helminth infections, but may then require additional support to complete further mapping. Indigenous populations are at greater risk of trachoma than non-indigenous groups, but high costs and limited access to these populations makes mapping difficult. The plan is to conduct population-based surveys in several countries in areas covered by the Amazon rainforest. Standardized training of graders is currently difficult and costly, and endemic countries have trouble affording it. In Mexico, tools and procedures for post-validation surveillance have not yet been defined. There is therefore a risk of undetected recurrence in populations following validation, and a system for picking up and notifying recurrence needs to be created.

The Alliance applauded the success of Mexico, Morocco and Oman in being validated as having eliminated trachoma.

SESSION 2
Trachoma Scientific Informal Workshop

The Trachoma Scientific Informal Workshop had taken place on 18th April 2017, at WHO Headquarters. Dr Solomon presented highlights of the Workshop for the information of the Alliance.

1. While programmes should aim for 100% coverage when undertaking azithromycin MDA, at least 80% coverage in children has been shown to lead to a reduction in infection and disease (*34*).
2. There is continued interest in the value of a single round of azithromycin MDA for districts with TF prevalence in 1–9-year-olds of 5–9.9%.
3. It is important to first understand behavior before designing an intervention related to WASH. Engaging a behavioral change specialist to work within the community to co-develop contextually applicable WASH interventions is important (*65, 66*).
4. Parents may prefer three days of topical azithromycin drops administered at the village center over six weeks of tropical tetracycline tubes handed out during antibiotic MDA.
5. There is ongoing work to assess the role of serology for use in trachoma surveys as a tool to understand community transmission (*29*). Researchers are looking to partner with national programmes in ongoing work.
6. New cases of conjunctival scarring may continue to appear for at least four years after the prevalence of TF in 1–9-year-olds has been reduced to <5% (*67*).
7. Appearance of the eyelid immediately after trichiasis surgery predicts poor outcomes (such as recurrence, contour abnormality and granuloma), suggesting that surgeons need to pay close attention to the immediate post-operative appearance, and supervisors should monitor this on a regular basis.
8. A system to help train and certify graders on the recognition of trichiasis, using three-dimensional images, has been developed and is currently being validated. It may more closely mimic field grading than normal two-dimensional images. This may be particularly useful in areas with low trichiasis prevalence. It is likely to be rolled out in Tropical Data systems in the near future.

Questions

One participant asked for clarification on the role of supervisors in the provision of trichiasis surgery. Dr Solomon answered that supervisors have a number of important roles, and in the interests of time, suggested that details be sought in the report on the Second Global Scientific Meeting on Trachomatous Trichiasis (*68*).

Another participant asked whether programmes should continue to use two-dimensional photographs for training graders to recognize trichiasis. Dr Solomon responded that training using three-dimensional photographs was still in development, so existing training systems should continue to be used until further notice.

Surgery for GET2020 Panel

Reducing the Trichiasis Backlog

Dr Dézoumbé Djoré, Coordonnateur du Programme National de Lutte Contre la Cécité, Chad

In Chad, trichiasis is a public health problem in 11 districts with a collective 2.5 million inhabitants. In the district of Mongo, impact survey results suggest that the prevalence of trichiasis decreased from 6.2% in 2015 to 1.2% in 2017. There are currently an estimated 63,888 cases of trichiasis nationally that require corrective surgery. To reduce the prevalence everywhere to below the elimination threshold, the programme needs to manage an

estimated 35,106 individuals with trichiasis, using a combination of fixed and mobile surgery teams. In 2014, 2281 individuals with trichiasis were managed. In 2015, 9569 cases of trichiasis were managed. In 2016, 17,809 cases of trichiasis were managed, representing 51% of the calculated backlog at that time. Guera, Salamat, Ouaddai regions are thought to still require surgery interventions in order to reach elimination prevalence targets.

A survey of districts with active surgery programmes indicated that 89% of operated individuals were followed up post-operatively. The incidence of post-operative complications was 2%. Additional surveys were carried out in other districts to determine the prevalence of trichiasis and number of cases requiring operation. Results showed 26 new endemic districts with 9703 new cases of trichiasis to manage in a population of 5.5 million people. Trichiasis endemicity in these districts ranged from 0–1.2%.

In order to address the trichiasis backlog in Chad, graders are being trained to detect trichiasis, and surgeons are being certified. Trichiasis case-finding is conducted on a door-to-door basis. The Ministry of Health plans to continue interventions in the 11 districts that have completed mapping, and conduct surveys for trichiasis in the remaining 26 districts.

Getting the Trichiasis Backlog to Zero

Dr Marcel Awoussi, Togo

Trichiasis is not a common presentation in Togo. To help develop a dossier for validation of elimination of trachoma as a public health problem, prevalence data collection is a very important concern. In some areas, people working in the health sector are simply not aware of the disease. Data on trichiasis are not routinely recorded at local health centers. In 2009, surveys were undertaken using a non-standard integrated mapping approach (*69*). In three districts in which those surveys suggested an elevated prevalence of trachoma, cluster-sampled surveys were implemented in 2011. Very little active trachoma was found. District-level prevalence of trichiasis in women aged ≥15 years was ≥0.2% in two districts, Binah and Blitta.

Subsequently, two strategies have been used to find and address prevalent trichiasis cases. The first approach required healthcare workers in rural settings to report detection of any new cases of trichiasis. This passive surveillance system had low sensitivity, and may have provided limited information. Using this approach, 17 cases of trichiasis were detected, of which 16 had surgery. The second approach, implemented with support from the Bill & Melinda Gates Foundation, was a form of active surveillance involving door-to-door visits by community health workers or ophthalmic nurses. This approach was more sensitive, and able to detect cases that existed in remote areas. However, it was costly, labor intensive and difficult to sustain over time. This approach detected 203 cases of trichiasis, of which 158 had surgery. Some of the detected cases did not consent to the operation. Reasons cited for refusing surgery included being too old, being afraid of the procedure, or being unable to afford the operation. Patients also refused surgery if their families were resistant to them doing so.

A review meeting was held in Lomé, Togo, from 1–2 March 2017. The meeting recommended that all previous and ongoing data from routine trichiasis surgeries at health facilities, surveys and screening initiatives be collated to inform decisions on where to undertake further population-based surveys. Those surveys are intended to be completed by the end of 2017, with the support of Tropical Data and funding from USAID, to allow for subsequent planning and action.

Questions

OA participant asked Dr Djoré for clarification on the methodology used to estimate the prevalence of trichiasis. A question to both speakers asked what was being done to ensure that surgery interventions were effective in preventing vision loss.

Dr Djoré responded that in 2004, the trachoma survey performed in Chad was carried out in a sample of 27 villages in one region (70). Surveys were later conducted in three other regions. In 2013, the Ministry of Health began surgical activities in all four regions (11 districts) that had completed trachoma surveys. In 2014, 41 evaluation units were surveyed, and 29 had trichiasis prevalence estimates which indicated a need for public-health-level surgery interventions (*71*). Dr Djoré added that post-operative follow-up was undertaken for all patients. Patterns of recurrence and other data were used to inform refresher training for surgeons.

Dr Awoussi said that ophthalmic nurses from Togo received training to undertake trichiasis surgery in Mali, plus supplementary training in Ghana to correctly assess trichiasis cases. Funding was also being used to provide additional training to surgeons to ensure that they were able to deliver quality surgeries.

Transitioning Trichiasis Care into Routine Services

Dr Marilia Messangaie, Mozambique

In 2014, the Queen Elizabeth Diamond Jubilee Trust launched an initiative to support the Ministério da Saúde to reduce the backlog of trichiasis throughout Mozambique. The aim was to achieve 100% coverage across the 50 districts in which the prevalence of trichiasis exceeded the elimination prevalence threshold. An estimated 11,709 individuals, or 67% of the trichiasis backlog, would need to be managed by 2020, in order for this to occur. There are currently 14 trainers and 175 ophthalmologists trained to deliver trichiasis surgeries in the country. The Ministério da Saúde is now working to build health system capacity by training more surgeons and health personnel. The trichiasis surgical service has been integrated into local hospital services, and people with trichiasis are being offered transport to the nearest hospital offering surgery free of charge. Local health centers are continuing to undertake surveillance for additional cases of trichiasis.

The TT patient tracking app

Dr Michael Masika, Ministry of Health, Malawi

The Trichiasis Patient Tracking Application was created in order to address the lack of standardized trichiasis monitoring tools. Before it was launched, different partners used different tools to monitor output of interventions against trichiasis, and many of those tools overlapped geographically. Post-operative patient follow-up was challenging. It was difficult for surgeons to provide supervision and support to their patients. Reporting of trichiasis case identification and of surgical delivery did not occur in timely fashion. These issues created a need to develop a common system for registering patients with trichiasis, tracking them through to the operation and through their post-operative follow-up course, and making data available at all levels of service delivery. As a solution, WHO held a consultation (*72*) to develop a target product profile for a standard system, which has since been produced and is being piloted in Chikwawa, Malawi. Patient registration, surgery and follow-up data are collected on smartphones. The application uses data entry fields modeled on standard forms developed by the International Coalition for Trachoma Control. Patients are tracked using

identification numbers. Data are made available online for supervisors to plan outreach and oversee each surgeon's performance. The application can be customized as needed to be interoperable with other databases or other reporting forms used by national programmes. In Malawi, the government will maintain the system and make data freely available to its partners. This tool will be very useful for trichiasis programmes. It is faster and less prone to error than paper-based monitoring methods. The application can facilitate planning by producing reports of patient surgery and follow-up status, organized at different administrative levels. Downloadable summary statistics make it easier to report programme output to donors and partners. The Blantyre Institute for Community Outreach, Tropical Data, and WHO were acknowledged for their work in developing this tool.

Questions

The first question addressed to Dr Masika was whether the application uses free, open-source software. A follow-up question asked which other programmes can benefit from this application. A third question asked whether the data being uploaded from the app were secure.

Dr Masika asked Dr Khumbo Kalua (Blantyre Institute for Community Outreach) to help respond to these questions. Dr Kalua noted that the application was not open-source. The pilot testing in Malawi had been an excellent opportunity to refine the system, and the aim was now to undertake a second round of testing in Ethiopia. The intention is to then make the system available to any country that would like to use it. The data are stored and transferred fully encrypted.

The Morbidity Management and Disability Prevention Project

Dr Joe Amon, Helen Keller International.

The Morbidity Management and Disability Prevention Project is a five-year initiative funded by USAID to help support efforts in Burkina Faso, Cameroon and Ethiopia to eliminate trachoma and lymphatic filariasis as public health problems. The project works to increase availability of quality data for decision-making, increase support for scale-up in implementation, improve quality, strengthen capacity within health ministries and strengthen the evidence base for preferred practices in morbidity management and disability prevention. For trachoma, tools and resources developed or augmented by the project include those on infection control and waste management, supportive supervision, epilation, trichiasis surgeon training and a procurement calculator to determine the cost of surgeries in order to support programme managers.

To date, the project has made good progress towards reducing trachoma morbidity in the three participating countries. More than 200 trichiasis surgeons have been trained, 300,000 people have been screened, and 25,000 surgeries have been completed. The project supports post-operative follow-up of patients, which is critical both for the patients themselves and to provide feedback to surgeons for continuous quality improvement. In Cameroon, the project has supported the Ministre de la Santé publique to measure the prevalence of trichiasis more precisely, and implementation data have been used as a tool for sub-district-level trichiasis service

tracking. Looking ahead, the project hopes to connect to other health initiatives, work with other health ministries to document and disseminate lessons learned, provide short-term technical assistance to other USAID-supported NTD programmes and continue to add to the growing global evidence base.

Can We Eliminate Trichiasis by 2020?

Professor Hugh Taylor, International Council of Ophthalmology

Many graders and ophthalmologists are familiar with more severe cases of trichiasis, in which the chance of restoring functional vision with an operation is very small. It is important to identify and address less severe cases of trichiasis, because these are cases in which corrective surgery can still prevent blindness. Trichiasis surgeons typically employ the bi-lamellar tarsal rotation procedure or the Trabut procedure (*35, 73*). The operation is intended to preserve remaining vision, not to restore lost sight.

There are many challenges to delivering effective operations, including: apparently-poor immediate post-operative results, such as badly damaged tissue around the eye, which may dissuade others from seeking care; significant variations in the technical ability of different surgeons; and poor acceptance by communities. Considerable variation has been noted in trichiasis recurrence rates from one surgeon to another. It is imperative that trichiasis surgeons are adequately trained and supervised in order to prevent poor cosmetic results, unnecessary loss of vision, and excessive recurrence of disease.

The International Council of Ophthalmology is the global body representing ophthalmologists around the world, through National Ophthalmic Societies. The Council's strategy for trichiasis recommends tailored local interventions, coordination of activities by all partners and stakeholders, integration of trachoma elimination programmes into national health services and integration of trachoma-focused efforts with other initiatives of the broader NTD community, including facial cleanliness and environmental improvement initiatives. In the Bahrain Declaration on Trachoma and Trichiasis Surgery (*74*), the Council encouraged National Ophthalmic Societies around the world to become active advocates for the effective management of trichiasis, to take a leading role in trichiasis surgery activities and to become involved in the training and supervision of trichiasis surgeons. The engagement of ophthalmologists with trachoma teams is critical to eliminate trichiasis and new blindness from trachoma.

Questions

A participant asked if other methods for avoiding blindness, such as epilation, are recommended for individuals that have difficulties accepting surgery. Another asked how priority countries are defined, since so many countries require assistance.

Professor Taylor answered that epilation can remove single eyelashes, but must be done properly, is not necessarily definitive, and may need to be repeated. In his view, epilation should generally only be considered in the event of a delay in or refusal of a more definitive procedure. Dr Amon noted that priority countries for the Morbidity Management and Disability Prevention Project were defined by consultation with donors, taking into account the existing burden of trachoma. The intention was not to suggest that priority countries are the most important.

Mr Julián Trujillo, representing Colombia, said that in Colombia, oculoplastic surgeons provided trichiasis surgeries and ensured post-elimination follow-up, yet there remained a high rate of trichiasis recurrence. He asked whether Professor Taylor had any recommendations for the trichiasis programme in Colombia,

and whether clinical signs had been identified which might predict recurrence in these cases. Professor Taylor responded that the scarred eyelid is damaged tissue, and trichiasis surgery is unable to undo the damage caused over years of trachomatous scarring. He recommended that recurrent cases be referred to expert ophthalmologists (*68*).

Breakout A

Professor Hugh Taylor, International Council of Ophthalmology

The Chair described the breakout sessions as a method to facilitate the exchange of ideas between participants from various organizations and institutions on the challenges of trachoma elimination and solutions to those challenges.

The Chair followed that the first breakout session would be a discussion on trichiasis surgery interventions within the framework of the SAFE strategy, with three separate discussion groups, divided on the basis of language.

English-speaking group

The group recognized that the incidence of trichiasis and incidence of recurrent trichiasis were both decreasing, yet several issues remained which hindered progress toward the trichiasis component of elimination of trachoma as a public health problem. Many surgeons trained to deliver trichiasis surgery were no longer qualified to operate, especially if a substantial period of time passed since their most recent training and actual practice. It was important, the group felt, that the Alliance held countries to a high standard with regard to trichiasis surgeon training. In addition, supervision was necessary to ensure that high quality surgeries were being delivered. In surgeon training courses, greater emphasis should be placed on what trichiasis surgeons are not qualified to do and what constitutes incorrect practice. Country trachoma action plans must be updated to empower trichiasis programmes to hold surgeons accountable for their work. Same day, next day and seven-day postoperative follow-up benchmarks were needed to adequately measure patient outcomes.

The group noted that there was no standard referral system for patients who developed trichiasis. Patient referral should lead to the cost of the surgical procedure being met, access to the procedure being provided and post-operative patient tracking being undertaken. Each trachoma action plan should be updated to include a section detailing the referral system specific to that country. Special recommendations need to be made for countries that have difficulty ensuring quality standards are met. It may be necessary to establish a review board, which ensures that quality standards are being met and provides special recommendations for countries that have difficulty meeting those standards. The group endorsed the Trichiasis Patient Tracking Application for addressing many of the challenges brought up in the discussion.

French-speaking group

The group recognized that estimates of trichiasis backlogs serve as an advocacy tool for health ministries to make decisions regarding budget appropriations and implementation of surgery interventions. A few concerns were raised during the discussion. First, some national health systems are finding it difficult to determine the prevalence of trichiasis unknown to the health system, and to evaluate whether this meets the WHO trichiasis elimination criterion of <0.2% in ≥15-year-olds (*23*). Second, many governments are concerned with the high cost of training local surgeons and managing human resources. Third, countries agreed that methods for managing trichiasis cases can be improved upon. National trachoma programmes are working to reduce the trichiasis backlog and to ensure that quality standards for surgeries are being met.

Portuguese- and Spanish-speaking group

The group noted that trichiasis cases vary in the extent to which the lid is deformed, as well as the extent to which vision loss has occurred. More severe cases of trichiasis are very difficult to resolve with trichiasis surgery. The group recommended that, in areas with a high recurrence rates, such as Colombia, trichiasis cases be categorized by severity on a case-by-case basis in order to determine the appropriateness of surgery and the degree of difficulty represented by surgery. Post-operative follow-up of patients can be challenging in remote communities. In South America, many indigenous communities have trichiasis cases which require corrective surgery. It can be difficult to ensure those patients have access to trichiasis surgery, and to track patients after the operation. Previously, trichiasis programmes forged partnerships with NGOs to reach indigenous communities. The group recognized that epidemiological surveillance of trichiasis in endemic communities is important. However, insufficient human resources and funding from national health systems make it difficult to improve and sustain surveillance in some countries. Health system strengthening is critical, especially in larger countries with more fragile health systems.

Managing PC-NTD Implementation Data

Mr Alexei Mikhailov, Data Manager, Preventive Chemotherapy and Transmission Control, WHO.

Preventive chemotherapy is a public health intervention based on the large-scale administration of safe drugs against selected NTDs (*75*). Before 2007, preventive chemotherapy data for lymphatic filariasis, soil-transmitted helminthiasis and schistosomiasis programmes were collected from countries on paper. In 2007, these data began to be collected through electronic forms. In 2008, core indicators for NTDs were defined, and a database to collect global preventive chemotherapy data was created. In the next year, this database was published on the WHO website as the preventive chemotherapy and transmission control databank (*76*). In 2012, data modules on lymphatic filariasis, soil-transmitted helminthiases, schistosomiasis, onchocerciasis and trachoma were created in the WHO Global Health Observatory. The year 2013 marked the release of the Joint Application Package, an integrated planning and request tool for countries seeking support in the supply of preventive chemotherapy medicines from WHO. In 2014, the country-level integrated NTD database was developed and released. In 2017, the Preventive Chemotherapy Data Portal (http://apps.who.int/gho/cabinet/pc.jsp) went live. This is a tool for data visualization and assessment of coverage. It includes the most recent updates on coverage by disease and by region, and on use of donated medications. It also includes country profiles with an interactive display of historical trends in implementation of preventive chemotherapy interventions by disease and age group, and five disease-specific modules displaying comparative performance. The preventive chemotherapy data collection process begins when a country submits its Joint Application Package. After review and clearance by the relevant WHO regional office, the Joint Application Package is sent to WHO Headquarters. Analysis entails defining data on selected indicators and validating epidemiological data for mapping. Data modules are then prepared for dissemination. The JAPs are stored on the SharePoint site, and district data are accessible through a database. Trachoma data are reported instead through the TEMF. Both the Joint Application Package and the TEMF use an Excel-based format to allow data to be reported, aggregated at sub-national and national levels. The applications have common indicators. Country-level integration of these data would help to make more precise analyses of preventive chemotherapy interventions.

Questions

A participant asked for clarification on deadlines for reporting data through the JAP. Mr Mikhailov explained that there were two deadlines for reporting. The first is on 15th April. This report asks for data from the previous year and medication requests for the following year if the country plans to conduct PC interventions in the first quarter of that year. The second deadline is on 15th August, for countries planning to conduct PC interventions later than the first quarter of the following year. Countries are not expected to report the same information more than once. Both dates will continue to be used until a more effective system that can utilize a single reporting date is implemented.

A second questioner asked whether countries should collect data by district, municipality, or province. Mr Mikhailov indicated that data should be reported by the most appropriate administrative level, which is expected to differ from country to country.

Managing Trachoma Prevalence Survey Data

Dr Nicholas Olobio, Federal Ministry of Health, Nigeria

The Global Trachoma Mapping Project conducted population-based prevalence surveys in 1546 districts of 29 countries between December 2012 and January 2016 (*2, 77*). Countries requested that a service with the same methodologies and technologies be used to support the collection, processing and application of data for trachoma elimination programmes after the Global Trachoma Mapping Project closed. In response, a new system was developed to utilize resources that were already in place, including trainers, materials and equipment. Tropical Data is an initiative that supports countries to collect, analyze and use quality data for national trachoma programmes (*27*). This project helps to ensure that surveys are conducted using WHO-approved methodologies, that outputs are of the highest quality, and that health ministries have full ownership of the data. Tropical Data provides epidemiological survey support from planning and protocol development to field support, training, data processing, health ministry review, and support for further analyses.

Tropical Data has many benefits. First, the project enhances in-country capacity to use data for decision-making, fostered by a focus on interpretation and application of data. Second, it facilitates appropriate resource allocation and reduce program costs. There is no need to design and build multiple country-level data collection platforms. A single platform avoids the proliferation of a patchwork of tools, strategies and methodologies. Third, Tropical Data produces internationally consistent, gold standard data, reinforced by grader and trainer certification, scrutinized survey protocols and field methodologies, and strict data cleaning and analysis algorithms deployed by an independent data analytics team. This reassures programmes and their partners on the veracity of survey outputs, and therefore allows them to invest human and financial resources in trachoma elimination with confidence.

It is estimated that a minimum of 1450 surveys will need to be conducted from 2017–2020 in districts that have received azithromycin donations through ITI. In Nigeria, the Federal Ministry of Health has requested Tropical Data to support impact surveys in 92 districts (*40*) and surveillance surveys in 102 districts. Nigeria became involved with Tropical Data by registering online, then submitting a draft protocol supported by a Tropical Data epidemiologist. This protocol was then reviewed by WHO.

Questions

It was asked how long trachoma survey data remain valid after the completion of a survey and before the start of interventions. In response, it was noted that by convention, trachoma data were felt to remain current for up to ten years, in the absence of interventions against trachoma or significant socio-economic change.

Forecasting Trachoma Elimination

Dr Anthony Solomon, Medical Officer, HQ/ NTD, Geneva

The estimated number of people living in districts in which the prevalence of TF is ≥ 5% decreased from 200.1 million in 2016 to 181.6 million in 2017. Two different sets of forecasts for trachoma elimination have been generated. The median (optimistic) forecast uses longitudinal data from all districts that have progressed to TF < 5% to determine, for each baseline TF prevalence category, the median number of years of A, F and E implementation required to reach TF < 5%, and applies those median values to all remaining districts in which TF is > 5%. The conservative forecast takes into account the experience of apparently more treatment-refractory districts, which have not yet progressed to TF < 5%. For these districts, taking into account the trajectory of TF prevalence, expert opinion was used to set the likely mean number of years of A, F and E implementation required to reach TF < 5%. Several assumptions are made in these forecasts. First, as-yet-untreated districts with TF ≥ 10% would begin treatment in 2017, and as-yet-untreated districts with TF prevalence estimates of 5.0–9.9% would begin treatment in 2018. Second, programmes will have no funding constraints. Third, no disruptions to programming will occur due to insecurity or other factors. And fourth, possible future programmatic acceleration due to new research is ignored.

Using the conservative forecast parameters, the predicted number of people needing public-health-level interventions against active trachoma will decrease from over 200 million in 2017 to less than 10 million in 2025. In 2026, this number will level out close to zero. The optimistic parameter set predicts that the number of people needing public-health-level interventions against active trachoma will decrease from over 200 million in 2017 to less than 10 million in 2021. In 2022, this number will level out near zero.

In summary, the models predict that (1) the number of people needing A, F and E for trachoma elimination purposes will have decreased from 325 million in 2011 to 5-80 million by the end of 2020; (2) of the estimated 1828 districts that currently or previously had TF > 5%, 74-99% will have TF < 5% (and have discontinued antibiotic treatment) by the end of 2020; and (3) we are likely to be able to discontinue population-based antibiotic treatment for trachoma elimination purposes worldwide at some point between 2023 and 2028.

Questions

A participant asked about historical trends of trachoma prevalence and whether it would be possible to eradicate trachoma.

Dr Solomon replied that the goal is not the eradication of trachoma, as it was in the case of smallpox, because we expect *Chlamydia trachomatis* to continue to be found in human populations after trachoma elimination. When interventions are discontinued, there will be a period of surveillance and validation of elimination for several years. The Alliance needs to acquire more experience dealing with near-elimination status. He noted that

the conditions expected to keep transmission of ocular *C. trachomatis* below the level likely to induce scarring and trichiasis are access to water, sanitation and hygiene, which are basic human rights.

Another participant noted that the Bill & Melinda Gates Foundation have used mathematical models to predict the elimination status of trachoma, and asked Dr Solomon to comment on the convergence between that prediction and the mentioned forecasts.

Dr Solomon answered that in the Bill & Melinda Gates Foundation-supported work, Dr Thomas Lietman had estimated that 73% of districts would have a TF < 5% by the end of 2020. That estimate is encouraging because it is very similar to the forecast presented. There is considerable agreement between the predictions of two models, despite differing methodologies. This increases confidence in the conclusions made.

A third participant commented that the models primarily considered the A, F and E components of SAFE, and asked whether trichiasis backlogs need to be considered in models forecasting the elimination of trachoma. A follow-up question asked whether the recent scale up of interventions and intensified momentum warrant a more ambitious forecast for the elimination of trachoma.

Dr Solomon answered that the potential trajectory of the trichiasis backlog was different from the potential trajectory of declines in the prevalence of active trachoma. The speed of trichiasis elimination is entirely dependent on the resources made available: an increase in the number of trained, resourced, incentivized surgeons would increase the speed of decline in prevalent trichiasis. The two forecasts proposed earlier are based on extensive longitudinal data, and would continue to be periodically refined as more solid data are accumulated.

A final interlocutor noted that political instability and conflict in some places may contribute to trachoma remaining a public health problem for a longer period of time. While the forecasts assume no disruptions to programming due to insecurity, the displacement of populations and disruption to living conditions in areas of conflict may be problematic. Dr Solomon endorsed the comment, adding that trachoma mapping has been delayed in several countries for that reason.

SESSION 3
Panel: Validation of Trachoma Elimination

Dr Agatha Aboe of Sightsavers acted as facilitator

Country perspective: Morocco

Professor Abderrahmane Maaroufi, Rabat, Morocco

Morocco was one of the first countries to request validation of national elimination of trachoma as a public health problem following implementation of the SAFE strategy (*78*). The official request was sent in February 2016, and the case was studied for four months from July to October. In November 2016, Morocco was formally recognized as having eliminated trachoma as a public health problem (*14*). It took eight months for the Morocco dossier to be studied and validated. The validation process was relatively simple, and could improve if countries that have been validated area able to share lessons learned with countries that are undergoing validation. The Ministry of Health of Morocco has a guide describing its elimination process, and the country wishes to share its experience with other Member States. In the next few years, the number of countries beginning the trachoma validation process will increase. It is important to note that formal validation of national elimination of trachoma as a public health problem is not the end of the process. In the post-validation phase, countries need to continue surveillance for several years. This could be done through passive or active surveillance. Active surveillance can be incorporated into other public health programmes. Monitoring for incident trichiasis is particularly important. An educational and awareness raising campaign may reduce recrudescence. In Morocco, medical schools have been instructed to keep trachoma in their syllabus in order to sustain awareness of the disease amongst health professionals.

Country Perspective: Mexico

Dr Sury Antonio Lopez Cancino, Mexico

Mexico put in a tremendous amount of work to eliminate trachoma as a public health problem. In 1962, the Ministry of Health identified trachoma in the Chiapas Highlands, and introduced public health interventions in the region. In 2004, the WHO-endorsed SAFE strategy was adopted to continue the fight against trachoma. In 2013, the Ministry of Health submitted a request for the validation of national elimination of trachoma as a public health problem. Academic staff were responsible for conducting the relevant studies and for compiling the report. In 2013,

international trachoma experts visited Mexico and stressed the importance of conducting surveys in local areas of Chiapas and in other underdeveloped areas where trachoma was previously endemic. In the following years, two surveys were conducted. The first survey was done in an area known to have had trachoma in the past, and the second survey was done in the population surrounding this formerly endemic area. Both surveys found prevalences of TF and trichiasis that were below the WHO trachoma elimination thresholds. On the basis of this evidence, the Ministry of Health made the case that trachoma was no longer a public health problem in Mexico. In 2017, Mexico was officially validated as having eliminated trachoma as a public health problem, becoming the first country in the Pan American Region and the third country in the world to have achieved this feat (*30*). Mexico would be happy to help other countries planning to submit dossiers.

Country Perspective: Lao People's Democratic Republic

Dr Khamphoua Southisombath, Vientiane, Lao PDR

Lao PDR is divided into 17 provinces, and has a total population of 6.2 million. In 2000, TRAs were conducted in five provinces and found 14.8% of examined children had TF and 0.03% of adults had trichiasis. In 2011, data from provincial hospitals revealed that 48 trichiasis surgeries had been carried out in ten provinces, while no surgeries had been performed in eight provinces. From November 2013 to August 2014, population-based prevalence surveys were conducted to determine whether trachoma remains a public health problem in the country. The results of the surveys found a prevalence of TF of < 5% in children and a prevalence of trichiasis of < 0.2% in adults in each evaluation unit (*46*). The low prevalence of TF and trichiasis indicate that public health-level interventions against trachoma are not needed. The Ministry of Health is now preparing the dossier to document its achievement of trachoma elimination targets.

Country Perspective: Nepal

Mr Sailesh Kumar Mishra, Kathmandu, Nepal

In Nepal, trachoma was previously the second leading cause of preventable blindness, being endemic in many areas of the country, with prevalence rates as high as 23% in several districts. In 2002, the Ministry of Health in collaboration with Nepal Netra Jyoti Sangh, the Department of Water Supply and Sewerage and ITI initiated a national programme to eliminate trachoma. The programme implemented SAFE in endemic districts. After ten years of intervention, the prevalence of trachoma has been reduced and the program has been declared a success. With support from RTI International, the Ministry of Health plans to submit a completed dossier for validation of elimination of trachoma as a public health problem. The dossier was mostly straightforward to fill out; two questions were challenging. The first required areas determined not to need baseline surveys to be identified. The second asked for pre-validation surveillance survey data for active trachoma and trichiasis. Specific surveys have been planned to fill these needs.

The Ministry of Health has created a plan for trachoma monitoring in the post-elimination phase. Trachoma surveillance will be integrated into the health system from the local to the federal level, and trichiasis will be tracked within the health management information system. Operational research has been built in to that programme (*79-81*).

Country Perspective: Gambia

Mr Sarjo Kebba Kanyi, Banjul, Gambia

The Gambia, located in the Sahel of West Africa, has been addressing trachoma for decades (*82*). In 1986, a national survey found that trachoma was the second leading cause of blindness in the country (*83*). Subsequently, the National Eye Health Program was established to screen

communities for active trachoma and provide trichiasis surgery. In 1996, population-based surveys found an active trachoma prevalence of 5.9% in children aged 0–9 years (*84*). In 2006, similar surveys in two endemic regions found a TF prevalence of ≥ 10% in the same age group (*85*). In the following years, the SAFE strategy was implemented in trachoma endemic districts. Azithromycin MDA was undertaken, and trichiasis surgeries were carried out in rural communities. In June 2017, the Ministry of Health plans to convene a meeting to finalize the dossier claiming elimination of trachoma as a public health problem.

Dossier Review Group Perspective

Professor Sheila West, John Hopkins University

WHO has a template dossier that countries can complete to request elimination of trachoma as a public health problem. The process is explained in the standard operating procedures (*23*), which are available in English, French, Spanish and Portuguese (http://www.who.int/neglected_diseases/resources/who_htm_ntd_2016.8). The country prepares the dossier to document achievement of elimination targets, and submits it to the WHO Country Office. The dossier is then assessed by the Dossier Review Group appointed by the WHO Regional Director. The Group evaluates the evidence, and makes a recommendation to WHO to either validate the claim of elimination as a public health problem or postpone validation until more evidence is provided. In the case that validation is recommended, members of the Dossier Review Group will also provide recommendations on post-validation activities. In the case of postponement, Dossier Review Group recommendations will focus on the steps that the country should take in order to successfully validate elimination of trachoma in the future.

Donor Perspective

Mr Aryc Mosher, USAID

The WHO Alliance for GET2020 has set a precedent for other NTD programmes through its involvement in protocol development, baseline mapping, resource mobilization, programme implementation, evaluation and surveillance. From the donor perspective, seeing countries submitting dossiers and achieving formal recognition for elimination of trachoma as a public health problem is extremely encouraging. These achievements validate the work being done by governments, international organizations, NGOs and other partners. Moving forwards, country governments should take full advantage of the support of international organizations and NGOs, and utilize all of available human resources, to support the process of reaching elimination targets and demonstrating that success.

Questions

A participant asked what kind of evidence was required to demonstrate that trachoma was no longer present in a formerly endemic area. Professor West responded that the Dossier Review Group would takes context into account in the review process. Different approaches are needed for different epidemiological contexts. It was critical, she noted, that each country submitting a dossier supports each component of its case with the most rigorous evidence.

Another participant asked to what extent a country could use indirect evidence, such as improved socioeconomic status, to support a claim that trachoma had been eliminated. Professor West answered that indirect evidence was felt to be less robust than direct evidence, because it could be difficult to assess. In areas with complete water, sanitation and hygiene coverage, the argument for improved socioeconomic status may be accepted if trachoma was endemic decades ago. In

those areas, trachoma rapid assessments, for example, might be viable options to support an elimination claim. Dr Solomon added that Dossier Review Groups are instructed to be evidence-based, but also cognizant of the fact that evidence comes in different forms. If a country had concrete evidence of trachoma elimination that was not in the form of population-based prevalence surveys, the Dossier Review Group would not want the country to spend more money proving that trachoma was not a public health problem where there was indeed no trachoma present. Since no two countries are the same, the validation process is done on a case-by-case basis. Tailored advice can be provided by WHO.

A participant observed that Iran had trachoma endemic districts in previous decades, and now claimed to no longer have trachoma, much like the United States; he asked why Iran needed to submit a dossier to validate its elimination claim, while the United States did not.

Dr Solomon answered that no country was compelled to submit a dossier, but that without a dossier, it would not be possible to validate any elimination claim.

The panel concluded with a suggestion that countries begin filling out their dossiers early, so that information could be preserved in it as a repository, facilitating the process of external support when required.

Report: International Trachoma Initiative

Dr Paul Emerson, ITI

In 1996, the Alliance did not fully understand the magnitude of the problem from trachoma, and the goal to eliminate the disease by the year 2020 was a shot in the dark. Two decades later, he said, we were now seeing the goals of national trachoma elimination programmes come to fruition. This was in large part due to exceptional funding commitments from the governments of the United Kingdom and the United States, and exceptional commitment from thousands of volunteers and tens of millions of individuals who made the choice to participate in trachoma elimination programmes. The year 2016 stood out as a remarkable year for Pfizer's Zithromax donation. The annual number of doses of azithromycin shipped nearly doubled from 62 million in 2015 to 121 million in 2016 (*10*). As of April 19, 2017, over 636 million doses of azithromycin had been shipped since the donation program began. It was expected that 100–120 million doses would be shipped each year for the subsequent few years, with a gradual decline in the donation as active trachoma was progressively eliminated. ITI was providing transparent data, and these figures on numbers of treatments donated were freely available online.

ITI was now providing donated azithromycin to 77% of districts approved for MDA by its Trachoma Expert Committee. This meant that ITI was providing treatment to 45% of all known endemic districts. In these data, ITI tended to overestimate the denominator in order to make sure the donation program was inclusive.

Between 2014 and 2016, 11 new countries, 607 new districts and a population of 82.2 million people were added to the donation programme. In the same period, 220 districts with a combined population of 43.9 million reached the TF elimination target and no longer warranted MDA. In 2016 alone, ITI scaled up its donation program to include five new countries, 277 new districts and 37.8 million more people, most of whom lived in Ethiopia. In areas where the prevalence of active trachoma had declined, donations had appropriately scaled down. In Ethiopia, impact surveys were undertaken in 64 districts in 2016; 23 (36%) reached the TF elimination target of < 5%: 2.4 million people no longer needed MDA. In the rest of the world, there were 62 districts with impact surveys; 54 (87%) reached the TF elimination target of < 5%: 11.8 million people no longer required MDA. This apparently slower response to antibiotic pressure in Ethiopia was concerning, Dr Emerson said, because Ethiopia comprised 41% of the population living in known trachoma endemic districts worldwide. It was likely, he thought, that on this basis, the proportion of all districts in Ethiopia would continue to increase over the next few years.

ITI had recently introduced the Zithromax® Shipment Tracker, a way for health ministries and their partners to receive updates on the status of ITI's donations. The tracker allows programme partners to monitor progress of a shipment from the shipment date to the expected arrival date. The tracker also allowed users to see the total number of shipments planned for the year, quantities of drugs shipped and quantities of drugs remaining to be shipped.

Questions

A participant asked Dr Emerson to explain the disconnect between the statistics showing 77% administrative coverage and 45% coverage-against-need in 2016.

Dr Emerson said that the administrative coverage statistic represented the number of districts in which antibiotic distribution had been undertaken divided by the number of districts approved for distribution, while the coverage-against-need statistic represented the number of districts in which antibiotic distribution had been taken divided by the number of districts in ITI-supported countries with a TF prevalence ≥ 5%. In the latter equation, the denominator was larger. The coverage-against-need was still below 50% because ITI could not facilitate azithromycin donation for districts in which MDA was not yet requested and approved.

A donor commented that the Zithromax® Shipment Tracker would allow the donor community to be fully informed of the status of their investments, and facilitate the exchange of information with other donors.

A, F and E for GET2020

Selecting and Training Community Drug Distributors

Ms Mackline Garae, Ministry of Health, Vanuatu

Vanuatu is a chain about 80 islands located in the South Pacific Ocean. According to the 2016 census, the national population was 275 649. In November 2013, work done as part of the Global Trachoma Mapping Project found a national TF prevalence of 12% in children aged 1–9 years, and a trichiasis prevalence of 0.04% in ≥ 15-year-olds (*17*). In 2015, the Ministry of Health coordinated meetings for provincial health managers and local NGOs to discuss antibiotic MDA. In February 2016, the Ministry of Health held a Trachoma Action Planning workshop with the support of the International Agency for the Prevention

of Blindness and ITI. In August, MDA was initiated. In January 2017, the Ministry of Health compiled an MDA report. An impact assessment was currently taking place. To date, 262 593 people had been treated with azithromycin. Of those treated, 35 908 (14%) were children aged ≤ 5 years, and 226 685 were children and adults aged ≥ 5 years. Tetracycline eye ointment had been distributed to 3243 people, and benzyl benzoate lotion (for scabies) had been distributed to 2149 people. SMS messaging had been used extensively as a tool to inform communities about MDA.

The Ministry of Health experienced several challenges relating to MDA implementation. First, there had been a shortage of donated antibiotics in some areas. Second, the logistics of delivering drugs to the many islands in Vanuatu posed practical problems. Third, data entry had taken longer than expected. And fourth, lengthy government financial processes delayed interventions.

Going to Scale with A, F and E

Mr Martin Kabore, Programme National de Prevention de la Cecité, Burkina Faso

Burkina Faso is a landlocked country in western Africa, with a total population of 19.6 million. From 2005–2010, the baseline prevalence of trachoma was determined for all 63 districts. In 2007, MDA was initiated in a total of 30 districts. There was considerable scale-up of antibiotic MDA between 2015 and 2016. In 2015, five districts received 1.1 million azithromycin treatments. In 2016, 19 districts received 4.3 million treatments. This scale-up was largely due to the completion of nationwide trachoma mapping, provision of antibiotics through the Pfier-ITI donation programme, generous financial support from partners, good planning and close oversight by the Ministry of Health, political stability and participation by the beneficiaries of MDA. As of 2016, a total of 24.1 million doses of antibiotics had been distributed in 30 districts as part of the programme. 19 districts had either met or exceeded the recommended 80% minimum antibiotic coverage.

Interventions for Facial Cleanliness & Environmental Improvement

Ms Maryann Delea, Emory University

The purpose of this grey literature review (*66*) had been to better understand the work that was being done for the F and E components of SAFE, and identify gaps for future work. The review attempted to determine the nature of current implementation practices for F and E interventions in the context of trachoma elimination programmes.

Behavior change is often necessary for F and E, but it is very difficult to change and maintain behaviors and practices. Human behavior is complex for a number of reasons. First, behaviour is context-dependent and mediated by external forces. Second, behavior can be influenced by normative factors such as tradition or others' approval. And third, behavior can result from habitual or automatic responses, which are, at times, irrational. In addition to being determined in complex ways, behavior can be difficult to measure, due to reporting bias. Promotion of healthy behaviors requires intervention at various levels of influence. A combination of educational, political, regulatory and organization supports are needed for behavior and environmental changes that are conductive to health.

The RANAS (risk, attitude, norm, ability, and self-regulation) model is a theoretical

framework of factors for sustained behavior change. According to that model, informational, persuasive, normative, infrastructural and planning interventions are needed to address risk, attitude, norm, ability and self-regulation factors, respectively. The Theory of Triadic Influence is another framework which categorizes factors that directly and indirectly affect behavior into three levels of influence. Ultimate-level factors, such as biologically-informed traits and enabling cultural, social and familial environments, indirectly influence behavior. Distal-level factors, such as knowledge, values and motivations to comply, only moderately influence behavior. Proximal-level factors, such as attitudes and social-normative beliefs, are the most influential tier. These influences lead to intentions to adopt behaviors, followed by improved behaviors.
The review identified grey literature referencing F and E related interventions implemented in areas in which trachoma elimination programmes were operating. A total of 27 documents met the inclusion criteria; 17 (63%) were technical guides and resources, 6 (22%) were implementer reports and 4 (15%) were programmatic pieces. The review process involved identification of intervention activities, thematic analysis to identify intervention categories, and categorization of which behavioural factors were being addressed. A heat map was produced. It suggested that more could be done to address proximal-level factors in motivating behaviour change.

A high proportion of F and E interventions are intended to stimulate behaviour change. A person who changes behavior can revert to previous behaviour. Interventions which promote sustained change are critical. Effective sustained behaviour change interventions should address behavioural factors identified as barriers or facilitators during formative work; move beyond knowledge and information interventions to address more proximal factors; implement a variety of techniques to target multiple behavioral factors; and facilitate maintenance and recovery of improved behaviour. Cross-sectoral collaboration between trachoma and WASH communities would help in planning interventions, and in considering local-level capacity and resource needs.

Thresholds for Environmental Improvement

Dr Sophie Boisson, Technical Officer, HQ/FWC, Geneva

To date, studies on trachoma have looked at potential risk factors in household environments, such as whether a household has an improved latrine or access to an improved source of water, and what degree of protection that improved facility offers. However, it is also important to look at potential risk or protective factors at community-level. Herd protection is a form of indirect protection from an infectious disease that occurs when a large proportion of a population is immune to infection. Herd protection is well known in vaccination, but an analogous effect can also be induced through non-immunizing interventions, such as insecticide-treated bed nets.

This research (*86*) used Global Trachoma Mapping Project data from 13 countries to investigate community coverage thresholds for water and sanitation that associate with herd protection against trachoma. A multivariable mixed effects model was used to determine whether household-level and cluster-level water and sanitation exposures were related to TF. Household-level sanitation was shown to be protective with a prevalence ratio of 0.87 (95% CI 0.83–0.91). When household-level

water and sanitation access was controlled for, community-level sanitation had a protective association against TF, with a threshold of ~90%. Household-level water supply was shown to be also be protective, with a prevalence ratio of 0.81 (95% CI 0.75–0.88). Community-level water supply had no clear protective threshold. The study had several limitations: as with any cross-sectional study, there was potential for unmeasured confounding; access to water was ascertained primarily through self-report; a single observation was used to capture a complex time-varying WASH history; and water quantity was not taken into account.

Questions

A participant commented that the use of SMS messaging in Vanuatu was innovative. He asked Ms Garae to describe how these messages were coordinated. Ms Garae answered that the Ministry of Health paid Telecom Vanuatu Limited for a bulk messaging service. Each week, the Ministry of Health would give the company a specific message to be sent out to communities receiving MDA.

Another participant commented that water use in a household depended in part on the number of people living in a household, and asked Dr Boisson whether this was included in her analyses. Dr Boisson said that this had not been done as part of the study described.

Breakout B

English-speaking group

The group recognized that WASH was a basic human right, and agreed that public health programmes should aim for 100% WASH coverage regardless of disease status. Some group members were concerned that clean faces were not being used as an indicator for facial cleanliness, and requested that data on facial cleanliness be collected as part of their trachoma surveys. There was a divergence of opinion, however, with other members of the group contending that prevalence of facial cleanliness was not a useful variable because (*1*) it is difficult to measure reliably and therefore potentially subject to bias; (*2*) recording the presence of absence of facial cleanliness encourages parents and guardians to quickly wipe faces clean with their hand or a shared cloth as the survey team arrives, potentially facilitating pathogen transmission; and (*3*) the need to implement the A, F and E components of the SAFE strategy is determined by the prevalence of TF. The group agreed that concrete data on indicators would help. Country representatives requested guidance from WHO on measuring F and E progress, and expressed a need for greater collaboration between trachoma elimination programmes and WASH programmes.

French-speaking group

Many trachoma-endemic countries were facing challenges in implementation of antibiotic MDA. In Chad, there had been delays in the distribution of antibiotics because old surveys estimating district-level TF prevalence were believed to be inaccurate. In Niger, there were issues with incentivizing distributors to deliver antibiotics to remote communities. In some areas, the Ministry of Health had not been able to provide sufficiently attractive financial incentives. For such scenarios, the group recommended that the cost of distribution be shared with partners so that the country did not have to support the entire cost. The group requested that WHO assist countries experiencing difficulties in delivering antibiotics to communities. The group expressed a desire for greater advocacy. The group recommended that a report on activities carried out for trachoma elimination be submitted to the WHO Regional Committee for Africa in 2018.

Portuguese- and Spanish-speaking group

The group recognized that trachoma programmes had met with variable success in the region. In Guatemala, only one round of antibiotic MDA had been needed in trachoma-endemic districts. The Ministry of Health was now preparing to undertake impact surveys to determine whether the TF prevalence threshold had been reached. In Brazil, six years of antibiotic distribution had been unable to fully address active trachoma. The group believed that Brazil needed to reassess its epidemiological situation in order to adequately address trachoma as a public health problem. In Colombia, it had previously been believed that only one district required interventions. Four years of MDA implementation had reduced the TF prevalence in this district. More recently, four more trachoma endemic districts had been identified in Colombia. The Ministry of Health had not yet implemented the SAFE strategy in those districts due to a lack of resources.

SESSION 4
Plans of Action for 2016 and 2017

Governments of endemic countries

Our commitments and progress in the last twelve months:

- Ensure political commitment to elimination extends from national decision-makers to communities in need, and increase domestic funding for these initiatives, as an investment in strong public health systems.

  Political commitment for trachoma elimination continues to strengthen at all levels. Many endemic countries now make substantial domestic investments in their national programmes. Continued work is necessary.

- Bring together key decision-makers from health, education, WASH and finance ministries; and work with donors and implementing partners to better integrate elimination efforts.

  These efforts are ongoing.

- Apply the WHO global strategy, Water, sanitation and hygiene for accelerating and sustaining progress on neglected tropical diseases (*22*) to maximize the integration of trachoma and WASH interventions; and embed targeted hygiene practices relevant to trachoma elimination in school health curricula and health worker training packages.

  These efforts are ongoing.

- Work with neighboring countries to address common trachoma challenges, particularly along shared borders.

  The extent to which this has been possible has varied. A number of groups have been formed to actively consider cross-border issues for trachoma and other NTDs.

Additional plans for the year ahead.

Actively engage in cross-border trachoma and NTD work, where relevant, including establishing groups in southern Africa and for French-speaking trachoma-endemic countries.

World Health Organization

Our commitments and progress in the last twelve months:

- Revise the template dossier in light of the Morocco experience, and finalize standard operating procedures for dossier review and validation of elimination.

  This has been completed. The standard operating procedures were published in June 2016.

- Support dossier development for countries claiming to have eliminated trachoma.

  Four countries have been supported through to the point of formal submission to WHO of a dossier claiming elimination of trachoma as a public health problem.

- Validate countries as having achieved the elimination of trachoma as a public health problem.

  Three countries (Mexico, Morocco and Oman) have been validated as having eliminated trachoma as a public health problem.

- Lead the NTD financing dialogue and publish the economic case for trachoma elimination.

  Discussions to encourage financing of work against NTDs are ongoing. Conversations with partners on the best way to present the economic case for trachoma elimination to a broad audience are also underway.

- Engage WHO country offices to influence relevant ministries of trachoma-endemic Member States.

  This is being done.

- Facilitate meetings of the WHO Alliance for GET2020.

  This is being done.

- Help to maintain and update the WHO Alliance for GET2020 Database.

  This is ongoing.

- Update relevant WHO guidance on trachoma as needed and contribute to the development of implementation tools.

  Insufficient progress has been made on plans to produce a revised and updated version of Trachoma control: a guide for programme managers, published in 2006 (*87*). Extensive input has been provided on a number of publications produced by the International Coalition for Trachoma Control.

- Formalize the Network of WHO Collaborating Centres for Trachoma and contribute to operational research as appropriate.

  Following the second meeting of the Network of WHO Collaborating Centres for Trachoma, plans are being made to review and update the list of agreed research priorities at the annual meeting of the Coalition for Operational Research on Neglected Tropical Diseases.

- Lead the standardization of impact surveys and surveillance surveys through the Tropical Data platform.

  This is ongoing.

- Contribute to ongoing capacity building efforts.

  The World Health Organization has provided significant contributions to the Massive Open Online Course on trachoma, delivered by the London School of Hygiene & Tropical Medicine.

NGOs and other implementing partners

Our commitments and progress in the last twelve months

- Prioritise strategic resource mobilisation and SAFE implementation, including for all areas with a TF prevalence in 1–9-year-olds of ≥ 30% that are still not under intervention.

  NGO partners supported countries with the development of Trachoma Action Plans and other tools for tailored advocacy and resource mobilization (with a particular emphasis on enhanced F&E interventions), and with communication materials for existing and potential new donors. Strategic resource mobilization efforts focused on Democratic Republic of Congo, South Sudan and parts of Ethiopia, through WHO AFRO's Extended Special program to Eliminate NTDs.

- Help to maintain and update Global SAFE Implementation Cost Estimates.

  In 2016, for the first time, NGO partners supported the release of cost ranges for diverse SAFE implementation environments, analyzed unit costs for trichiasis surgery, developed cost estimates for impact and surveillance surveys and global projections on costs of surveys to meet GET2020 targets, and organized meetings with national programmes to generate implementation cost estimates. They also integrated their own organizational costing mechanisms with large scale partnership initiatives.

- Support implementation of high quality trichiasis surgery, through the application of technology to track cases and adoption of protocols for surgical supervision.

  NGO partners focused on efforts to improve surgical training through support for mannequin-based training (*26*), surgical supervision, and a trichiasis quality-assurance project linked with systematic operational research. A number of tools that aim to contribute to quality outcomes - including the Kobo toolbox for implementing surgical audits, a trichiasis tracking tool, and the International Agency for the Prevention of Blindness essential equipment list for trichiasis screening and surgery (*88*) were also developed and/or trialed.

- Work together to focus efforts on underperforming 'AFE' areas, including through raising awareness of the tools available to support decision making, strengthening MDA planning for improved coverage, and coordinating expansion by maximizing drug availability and involving WASH partners.

  National planning and review workshops strengthened awareness of WHO guidelines and International Coalition for Trachoma Control preferred practices; challenges were identified in cross-border forums; and multi-country working groups were formed to take action. Tools for improving MDA coverage were developed and implemented in pilot districts, and NGO partners redoubled their efforts to systematically engage WASH partners, particularly through the Queen Elizabeth Diamond Jubilee Trust- and DFID-funded scale-up partnership programmes.

- Stand ready to support countries to prepare and submit their dossiers to WHO for validation of elimination.

  NGO partners supported dossier development and submission in Cambodia and Lao PDR; draft dossiers

in Ghana, Nepal and Vietnam; and dossier scoping in Kenya, Mozambique, Senegal, Uganda, and United Republic of Tanzania.

Plans for the year ahead

- Support countries and regions to increase domestic resource allocations, including the development of a regional elimination plan for endemic countries in the Eastern Mediterranean Region.
- Prioritize strategic resource mobilization for GET2020, including where the status of trachoma is uncertain, where districts have not yet started implementation or are not implementing SAFE at 100% geographical coverage, for Tropical Data, towards a trichiasis backlog elimination campaign, and with new funding audiences.
- Advocate for the elimination of trachoma within the context of the Sustainable Development Goals in the 2030 agenda, by advocating to include trachoma interventions into national indicators under target 3.3, in Voluntary National Reviews, and in the global review at the UN High Level Political Forum.
- Seek opportunities for greater partnership and engagement with other NTD communities and develop trachoma's voice in other sectors, including through documentation and promotion of programme successes.
- Support implementation of high quality trichiasis surgery, including through the rollout of the trachomatous trichiasis tracker, and development of preferred practices.
- Support opportunities to underpin programmatic practice for SAFE implementation with the following groups and settings: internally-displaced persons, indigenous populations and refugee camps.
- Stand ready to support countries to prepare and submit dossiers to WHO for validation of elimination of trachoma as a public health problem.

Public and private donors

- Reaffirm our commitment to drug donation, implementation and research.

  Focal points within donor organizations have continued to undertake extensive internal advocacy work to highlight the achievements of the global trachoma elimination programme and the value of ongoing support. The results of this work are being seen through continuing donations of both money and product.
- Create a Donor Coordination Group that meets every quarter to: review timelines and activities, discuss long-term priorities, and identify opportunities for greater coordination in advocacy and funding, informed by input from other constituencies within the Alliance.

  A Donor Coordination Group was established, meeting via teleconference and face to face where possible, and actively sharing information to improve coordination and available funds for implementation of the SAFE strategy.
- Support the Alliance in developing new partnerships and initiatives to further the goals of GET2020.

  In October 2016, the Donor Coordination Group launched the Trachoma Free Africa campaign (http://www.trachomacoalition.org/type/trachoma-free-africa) to support acceleration towards elimination of trachoma by 2020.
- Explore the development of coordinated, proactive advocacy initiatives to help raise visibility of the Alliance, and attract new donors and partners.

The Donor Coordination Group developed an infographic to position elimination and eradication efforts for all NTDs which was widely promoted during the April 2017 NTD Summit, and actively supported the CEO Roundtable meeting and associated media and public relations efforts linked with that same summit.

- Recognizing the importance of domestic financing, stand ready to support country efforts.

  In public presentations made by individual group members, the Donor Coordination Group actively promoted the importance of domestic financing for NTDs in response to Investing to overcome the global impact of neglected tropical diseases: third WHO report on neglected tropical diseases (*13*). They are ready to respond to requests to support country efforts.

Academic and research institutions

Our commitments and progress in the last twelve months

- Facilitate the annual Trachoma Scientific Informal Workshop.

  The 2017 Trachoma Scientific Informal Workshop took place at WHO Geneva on 18 April 2017, in advance of the Alliance meeting. More than 50 people participated.

- Develop and maintain a forum for discussing strategic directions for trachoma research.

  The Network of WHO Collaborating Centres for Trachoma fulfils this need.

- Work with health ministries of trachoma-endemic countries and other stakeholders to undertake, publish, package and disseminate research that will help accelerate achievement and validation of global elimination of trachoma; a particular focus should be to include research components in large-scale elimination programmes, as part of multi-centre investigations that address critical questions about the effectiveness of various interventions.

  This work is ongoing.

- Build scientific capacity in endemic countries in which research is undertaken.

  Four students from trachoma-endemic countries in Africa have recently been supported to undertake Masters-of-Science dissertations related to trachoma through the International Centre for Eye Health and the Kilimanjaro Centre for Community Ophthalmology.

Plans for the year ahead

- Facilitate the annual Trachoma Scientific Informal Workshop
- Develop methods to improve knowledge translation for programmes, including effective screening of research findings and frameworks to enable relevant uptake of findings into practice.
- Support the research priorities identified by the WHO Network of Collaborating Centres for Trachoma, including through discussions at the annual meeting of the Coalition for Operational Research on NTDs.
- Support capacity building by developing scientific infrastructure and research tools as well as supporting trainees in endemic countries.

- Develop academic programmes that provide training directed towards programme strengthening, including training for managing complicated trichiasis cases and training on management of post-operative trichiasis.

Meeting Close

Dr Gautam Biswas, Coordinator, HQ/NTD, Geneva.

In preventive chemotherapy, NGOs are often the driving force behind interventions, while health ministries take on a more passive role. It is imperative that health ministries begin to play a more prominent role in national efforts to eliminate trachoma as a public health problem. In the post-elimination phase, health systems will need to conduct surveillance for several years. For health systems that were previously uninvolved in the elimination process, this new role of surveillance will be very challenging. There is also a need for greater involvement at local level. Local health departments can coordinate interventions and monitor for disease recurrence more easily.

In 2016, 121 million doses of azithromycin were shipped, and only 86 million people were treated with antibiotics. This indicates that 35 million doses were carried over to 2017. The gap between the provision of treatments and the availability of treatments is an issue which will need to be addressed.

The Alliance has made excellent progress towards the elimination of trachoma in 2016. However, there is still a long way to go to reach the 2020 elimination target. WHO stands ready to support.

References

1. World Health Organization. WHO Alliance for the Global Elimination of Trachoma by 2020: progress report on elimination of trachoma, 2014-2016. Wkly Epidemiol Rec. 2017;92:359-68.
2. Solomon AW, Pavluck A, Courtright P, Aboe A, Adamu L, Alemayehu W, et al. The Global Trachoma Mapping Project: methodology of a 34-country population-based study. Ophthalmic Epidemiol. 2015;22:214-25.
3. Engels D. The Global Trachoma Mapping Project: A Catalyst for Progress Against Neglected Tropical Diseases. Ophthalmic Epidemiol. 2016;23:1-2. doi: 10.1080/09286586.2016.1257139.
4. World Health Assembly. Global elimination of blinding trachoma. 51st World Health Assembly, Geneva, 16 May 1998, Resolution WHA51.11. Geneva: World Health Organization; 1998.
5. Habtamu E, Wondie T, Aweke S, Tadesse Z, Zerihun M, Zewdie Z, et al. Trachoma and Relative Poverty: A Case-Control Study. PLoS Negl Trop Dis. 2015;9:e0004228. doi: 10.1371/journal.pntd.0004228.
6. Francis V, Turner V. Achieving community support for trachoma control (WHO/PBL/93.36). Geneva: World Health Organization; 1993.
7. World Health Organization. Planning for the global elimination of trachoma (GET): report of a WHO consultation, Geneva, Switzerland, 25 & 26 November 1996 (WHO/PBL/97.60). Geneva: World Health Organization; 1997.
8. World Health Organization. Global WHO Alliance for the Elimination of Blinding Trachoma by 2020. Wkly Epidemiol Rec. 2012;87:161-8.
9. World Health Organization. Trachoma: fact sheet updated April 2017 [available at http://www.who.int/mediacentre/factsheets/fs382/en/; accessed 16 April 2017]. 2017.
10. Emerson PM, Hooper PJ, Sarah V. Progress and projections in the program to eliminate trachoma. PLoS Negl Trop Dis. 2017;11:e0005402. doi: 10.1371/journal.pntd.0005402.
11. World Health Organization. Network of WHO Collaborating Centres for Trachoma: 2nd meeting report, Decatur, GA, USA, 26 June 2016 (WHO/HTM/NTD/PCT/2017.06). 2017.
12. World Health Organization Alliance for the Global Elimination of Trachoma by 2020. Eliminating trachoma: accelerating towards 2020. London: International Coalition for Trachoma Control; 2016.

13. World Health Organization. Investing to overcome the global impact of neglected tropical diseases: third WHO report on neglected tropical diseases. Geneva: World Health Organization; 2015.
14. World Health Organization. Morocco eliminates trachoma – the leading infectious cause of blindness [Press release, 15 November 2016]. Geneva & Marrakech: World Health Organization; 2016.
15. International Agency for the Prevention of Blindness. Trachoma mapping in the Pacific: Fiji, Solomon Islands and Kiribati. Melbourne: International Agency for the Prevention of Blindness Western Pacific Regional Office; 2013.
16. Cama A, Müller A, Taoaba R, Butcher RMR, Itibita I, Migchelsen SJ, et al. Prevalence of signs of trachoma, ocular Chlamydia trachomatis infection and antibodies to Pgp3 in residents of Kiritimati Island, Kiribati. PLoS Negl Trop Dis. 2017;11:e0005863.
17. Taleo F, Macleod CK, Marks M, Sokana O, Last A, Willis R, et al. Integrated Mapping of Yaws and Trachoma in the Five Northern-Most Provinces of Vanuatu. PLoS Negl Trop Dis. 2017;11:e0005267. doi: 10.1371/journal.pntd.0005267.
18. Marks M, Vahi V, Sokana O, Puiahi E, Pavluck A, Zhang Z, et al. Mapping the epidemiology of yaws in the Solomon Islands: a cluster randomized survey. Am J Trop Med Hyg. 2014;92:129-33. doi: 10.4269/ajtmh.14-0438.
19. Sokana O, Macleod C, Jack K, Butcher R, Marks M, Willis R, et al. Mapping Trachoma in the Solomon Islands: Results of Three Baseline Population-Based Prevalence Surveys Conducted with the Global Trachoma Mapping Project. Ophthalmic Epidemiol. 2016;23:15-21. doi: 10.1080/09286586.2016.1238946.
20. Marks M, Vahi V, Sokana O, Chi KH, Puiahi E, Kilua G, et al. Impact of Community Mass Treatment with Azithromycin for Trachoma Elimination on the Prevalence of Yaws. PLoS Negl Trop Dis. 2015;9:e0003988. doi: 10.1371/journal.pntd.0003988.
21. Ko R, Macleod C, Pahau D, Sokana O, Keys D, Burnett A, et al. Population-Based Trachoma Mapping in Six Evaluation Units of Papua New Guinea. Ophthalmic Epidemiol. 2016;23:22-31. doi: 10.1080/09286586.2016.1235715.
22. World Health Organization. Water sanitation & hygiene for accelerating and sustaining progress on neglected tropical diseases: a global strategy 2015-2020. Geneva: World Health Organization; 2015.
23. World Health Organization. Validation of elimination of trachoma as a public health problem (WHO/HTM/NTD/2016.8). Geneva: World Health Organization; 2016.
24. World Health Organization Strategic and Technical Advisory Group on Neglected Tropical Diseases. Technical consultation on trachoma surveillance. September 11–12, 2014, Task Force for Global Health, Decatur, USA (WHO/HTM/NTD/2015.02). Geneva: World Health Organization; 2015.
25. The Expanded Special Project for Elimination of Neglected Tropical Diseases. 2017 annual report. Brazzaville: World Health Organization Regional Office for Africa; 2018.
26. Gower EW, Kello AB, Kollmann KHM. Training trichiasis surgeons: ensuring quality. Community Eye Health. 2014; 27:58.
27. Hooper PJ, Millar T, Rotondo LA, Solomon AW. Tropical Data: a new service for generating high quality epidemiological data. Community Eye Health. 2016; 29:38.
28. World Health Organization. Tropical Data: a WHO-led initiative to help national programmes collect and do more with their data [web release. Available at: http://www.who.int/trachoma/news/News_Trachoma_Tropical_Data_launch/en/, accessed 21 July 2016]. 2016.

29. World Health Organization Strategic and Technical Advisory Group for Neglected Tropical Diseases. Trachoma Alternative Indicators Study Data review, 31 August - 1 September 2016, Geneva, Switzerland (WHO/HTM/NTD/PCT/2017.10). Geneva: World Health Organization; 2017.
30. Pan American Health Organization. Mexico eliminates trachoma, leading infectious cause of blindness (press release, 24 April 2017; Available at https://www.paho.org/hq/index.php?option=com_content&view=article&id=13179) Washington DC: Pan American Health Organization; 2017.
31. Bero B, Macleod C, Alemayehu W, Gadisa S, Abajobir A, Adamu Y, et al. Prevalence of and Risk Factors for Trachoma in Oromia Regional State of Ethiopia: Results of 79 Population-Based Prevalence Surveys Conducted with the Global Trachoma Mapping Project. Ophthalmic Epidemiol. 2016;23:392-405. doi: 10.1080/09286586.2016.1243717.
32. Cromwell EA, Courtright P, King JD, Rotondo LA, Ngondi J, Emerson PM. The excess burden of trachomatous trichiasis in women: a systematic review and meta-analysis. Trans R Soc Trop Med Hyg. 2009;103:985-92. doi: 10.1016/j.trstmh.2009.03.012.
33. Courtright P. Acceptance of surgery for trichiasis among rural Malawian women. East Afr Med J. 1994;71:803-4.
34. Amza A, Kadri B, Nassirou B, Cotter SY, Stoller NE, West SK, et al. Effectiveness of expanding annual mass azithromycin distribution treatment coverage for trachoma in Niger: a cluster randomised trial. Br J Ophthalmol. 2017. doi: 10.1136/bjophthalmol-2017-310916.
35. Merbs S, Resnikoff S, Kello AB, Mariotti S, Greene G, West SK. Trichiasis surgery for trachoma (2nd ed). Geneva: World Health Organization; 2015.
36. World Health Organization Strategic and Technical Advisory Group on Neglected Tropical Diseases. Design and validation of a trachomatous trichiasis-only survey (WHO/HTM/NTD/PCT/2017.08). Geneva: World Health Organization; 2018.
37. Smith JL, Sivasubramaniam S, Rabiu MM, Kyari F, Solomon AW, Gilbert C. Multilevel Analysis of Trachomatous Trichiasis and Corneal Opacity in Nigeria: The Role of Environmental and Climatic Risk Factors on the Distribution of Disease. PLoS Negl Trop Dis. 2015;9:e0003826. doi: 10.1371/journal.pntd.0003826.
38. Adamu MD, Mpyet C, Muhammad N, Umar MM, Muazu H, Olamiju F, et al. Prevalence of Trachoma in Niger State, North Central Nigeria: Results of 25 Population-Based Prevalence Surveys Carried Out with the Global Trachoma Mapping Project. Ophthalmic Epidemiol. 2016;23:63-9. doi: 10.1080/09286586.2016.1242757.
39. Alada J, Mpyet C, Florea VV, Boisson S, Willis R, Muhammad N, et al. Prevalence of and Risk Factors for Trachoma in Kwara State, Nigeria: Results of 8 Population-Based Surveys from the Global Trachoma Mapping Project. Ophthalmic Epidemiol. 2018; 25(sup1): 53-61. doi: 10.1080/09286586.2018.1437188.
40. Mpyet C, Muhammad N, Adamu MD, Ladan M, Willis R, Umar MM, et al. Impact survey results after SAFE strategy implementation in fifteen Local Government Areas of Kebbi, Sokoto and Zamfara States, Nigeria. Ophthalmic Epidemiol. 2018; 25(sup1): 103-14. doi: 10.1080/09286586.2018.1481984
41. Bio AA, Boko PM, Dossou YA, Tougoue JJ, Kabore A, Sounouvou I, et al. Prevalence of trachoma in northern Benin: results from 11 population-based prevalence surveys covering 26 districts. Ophthalmic Epidemiol. 2017;24:265-73. doi: 10.1080/09286586.2017.1279337
42. National Program for Control of Blindness and Visual Impairment. National Trachoma Prevalence Survey, India 2014-2017. New Delhi: Government of India; 2018.

43. National Program for Control of Blindness and Visual Impairment. National Trachoma Rapid Assessment Survey, India 2014-2017. New Delhi: Government of India; 2018.
44. Durkin SR, Casson RJ, Newland HS, Aung TH, Shein WK, Muecke JS, et al. Prevalence of trachoma-related trichiasis and corneal opacity in rural Myanmar: the Meiktila Eye Study. Ophthalmology. 2007;114:e7-11. doi: 10.1016/j.ophtha.2007.01.014.
45. Meng N, Seiha D, Thorn P, Willis R, Flueckiger RM, Dejene M, et al. Assessment of Trachoma in Cambodia: Trachoma Is Not a Public Health Problem. Ophthalmic Epidemiol. 2016;23:3-7. doi: 10.1080/09286586.2016.1230223.
46. Southisombath K, Sisalermsak S, Chansan P, Akkhavong K, Phommala S, Lewallen S, et al. National Trachoma Assessment in the Lao People's Democratic Republic in 2013-2014. Ophthalmic Epidemiol. 2016:1-7. doi: 10.1080/09286586.2016.1236973.
47. Dirani M, Keel S, Foreman J, van Wijngaarden P, Taylor HR. Prevalence of trachomatous trichiasis in Australia: the National Eye Health Survey. Clin Exp Ophthalmol. 2017;46:13-7. doi: 10.1111/ceo.13003.
48. Huppatz C, Gibson R, WA Trachoma Reference Group. Ten years of trachoma elimination in rural Western Australia: lessons from the field. In: Coleman C, editor. Proceedings of the 14th National Rural Health Conference, Cairns, Queensland, 26-29 April 2017. Canberra: National Rural Health Alliance; 2017.
49. Kama M, Cama A, Rawalai K, Koroivueta J. Active ocular trachoma In Fiji - a population-based prevalence study. Fiji J Pub Health. 2013;2:11-7.
50. Macleod CK, Butcher R, Mudaliar U, Natutusau K, Pavluck AL, Willis R, et al. Low Prevalence of Ocular Chlamydia trachomatis Infection and Active Trachoma in the Western Division of Fiji. PLoS Negl Trop Dis. 2016;10:e0004798. doi: 10.1371/journal.pntd.0004798.
51. Macleod C, Yalen C, Butcher R, Mudaliar U, Natutusau K, Rainima-Qaniuci M, et al. Eyelash Epilation in the Absence of Trichiasis: Results of a Population-Based Prevalence Survey in the Western Division of Fiji. PLoS Negl Trop Dis. 2017;11:e0005277. doi: 10.1371/journal.pntd.0005277.
52. Hiep NX, Ngondi JM, Anh VT, Dat TM, An TV, Dung NC, et al. Trachoma in Viet Nam: results of 11 surveillance surveys conducted with the Global Trachoma Mapping Project. Ophthalmic Epidemiol. 2018; 25(sup1): 93-102. doi: 10.1080/09286586.2018.1477964
53. Kilangalanga J, Ndjemba JM, Uvon PA, Kibangala FM, Mwandulo JSB, Mavula N, et al. Trachoma in the Democratic Republic of the Congo: results of 46 baseline prevalence surveys conducted with the Global Trachoma Mapping Project. Ophthalmic Epidemiol. 2017;2018 Dec; 25(sup1):192-200. doi: 10.1080/09286586.2017.1306869.
54. Karimurio J, Gichangi M, Ilako DR, Adala HS, Kilima P. Prevalence of trachoma in six districts of Kenya. East Afr Med J. 2006;83:63-8.
55. Sanders AM, Stewart AEP, Makoy S, Chebet JJ, Magok P, Kuol A, et al. Burden of trachoma in five counties of Eastern Equatoria state, South Sudan: Results from population-based surveys. PLoS Negl Trop Dis. 2017;11:e0005658. doi: 10.1371/journal.pntd.0005658.
56. Masesa DE, Moshiro C, Masanja H, Mkocha H, Ngirwamungu E, Kilima P, et al. Prevalence of active trachoma in Tanzania. East Afr J Ophthalmol. 2007;13:34-8.
57. Burr SE, Sillah A, Sanou AS, Wadagni AC, Hart J, Harding-Esch EM, et al. Cross-Sectional Surveys of the Prevalence of Follicular Trachoma and Trichiasis in The Gambia: Has Elimination Been Reached? PLoS Negl Trop Dis. 2016;10:e0004906. doi: 10.1371/journal.pntd.0004906.

58. Migchelsen SJ, Sepulveda N, Martin DL, Cooley G, Gwyn S, Pickering H, et al. Serology reflects a decline in the prevalence of trachoma in two regions of The Gambia. Sci Rep. 2017;7:15040. doi: 10.1038/s41598-017-15056-7.

59. Yayemain D, King JD, Debrah O, Emerson PM, Aboe A, Ahorsu F, et al. Achieving trachoma control in Ghana after implementing the SAFE strategy. Trans R Soc Trop Med Hyg. 2009;103:993-1000. Epub 2009/03/17. doi: 10.1016/j.trstmh.2009.02.007.

60. Debrah O, Mensah EO, Senyonjo L, de Souza DK, Hervie TE, Agyemang D, et al. Elimination of trachoma as a public health problem in Ghana: Providing evidence through a pre-validation survey. PLoS Negl Trop Dis. 2017;11:e0006099. doi: 10.1371/journal.pntd.0006099.

61. Hassan A, Ngondi JM, King JD, Elshafie BE, Al Ginaid G, Elsanousi M, et al. The prevalence of blinding trachoma in northern states of Sudan. PLoS Negl Trop Dis. 2011;5:e1027. doi: 10.1371/journal.pntd.0001027.

62. Elshafie BE, Osman KH, Macleod C, Hassan A, Bush S, Dejene M, et al. The Epidemiology of Trachoma in Darfur States and Khartoum State, Sudan: Results of 32 Population-Based Prevalence Surveys. Ophthalmic Epidemiol. 2016;23:381-91. doi: 10.1080/09286586.2016.1243718.

63. Thabit AA, Al-Khatib T. Prevalence of trachoma in four governorates in Yemen. Sana'a University J Med Sci. 2016;7:9-14. doi: 10.1016/s0140-6736(11)61515-8.

64. Pan American Health Organization. Fourth regional meeting of managers of national programs for the elimination of trachoma as a public health problem in the Americas, Mexico City, 6–8 September 2016 (PAHO/CHA/17-015). Washington, D. C.: PAHO; 2017.

65. International Coalition for Trachoma Control. All you need to know for F&E: a practical guide to partnering and planning. London: International Coalition for Trachoma Control; 2015.

66. Delea MG, Solomon H, Solomon AW, Freeman MC. Interventions to maximize facial cleanliness and achieve environmental improvement for trachoma elimination: a review of the grey literature. PLoS Negl Trop Dis. 2018;12:e0006178.

67. Karani R, Wolle M, Mkocha H, Munoz B, West SK. Risk factors for incidence of trachomatous scarring in a cohort of women in low endemic district. Br J Ophthalmol 2018; 102(4): 419-23. 2018. doi: 10.1136/bjophthalmol-2017-311301.

68. World Health Organization Alliance for the Global Elimination of Trachoma by 2020. Second Global Scientific Meeting on Trachomatous Trichiasis. Cape Town, 4-6 November 2015 (WHO/HTM/NTD/2016.5). Geneva: World Health Organization; 2016.

69. Dorkenoo AM, Bronzan RN, Ayena KD, Anthony G, Agbo YM, Sognikin KS, et al. Nationwide integrated mapping of three neglected tropical diseases in Togo: countrywide implementation of a novel approach. Trop Med Int Health. 2012;17:896-903. doi: 10.1111/j.1365-3156.2012.03004.x

70. Dézoumbé D, Djada DA, Négrel AD. Resultats preliminaires de quatre enquetes epidemiologiques de prevalence du trachome (2001-2005): Note de synthèse. N'Djamena: Programme National de Lutte Contre la Cécité, Ministère de la Santé; 2005.

71. Dézoumbé D, Djada DA, Harba TT, Biaou JE, Kali B, Bernasconi J, et al. Prevalence of trachoma in the Republic of Chad: results of 41 population-based surveys. Ophthalmic Epidemiol. 2018; 25(sup1): 143-54. doi: 10.1080/09286586.2018.1546877

72. World Health Organization. Informal consultation on a tracking system for patients with trachomatous trichiasis. Rollins School of Public Health, Emory University, Atlanta, USA, Wednesday 30 September 2015 (WHO/HTM/NTD/2016.1). Geneva: World Health Organization; 2016.

73. Habtamu E, Wondie T, Aweke S, Tadesse Z, Zerihun M, Zewudie Z, et al. Posterior versus bilamellar tarsal rotation surgery for trachomatous trichiasis in Ethiopia: a randomised controlled trial. Lancet Glob Health 2016; 4(3): e175-84. doi: 10.1016/S2214-109X(15)00299-5.
74. International Council of Ophthalmology. Bahrain Declaration on Trachoma and Trichiasis Surgery [Available at: http://www.icoph.org/dynamic/attachments/resources/icotrichiasis.pdf, accessed 06 April 2017] 2009.
75. World Health Organization. Crossing the billion. Lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiases and trachoma: preventive chemotherapy for neglected tropical diseases (WHO/HTM/NTD/PCT/2017.04). Geneva: World Health Organization; 2017.
76. Yajima A, Mikhailov A, Mbabazi PS, Gabrielli AF, Minchiotti S, Montresor A, et al. Preventive Chemotherapy and Transmission Control (PCT) databank: a tool for planning, implementation and monitoring of integrated preventive chemotherapy for control of neglected tropical diseases. Trans R Soc Trop Med Hyg. 2012;106:215-22. doi: 10.1016/j.trstmh.2012.01.003.
77. Trotignon G, Jones E, Engels T, Schmidt E, McFarland DA, Macleod CK, et al. The cost of mapping trachoma: Data from the Global Trachoma Mapping Project. PLoS Negl Trop Dis. 2017;11:e0006023. doi: 10.1371/journal.pntd.0006023.
78. Hammou J, El Ajaroumi H, Hasbi H, A. N, Hmadna A, El Maaroufi A. In Morocco, the elimination of trachoma as a public health problem becomes a reality. Lancet Glob Health. 2017;5:e250-e1. doi: 10.1016/S2214-109X(17)30023-2
79. Pant BP, Bhatta RC, Chaudhary JS, Awasthi S, Mishra S, Sharma S, et al. Control of Trachoma from Achham District, Nepal: A Cross-Sectional Study from the Nepal National Trachoma Program. PLoS Negl Trop Dis. 2016;10:e0004462. doi: 10.1371/journal.pntd.0004462.
80. West SK, Zambrano AI, Sharma S, Mishra SK, Munoz BE, Dize L, 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. doi: 10.1001/jamaophthalmol.2017.3062.
81. Zambrano AI, Sharma S, Crowley K, Dize L, Munoz BE, Mishra SK, et al. The World Health Organization Recommendations for Trachoma Surveillance, Experience in Nepal and Added Benefit of Testing for Antibodies to Chlamydia trachomatis pgp3 Protein: NESTS Study. PLoS Negl Trop Dis. 2016;10:e0005003. doi: 10.1371/journal.pntd.0005003.
82. Sowa S, Sowa J, Collier LH, Blyth W. Trachoma and allied infections in a Gambian village. Medical Research Council Special Report. 1965;308:1-88.
83. Faal H, Minassian D, Sowa S, Foster A. National survey of blindness and low vision in The Gambia: results. Br J Ophthalmol 2018. 1989;73:82-7.
84. Dolin PJ, Faal H, Johnson GJ, Ajewole J, Mohamed AA, Lee PS. Trachoma in The Gambia. Br J Ophthalmol. 1998;82:930-3.
85. Harding-Esch EM, Edwards T, Sillah A, Sarr I, Roberts CH, Snell P, et al. Active trachoma and ocular Chlamydia trachomatis infection in two Gambian regions: on course for elimination by 2020? PLoS Negl Trop Dis. 2009;3:e573. Epub 2009/12/23. doi: 10.1371/journal.pntd.0000573.
86. Garn JV, Boisson S, Willis R, Bakhtiari A, Al-Khatib T, Amer K, et al. Sanitation and water supply coverage thresholds associated with active trachoma: modeling cross-sectional data from 13 countries. PLoS Negl Trop Dis. 2018;12:e0006110. doi: 10.1371/journal.pntd.0006110

87. Solomon AW, Zondervan M, Kuper H, Buchan JC, Mabey DCW, Foster A. Trachoma control: a guide for programme managers. Geneva: World Health Organization; 2006.

88. Balantrapu TV, Hoare PJ. The International Agency for the Prevention of Blindness (IAPB) launches essential equipment list for screening and surgery for trachomatous trichiasis. Ophthalmic Epidemiol. 2015;22:151-2.

Annexes

ANNEX1: AGENDA

Thursday, 20 April 2017

Time	Topic	Speakers / Facilitators
08:00–12:30	NTD Summit plenary session	
12:30–13:45	Lunch	

Session 1

Time	Topic	Speakers / Facilitators
13:45–14:00	Welcome Nomination of officers Purpose, outcome and outputs of meeting Adoption of agenda Administrative matters	Dirk Engels (WHO) Anthony Solomon (WHO) Anthony Solomon (WHO) Chair Anthony Solomon (WHO)
14:00–14:05	Opening	Ren Minghui (WHO)
14:05–14:45	High-level panel	Bruce Gordon (WHO) Mahmoud Fikri (EMRO) Mark Jacobs (WPRO) Iain Jones (DFID) Ren Minghui (WHO) Matshidiso Moeti (AFRO) Emily Wainwright (USAID)
14:45–15:00	Group photograph	
15:00–15:30	Coffee	
15:30–15:50	World Health Organization report	Anthony Solomon (WHO)
15:50–16:10	International Coalition for Trachoma Control report	Virginia Sarah (ICTC)
16:10–17:10	WHO regional reports	Programme managers (SEARO) Rabindra Abeyasinghe (WPRO) Simona Minchiotti (AFRO) Ismat Chaudhry (EMRO) Martha Saboya (PAHO)
17:10–17:30	Discussion	All

Friday, 21 April 2017

Session 2

Time	Topic	Speakers / Facilitators
08:00–08:15	Trachoma Scientific Informal Workshop: questions and answers	Matthew Burton (LSHTM), Emily Gower (UNC), Tom Lietman (UCSF), Sheila West (Johns Hopkins)
08:15–09:15	Water, Sanitation and Hygiene for GET2020	
	1) Reducing the TT backlog	Dézoumbé Djore (Chad)
	2) Getting the TT backlog to zero	Marcel Awoussi (Togo)
	3) Transitioning TT care into routine services	Marilia Massangaie (Mozambique)
	4) The TT patient tracking app	Michael Masika (Malawi)
	5) The MMDP Project	Joe Amon (HKI)
	6) Can we eliminate TT by 2020?	Hugh Taylor (ICO)
09:15–09:20	Instructions for Breakout A	Chair
09:20–10:30	Breakout A	English-speaking group
		French-speaking group
		Portuguese- and Spanish-speaking group
17:00–18:00	Partners' panel discussion	Warren Lancaster (END Fund)
10:30–11:00	Coffee	
11:00–11:30	Report back from Breakout A	Breakout group representatives
	Discussion	All
11:30–11:50	Managing PC-NTD implementation data	Alexei Mikhailov (WHO)
	Discussion	All
12:10–12:30	Managing trachoma prevalence survey data	Nicholas Olobio (Nigeria)
	Discussion	All
11:00–11:30	Forecasting trachoma elimination	Anthony Solomon (WHO)
	Discussion	All

Time	Topic	Speakers / Facilitators
12:30–14:00	Lunch	
14:00–17:30	NTD Summit plenary session	
18:00–21:30	Reception	

Saturday 22 April 2017

Session 3

Time	Topic	Speakers / Facilitators
08:00–09:00	Panel: validation of trachoma elimination	Agatha Aboe (Sightsavers)
	1) Country perspective: Morocco	Abderrahmane Maaroufi (Morocco)
	2) Country perspective: Mexico	Sury Antonio López Cancino (Mexico)
	3) Country perspective: Lao PDR	Khamphoua Southisombath (Lao PDR)
	4) Country perspective: Nepal	Sailesh Kumar Mishra (Nepal)
	5) Country perspective: The Gambia	Sarjo Kanyi (Gambia)
	6) Dossier Review Group perspective	Sheila West (Johns Hopkins)
	7) Donor perspective	Aryc Mosher (USAID)
	Discussion	All
09:00–09:15	International Trachoma Initiative report	Paul Emerson (ITI)
09:15–09:55	A, F and E for GET2020	
	1. Selecting and training community drug distributors	Mackline Garae (Vanuatu)
	2. Going to scale with A, F and E	Martin Kabore (Burkina Faso)
	3. Interventions for facial cleanliness	Maryann Delea (Emory)
	4. Thresholds for environmental improvement	Sophie Boisson (WHO)
11:45–12:30	Breakout B	English-speaking group
		French-speaking group
		Portuguese- and Spanish-speaking group
10:30–11:00	Coffee break	
11:00–11:45	Breakout B, continued	
11:45–12:30	Report back from Breakout B	Breakout group representatives
	Discussion	All

Session 4

Time	Topic	Speakers / Facilitators
14:00–14:05	Introduction to Breakout C	Anthony Solomon (WHO)
14:05–15:30	Breakout C: Plans of action: 2016 and 2017	
	1) Country representatives	Anthony Solomon (WHO)
	2) WHO	Sailesh Mishra (Nepal)
	3) NGOs	Promila Gupta (India)
	4) Donors	Rui Zhang (China)
	5) Academic and training institutions	Gustavo Sanchez Tejeda (Mexico)
15:30–16:00	Coffee	
16:00–16:50	Report back from Breakout C	Breakout group representatives
	Discussion	All
16:50–17:00	Call to action	Anthony Solomon (WHO)
	Meeting close	Chair

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* The 21st meeting of the WHO Alliance for GET2020 was held as part of the 2017 NTD Summit, for which registration was centralized and at which participants were free to move between disease-specific sessions. As a consequence, only national representatives sponsored by WHO to attend the Alliance meeting and members of the WHO Secretariat who contributed to the meeting are listed here.

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