NETWORK OF
WHO COLLABORATING CENTRES FOR

TRACHOMA

SECOND MEETING REPORT

DECATUR, GA, USA, 26 JUNE 2016

World Health Organization

Network of WHO collaborating centres for trachoma

Report of 2nd meeting

Decatur, GA, USA, 26 June 2016

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Abbreviations

BMGF	Bill & Melinda Gates Foundation
CDC	United States Centers for Disease Control and Prevention
CRT	community randomized trial
CT	*Chlamydia trachomatis*
DFID	United Kingdom Department for International Development
EDCTP	European & Developing Countries Clinical Trials Partnership
GET2020	WHO Alliance for the Global Elimination of Trachoma by 2020
GTMP	Global Trachoma Mapping Project
HKI	Helen Keller International
LSHTM	London School of Hygiene & Tropical Medicine
KCCO	Kilimanjaro Centre for Community Ophthalmology
MDA	mass drug administration
MMDP	morbidity management and disability prevention
NIH	United States National Institutes of Health
NTD-SC	Neglected Tropical Diseases Support Center
SAFE	surgery, antibiotics, facial cleanliness, environmental improvement
TF	trachomatous inflammation—follicular
TI	trachomatous inflammation—intense
TT	trachomatous trichiasis
UCSF	University of California, San Francisco
UNHCR	United Nations High Commissioner for Refugees
USAID	United States Agency for International Development
WHO	World Health Organization
WHOCC	WHO collaborating centre

Background

International commitment to eliminate trachoma as a public health problem worldwide is supported by resolution WHA51.11 of the World Health Assembly.[1] Important progress towards this goal has been made by harnessing the mostly informal relationships that exist between partners including Member States, the World Health Organization (WHO), academic institutions, donors and nongovernmental organizations. Recognizing that work remains to be done and that the 2020 target[2] for elimination is rapidly approaching, in February 2015 the WHO Department of Control of Neglected Tropical Diseases convened a group of academic institutions that had for many years helped WHO to implement its mandate on trachoma and to work towards establishing a Network of WHO collaborating centres (WHOCCs) for Trachoma. The report of that meeting has been published.[3]

WHO recognizes that formalized collaboration with institutions through designation of WHO collaborating centres yields benefits for both parties: WHO gains access to leading institutions worldwide and additional capacity to support its work; and institutions designated as WHOCCs gain increased visibility and recognition by national authorities and attract greater attention from the public for the health issues on which they are active. Centres can also work together at international level via a formal WHO-led platform, facilitating better coordination and enhanced opportunities to mobilize resources from funding partners. This win–win relationship between WHO and its Collaborating Centres should make a difference to the prospects of eliminating trachoma globally.

To be considered for designation as a WHOCC, eligible institutions must fulfil all of the following criteria:

- high scientific and technical standing at national and international levels;
- prominence in the country's health, scientific or educational structures;
- high quality of scientific and technical leadership, and sufficient number of staff with high-level qualifications;
- stability of personnel, activity and funding;
- strong working relationship with other institutions in the country, and at intercountry, regional and global levels;
- clear ability, capacity and readiness to contribute, both individually and within networks, to WHO programme activities, whether in support of country programmes or through participation in international cooperative activities;
- demonstrated technical and geographical relevance of both the institution and its activities to WHO's programme priorities; and
- at least 2 years of previous collaboration with WHO in carrying out jointly planned activities.

Each institution working towards designation as a WHO collaborating centre for trachoma[1] fulfils all of these criteria.

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[1] Resolution WHA51.11. Global elimination of blinding trachoma. Fifty-first World Health Assembly, Geneva, 7–16 May 1998. In: Resolutions and decisions, annexes. Geneva: World Health Organization; 1998 (http://www.who.int/blindness/causes/WHA51.11/en/)

[2] Accelerating work to overcome the global impact of neglected tropical diseases: a roadmap for implementation [Roadmap approved by the Strategic and Technical Advisory Group for Neglected Tropical Diseases in 2011]. Geneva: World Health Organization; 2012 (WHO/HTM/NTD/2012.1, http://www.who.int/neglected_diseases/NTD_RoadMap_2012_Fullversion.pdf).

[3] Network of WHO Collaborating Centres for Trachoma: inception meeting report. Decatur, GA, USA, 19–20 February 2015. Geneva: World Health Organization; 2015 (WHO/HTM/NTD/2016.3, http://apps.who.int/iris/bitstream/10665/208889/1/9789241508964_eng.pdf?ua=1).

The second meeting of the Network was held on 26 June 2016 at the International Trachoma Initiative in Decatur, GA, USA. The objectives of the meeting were to update members of the Network and other interested parties on developments since the inception meeting (Decatur, February 2015), to review progress on activities identified at that first meeting and to plan future work.

Opening of the meeting

The meeting was opened by Dr Anthony Solomon, WHO Medical Officer for Trachoma and Secretary to the WHO Alliance for the Global Elimination of Trachoma by 2020 (GET2020), who thanked participants for devoting time to attend the meeting. Participants (Annex 1) introduced themselves, and the purpose, outcome and outputs of the meeting were agreed as follows:

Purpose: to accelerate the process of establishing a Network of WHOCCs for Trachoma, facilitate a common understanding of progress towards that goal, and allow proposed institutions to update plans for activities that the Network might undertake.

Outcome: a developing Network, composed of a number of institutions working towards designation as WHOCCs for Trachoma; plus the Secretariat at WHO headquarters, supported by the relevant regional offices.

Outputs: a meeting report.

The **Agenda** (Annex 2) was adopted without amendment.

Update on progress

Dr Solomon summarized progress towards designation of WHOCCs for Trachoma, which had been slower than anticipated due to a shortfall in human resources dedicated to trachoma elimination at WHO headquarters in Geneva, Switzerland. The WHO Department of Control of Neglected Tropical Diseases was actively exploring options to redress this situation, and had agreed terms with Dr Andreas Mueller of the University of Melbourne (formerly Technical Lead, Blindness Prevention and Control, WHO Regional Office for the Western Pacific) to undertake a consultancy to support trachoma elimination activities for 2 days per week. Aside from the issue of formal designation of WHOCCs for Trachoma, the Network was already fulfilling part of its anticipated role by providing a platform for coordination of and collaboration on activities to accelerate global elimination of trachoma.

Vision, aim and objectives of the Network

The vision, aim and objectives of the Network, as agreed at the Inception Meeting, were reviewed; no amendments were proposed.

Vision of the Network: Global elimination of trachoma as a public health problem by 2020.

Aim of the Network: To facilitate coordinated action of designated academic institutions in their trachoma elimination area of work.

Objectives of WHOCCs and of the Network as a whole:

A: To plan and undertake collaborative research, and development and application of appropriate technology, relevant to trachoma elimination programmes

- A1: To plan and undertake collaborative research on the facial cleanliness and environmental improvement components of the SAFE strategy
- A2: To plan and undertake collaborative research on the antibiotic component of the SAFE strategy, including research on co-administration of azithromycin with other drugs
- A3: To plan and undertake collaborative research on elimination thresholds and surveillance for trachoma
- A4: To plan and undertake collaborative research on the surgery component of the SAFE strategy
- A5 To develop, and make accessible, quality-assured systems for measuring the prevalence of ocular *Chlamydia trachomatis* (CT) infection, and of circulating anti-CT antibodies, for the purposes of research at programmatic scale

B: To plan and undertake capacity-building and training initiatives to support trachoma elimination programmes

C: To collaborate in the collection, collation and dissemination of information about trachoma elimination and reference substances relevant to trachoma elimination programmes

D: To help standardize the use of terminology and data about trachoma

E: To coordinate efforts towards research and development; capacity-building and training; collection, collation and dissemination of information and reference substances; and standardized use of terminology and data.

Activities[4]

Activities for objective A1: To plan and undertake collaborative research on the facial cleanliness and environmental improvement components of the SAFE strategy

Questions that the activity should address (potential utility of answers)	Relevant previous and ongoing work	Suggested approach (potential locations)	Tentative cost (US$)[5], possible funders	Nominated lead(s) to develop activity
1. At district/evaluation unit level, what are the water and sanitation correlates of high TF prevalence? (Hypothesis development for intervention studies)	Previous studies are of highly variable quality; explanatory variables, grading and survey design generally not standardized	Analysis of data from the GTMP: health ministries are contributing data now	**20K** (WHO)	LSHTM (Pullan) and Emory (Freeman)
2. What approaches to the F&E components of SAFE have been used by trachoma elimination programmes? Are there any unpublished data on outcomes? (Hypothesis development for intervention studies)	To be determined through the activity; work is under way	Review of grey literature by graduate student; ICTC members to be asked to search for reports on file, and liaise with in-country partners	**26K** (WHO)	Emory (Freeman)
3. What are the major routes of transmission of ocular CT, and their behavioural determinants? Can contextually appropriate, targeted approaches be designed to interrupt them?	There is evidence that flies may be involved in transmission of ocular CT infection in some contexts; fingers and fomites are believed to also play a role, but evidence is limited	STRONGER-SAFE (Chad/ Ethiopia): (1) understand transmission – intensive observational studies, swab collection for PCR and CT sequencing; (2) interrupt transmission – small-scale pilot studies; (3) cluster randomized trials	**9000K** (still required: proposal being submitted to various potential UK funders)	LSHTM (Burton/Cairncross)

[4] Tables revised and updated by participants by going through the original tables (generated during the Inception Meeting) line by line.
[5] For this table and those that follow **amounts in green text** are funds already secured; **amounts in yellow text** are funds that have been requested and are under active consideration by one or more funding agencies; and **amounts in red text** have not yet been formally requested.

4. What approaches to the F&E components of SAFE lead to sustained changes in behaviour and access? Do these changes produce reductions in the prevalence of TF and/or ocular CT infection? (Guideline development and programme planning)	Previous: 1. West et al, Lancet 1995 2. Emerson et al, Lancet 1999 3. Emerson et al, Lancet 2004 4. West et al, Lancet 2006 Ongoing: 1. LSHTM (Curtis) working on UNILEVER trial of school-based hygiene intervention, with trachoma as one of several end-points 2. FASTRAC study (Amhara, Ethiopia) 3. SWIFT–WUHA study (year 3 of 5)	Reprise the FASTRAC study: a CRT comparing antibiotic distribution alone with antibiotic distribution plus F&E (two sites, one of which should be Oromia, Ethiopia; the other selected from, e.g. Bijagos Islands, Guinea-Bissau; Karamoja, Uganda; and Amazonas, Colombia) Outcome measures: prevalence of TF, prevalence of ocular CT, prevalence of soil-transmitted helminths, growth markers, cost	**500K** from World Bank + **200K** by 3ie committed to FASTRAC; an additional **500K** required for PCR and final year data collection **4000K** for two additional sites Queen Elizabeth Diamond Jubilee Trust and DFID (?to fund implementation of F&E) NTD-SC/BMGF/ USAID/EDCTP (research funds)	Emory (Freeman/McFarland) and UCSF (Keenan)
5. What are the optimal strategies for delivering F&E in populations where measuring impact on disease is difficult? (Guideline development and programme planning)	Limited	Work with 2–3 counties in which F&E is being implemented (as part of existing projects) to conduct a rigorous outcome evaluation; develop a consistent evaluation framework (tools, indicators) and pilot, revise and evaluate approaches to assess potential to change behaviour, with input from behavioural scientists	**400K** (concept note developed; funding source not yet identified)	Emory (Freeman)

Activities for objective A2: To plan and undertake collaborative research on the antibiotic component of the SAFE strategy, including research on co-administration of azithromycin with other drugs

Questions that the activity should address (potential utility of answers)	Relevant previous and ongoing work	Suggested approach (potential locations)	Tentative cost (US$), possible funders	Nominated lead(s) to develop proposal
1. Does azithromycin coverage matter? If yes, how do we maximize demand, and optimally motivate distribution teams? (Guideline development and programme planning)	1. Harding-Esch et al, PLoS NTDs 2013 2. West et al, PLoS NTDs 2013 In programme practice, administrative coverage reports differ from coverage survey data; coverage appears to be highly dependent on the distributor; people's choice about participation seems to be more important than their availability; donors are often unwilling to pay for coverage surveys, so they are done infrequently Ongoing: "How do we maximize demand?" (LSHTM)	Consider whether coverage matters in the context of programme impact – do areas of low compliance become "hot spots" of infection?	For "Does coverage matter?", Dana Center has **15K** (internal seed funding) for work in Kongwa, United Republic of Tanzania (?still require an additional **10K**) LSHTM part-funded (**50K**) by Wellcome Trust, **138K** needed (?RTI)	Dana Center (West) LSHTM (Mtuy/Burton)
2. How should national programmes rapidly identify areas with poor coverage? (Guideline development and programme planning)	There is a significant literature on coverage estimation for various interventions Coverage Survey Tool (WHO) to be trialed for	Review previous approaches used to evaluate coverage in mass administration of azithromycin and other interventions	Await literature review to determine whether further funding is required	KCCO (Courtright)/ Emory (Haddad)

	mass administration of azithromycin in Vanuatu.			
3. Is co-administration of azithromycin + albendazole (or mebendazole) safe? Is co-administration of azithromycin + ivermectin + albendazole safe? (Guideline development and programme planning)	1. Amsden et al, AJTMH 2007 2. El-Tahtawy et al, PLoS NTDs 2008 3. Coulibaly et al, PLoS NTDs 2013 4. Trial of ivermectin +azithromycin in the Solomon Islands	Carry out intensive safety monitoring of co-administration; discuss with clinical pharmacologists and regulatory experts to determine the scale of data collection needed to provide assurance about the safety of co-administration	Budget estimates being prepared ITI has **150K** available Progressing	LSHTM (Marks)
4. Should specific population subsets be targeted for antibiotic treatment, rather than undertaking MDA? Should the target population for antibiotic MDA remain the same throughout the whole programme cycle, or should it change? Is treatment more effective or efficient (in terms of quantities of azithromycin and drug distribution costs) using an intensive antibiotic "attack phase" and then maintaining the gains made with less intensive intervention, rather than simply conducting routine annual treatment rounds? Do the answers to these questions depend on the baseline TF prevalence? (Guideline development and programme planning)	Previous: 1. TANA – treating children only had a similar effect to treating the entire population 2. Biannual versus annual treatment has been studied; very little evidence of advantage over annual treatment 3. Bijagos Islands study (LSHTM): 2nd treatment 1 week after 1st did not provide evidence to change current practice Ongoing: 1. TANA2/ TIRET: A child-targeted treatment arm, compared with ongoing annual mass treatment and stopped treatment 2. PRET-Niger: A biannual child-treated arm compared with annual	Publish TANA2 and PRET-Niger studies comparing targeting to children versus other strategies, including annual treatment of the entire community; prepare a summary of relevant studies, which could be presented to decision-makers The "Enhanced MDA Study" is a programme-embedded CRT for Amhara, Ethiopia, that will examine the effect of giving children two extra rounds of antibiotic treatment in quick succession after MDA of entire population; it is already part-funded Consider a CRT undertaken in the context of programmes to assess antibiotic-sparing, sustainable treatment strategies, including: i) a single mass treatment	No funding required for dissemination and summary of current results Enhanced MDA study: **600K** already committed by ITI; additional **1400K** required Subsequent CRTs would cost a minimum of **1000K** per site, unless substantial	UCSF (Lietman) Emory (Emerson/Callahan)

	mass treatment	followed by treatment targeted to children only ii) targeting treatment to a subset of individuals—the minimal core group identified by an initial survey to be responsible for transmission in the community As a first step, form a committee to address how to perform randomized trials in the context of existing programmes, at a reasonable cost	cost savings could occur in the context of an existing treatment programme and a simple trial design	
5. What causes re-emergence? Primary treatment failure? Persistent/latent infection? Local recrudescence? Re-introduction from outside? (Hypothesis generation for intervention studies) Are differences in local *C. trachomatis* strains, or differences in the extent of strain diversity, involved?	Modelling suggests that the efficacy of treatment is ~70%; treatment failures frequently occur in treatment of genital tract CT infections Ongoing: LSHTM (Last) funded to study re-emergence in Guinea-Bissau	Conduct longitudinal studies using sequencing in the United Republic of Tanzania (where many rounds of mass azithromycin treatment have been delivered in some places) and in Guinea-Bissau	LSHTM: part of STRONGER-SAFE proposal (see objective A1, activity 3) For United Republic of Tanzania: **65K** needed to supplement **60K** already in hand from NIH It would be useful to also study this in Oromia	LSHTM (Burton/Thomson) Dana Center (West/Quinn) ?
6. What is the optimal number of rounds of antibiotic distribution before conducting or repeating an impact survey? (Guideline	Reliable data are limited, in part due to the previous lack of international standardization of grader training and survey design	Ongoing analyses of routine programmatic data collected using GTMP at baseline and standardized impact and surveillance survey protocols	Specific funds not needed	LSHTM (Macleod)/ Emory (Willis)

development and programme planning)		using certified graders.		
7. Are individuals in endemic communities receiving an ideal therapeutic dose? (Guideline development and programme planning)	People aged ≥ 15 years receive 1 g; anyone aged < 15 years should receive 20 mg/kg, but evidence suggests they receive more than this; the height-based dosing algorithm is designed to minimize under-dosing Ongoing: 1. Data from Malawi suggest mean dose is ~29 mg/kg 2. Data from Vanuatu suggest mean dose is ~30 mg/kg	Collect data on height, weight, and dose received, in multiple countries Revise the algorithm for the next Zithromax® Program Managers Guide	**?Further funds needed** (ITI)	Emory (Emerson)
8. What is the effect of azithromycin MDA on antimicrobial susceptibility patterns in non-target organisms? (Guideline development and programme planning)	Ongoing: MORDOR study currently examining this as a secondary outcome			UCSF (Lietman)/ LSHTM (Burr)

Activities for objective A3: To plan and undertake collaborative research on elimination thresholds and surveillance for trachoma

Questions that the activity should address (potential utility of answers)	Relevant previous and ongoing work	Suggested approach (potential locations)	Tentative cost (US$), possible funders	Nominated lead(s) to develop proposal
1. Do internally-displaced people, refugees, indigenous populations, persons in refugee camps, nomadic populations, prisoners have trachoma at prevalences indicating a public health problem? If yes, how do we best reach them with interventions? (Guideline development and programme planning)	Populations not overseen by UNHCR (generally internally-displaced people) are of greater potential concern than those living in established UNHCR camps; there are large refugee populations in the WHO Eastern Mediterranean Region; recent assessments in camps in Djibouti and Jordan reported zero trachoma Ongoing: 1. Gambella, Ethiopia (RTI/LSHTM) 2. Sudan (LSHTM)	GTMP should continue to work towards supporting these assessments where possible; CDC and ITI are also interested in this issue	Funding needed; proposal in development	CDC (Martin)/ LSHTM (Macleod)
2. The current TT elimination prevalence threshold is difficult to measure and use; would another measure (e.g. TT prevalence in those aged ≥ 40 years) be more reliable, and more easily interpretable? (Indicator development)	There is a considerable literature on TT and age; Muñoz et al, TMIH 1997 found that the incidence appeared to increase with age	Analysis of baseline survey data (GTMP) and impact survey data, followed by fieldwork to trial a prototype methodology	**36K** (Sightsavers/ Helen Keller International (HKI)'s USAID (MMDP grant)	LSHTM (Flueckiger)/ KCCO (Courtright)
3. What are the correct criteria (and terminology) to	WHO 2010 (Report of the 3rd Global Scientific	Use impact and surveillance survey data in Eritrea, Nepal,	Emory have a **7K** student travel	Clarify with Emory (Haddad) re-proposed

use for a TT case at the time of impact and surveillance surveys? Currently, individuals who have refused surgery, are listed for surgery but have not yet received it, or who have had surgery and now have post-operative TT ("recurrent cases") are all considered cases "known to the health system" and are not included in the backlog estimate (Indicator development and programme planning)	Meeting on Trachoma)	United Republic of Tanzania, Viet Nam, ?others Explore possibility of linking students from developed and developing countries KCCO (Courtright)/Dana Center (West)/Emory (Haddad)/WHO (Solomon) agreed on a basic question set	grant; require a further **3K** Dana Center have secured **5K** from the Johns Hopkins University Dean's Office and **5K** from BMGF	work in Senegal and Uganda to investigate, at community level, what services or advice people with TT have previously been offered. Dana Center (West) sending an MD student to United Republic of Tanzania
4. The WHO simplified trachoma grading system is not designed to assess TT in impact surveys; what is the effect on the measured TT prevalence of recording the presence or absence of trachomatous scarring in all cases of trichiasis? (Guideline development, indicator development and programme planning)	Rajak et al, IOVS 2011	Examine this question in Cameroon, Ethiopia, Guatemala, Malawi, Nigeria and Zambia impact surveys, and in the trichiasis screening work in Kongwa; ideally, an ophthalmologist or experienced ophthalmic nurse would undertake the work	**10K** (WHO)	KCCO (Lewallen)/ Dana Center (West)
5. How accurate is the prevalence of TT as assessed by trained antibiotic distributors? Could this be used as an alternative to dedicated TT surveys? (Guideline development)	Ongoing work in Kongwa, United Republic of Tanzania (Dana Center)	Compare TT prevalences determined by trained antibiotic distributors with TT prevalences determined by population-based prevalence surveys	**10K** in addition to partnership with the national programme and an NGO supporting an impact survey	Dana Center (West)
6. The elimination threshold	There is an extensive	Collect data on TF, TI, CT	The Trachoma	UCSF (Porco)/Emory

for active trachoma is a TF prevalence of < 5% in children aged 1–9 years, but the prevalence of CT infection is often much lower than this; what is TF really telling us about CT infection? (Indicator development)	literature on the disease/CT infection mismatch; recent publications on serology: 1. Goodhew et al, PLoS NTDs 2012 2. Liu et al, PLoS NTDs 2013 3. Goodhew et al, BMC Infect Diseases 2014 4. Martin et al, PLoS NTDs 2015 Ongoing: 1. Trachoma Alternative Indicators study (Emory) – review meeting planned for end August 2016 2. Pacific Enigma study (LSHTM)	infection and anti-CT antibodies in order to explore the relationship between them at individual and evaluation-unit levels; should include country and number of years of intervention as variables	Alternative Indicators study has **350K** support from BMGF through the NTD-SC The Pacific Enigma study has been funded by the Fred Hollows Foundation	(Emerson)/Dana Center (West)/LSHTM (Mabey) LSHTM (Mabey)
7. The elimination threshold for active trachoma is a TF prevalence of < 5% in children aged 1–9 years, but the prevalence of CT infection is often much lower than this; is infection or disease more important in predicting the risk of future conjunctival scarring? (Indicator development)	Previous: 1. Risk of trachomatous conjunctival scarring is related to inflammatory scores rather than follicular scores (Dawson et al, ISHCI 1990) 2. West et al, Ophthal Epidemiol 2001 3. Wolle et al, Ophthalmol 2009 4. In individuals with established trachomatous conjunctival scarring, scarring progresses in the	Cohort study in the United Republic of Tanzania	**300K** (funded by Wellcome Trust)	LSHTM (Burton)

	absence of ocular CT; progression is associated with episodes of conjunctival inflammation (Burton et al, PLoS NTDs, in press). Ongoing: cohort study in United Republic of Tanzania (600 children recruited)			
8. What would be the impact on the estimated TF prevalence of having TF diagnoses confirmed by a supervisor? What would the cost–benefit be? Could a cell phone or tablet photograph be used for supervision?	GTMP systems used to photograph yaws lesions in the Solomon Islands	MSc project. Would need supervisor review of a random sample of 5% of "no-TF" eyes, too, otherwise the only consequence of involving supervisors would be to reduce or maintain the prevalence estimate	**10K** (including publication costs) LSHTM Trust Funds/WHO **20K** to support the photograph reading centre at UCSF	LSHTM (Harding-Esch/Butcher)/UCSF (Keenan) UCSF (Lietman)
9. WHO recommends that impact surveys be done 6–12 months after the final round of 1–5 rounds of MDA; if TF prevalence is < 5% at this time point, what is the risk of TF recrudescence?	WHO 2014 (Technical consultation on trachoma surveillance)	Use data from existing datasets (PRET, ASANTE, TIRET) to assess TF and TI at 6 months and at 12 months to determine if 6 months simply measures the effect of the last MDA; involve BMGF-funding modelling consortium In the United Republic of Tanzania, resurvey communities with no disease every 6 months after MDA is discontinued	**10K** to compile datasets (research student required; a few months' work – has not advanced)	Dana Center (Muñoz)/ Emory (Callahan)

Activities for objective A4: To plan and undertake collaborative research on the surgery component of the SAFE strategy

Questions that the activity should address (potential utility of answers)	Relevant previous and ongoing work	Suggested approach (potential locations)	Tentative cost (US$), possible funders	Nominated lead(s) to develop proposal
1. What is the relationship between the prevalence of TF and the prevalence of TT at presumed steady state? (Guideline and indicator development)	Most published data lack international grader standardization and do not use standardized survey or analysis protocols	Analysis of data from GTMP: will require health ministries to contribute their data – now under way	**5K** (publication cost) GTMP can support publication costs	LSHTM (Mabey)/ KCCO (Courtright)
2. What is the ratio of TT prevalence in women to TT prevalence in men? Does this change with overall prevalence? (Advocacy, indicator development and programme planning)	Previous 1. West et al, BJO 2004 2. Cromwell et al, TRSTMH 2009	Analysis of data from GTMP: will require health ministries to contribute their data – now under way	**5K** (plus **5K** publication costs) GTMP can support publication costs	KCCO (Courtright)/ LSHTM (Mabey)
3. After, or in spite of, MDA, what causes scarring and trichiasis? (Indicator development)	In individuals with established trachomatous conjunctival scarring, scarring progresses in the absence of ocular CT; progression is associated with episodes of conjunctival inflammation (Burton et al, PLoS NTDs, in press)	Longitudinal studies of host gene expression, microbiota and anti-CT serological responses	**150K** (Proposal submitted to Wellcome Trust)	LSHTM (Holland)
4. How can surgery for trichiasis be optimized to maximize post-surgical outcomes? (Guideline development and programme planning)	Merbs et al, Ophthal Epidemiol 2015: lower post-operative scar height is associated with increased post-operative trichiasis 1 year after bilamellar tarsal rotation	A randomized controlled trial to compare high versus low incisions is planned (n=3600); may also add an arm to compare outcomes between bilamellar tarsal rotation and Trabut when surgery performed by surgeons originally	**1500K** (NIH)	Dana Center (Merbs)/ Wake Forest (Gower)

		trained to perform bilamellar tarsal rotation (c.f. Habtamu et al, Lancet Glob Health 2016)		
5. Is TT surgery uptake and refusal equitable between males and females? (Guideline development and programme planning)	Habte et al, Ophthal Epidemiol 2008: no difference (Ethiopia)	Programme data from Queen Elizabeth Diamond Jubilee Trust-supported, DFID-supported and USAID MMDP Project-supported programmes Will also add prospectively to the funded trial outlined in A4.4	**10K** Queen Elizabeth Diamond Jubilee Trust/DFID?	KCCO (Courtright)
6. How can case-finding and surgical uptake be made most effective and efficient? What is the value of integrated approaches (e.g. what additional eye health activities could be carried out at the same time as trachoma surveys or TT surgical services?) (Guideline development and programme planning)	Bowman et al, TMIH 2000	Vaupes, Colombia; United Republic of Tanzania Need input from health economists from the beginning Trials of different approaches to encouraging surgical uptake: e.g. house-to-house vs surgical camps vs current standard of care, examining uptake and costs (Burkina Faso, Ethiopia, Mali, Niger, Senegal, Sudan, United Republic of Tanzania)	**75K** HKI's USAID MMDP grant **75K** (to evaluate use of microfinance groups in United Republic of Tanzania) – ?HKI's USAID MMDP grant	Wake Forest (Gower)/ LSHTM (Burton)/ Emory (Haddad) KCCO (Courtright)
7. Does providing good-quality epilation forceps to individuals with TT reduce uptake of surgery? (Guideline development and programme planning)	1. Rajak et al, PLoS Med 2011 2. Habtamu et al, PLoS NTDs 2015	Multi-centre individual randomized controlled trial Burkina Faso, Cameroon, Ethiopia, Kenya, Sudan Issues with production of forceps have prevented this trial from commencing recruitment to date	**75K** (HKI's USAID MMDP grant)	LSHTM (Burton)/ Emory (Haddad)/ KCCO (Courtright)/ Wake Forest (Gower)

Activities for objective A5: To develop, and make accessible, quality-assured systems for measuring the prevalence of ocular CT infection, and of circulating anti-CT antibodies, for the purposes of research at programmatic scale

Activity	Relevant previous and ongoing work	Suggested approach (potential locations)	Tentative cost (US$), possible funders	Nominated lead(s) to develop proposal
1. Assure the reliability and validity of regional systems for measuring the prevalence of ocular CT infection	There is an extensive literature on assessing ocular CT infection in trachoma, and multiple commercially-available assays	Train laboratory personnel in CT PCR in at least one laboratory in each WHO region for research and programme purposes; this could be coordinated with efforts being made within the onchocerciasis control community to establish laboratory capacity for entomological studies Produce manuals on the use of the Cepheid GeneXpert USAID could encourage tuberculosis programmes in some key countries to share USAID-funded GeneXpert equipment with trachoma elimination programmes	Dana Center has existing funds for and extensive experience in certifying laboratories for CT detection Cepheid has agreed to donate GeneXpert II units (commercial value **500K**)	Dana Center (Gaydos/West) and Emory (Hooper)
2. Develop, and make accessible, quality-assured systems for measuring the prevalence of circulating anti-CT antibodies	1. Goodhew et al, PLoS NTDs 2012 2. Liu et al, PLoS NTDs 2013 3. Goodhew et al, BMC Infect Diseases 2014 4. Martin et al, PLoS NTDs 2015	Develop kits, with appropriate instructions, to enable laboratories to undertake ELISA or bead-based immunoassays for anti-CT antibodies, as well as a system of international quality assurance ELISA and a set of internal standards have now been	**101K in FY15; 150K in FY16** (Primarily funded through an inter-agency agreement between USAID and CDC)	CDC (Martin)

		developed. Training has been completed in Colombia, Ghana and Malawi, and is pending in Ethiopia.	Further funds to be requested from USAID for FY17	

Activities for objective B: To plan and undertake capacity building and training initiatives to support trachoma elimination programmes

Activity	Relevant previous and ongoing work	Suggested approach (potential locations)	Tentative cost (US$), possible funders	Nominated lead(s) to develop proposal
1. Undertake a capacity assessment in all trachoma-endemic countries to determine capacity-building needs	Ad hoc	Electronic survey	**10K** (ITI)	KCCO (MacArthur)/ WHO (Solomon)/ Emory (Sankar)
2. Make mannequin-based TT surgery training available to national programmes	HEAD-START Currently trying to change manufacturing process to increase production capacity, while maintaining quality; stock control and distribution systems need work	Training	**150–1000K** depending on scope; **500K** used for the purposes of providing summary calculations on this report HKI's USAID MMDP grant?	Wake Forest (Gower)/ Dana Center (Merbs)
3. Build the capacity of national programmes to undertake routine audit of TT surgery outcomes	Limited; the Mali programme presented results of a pilot audit to the 2016 GET2020 meeting	Develop and introduce a training manual for audit, with oversight included as part of supervision activities	**75K** (HKI's USAID MMDP grant)	Emory (Haddad)
4. Build knowledge, understanding and practical	WHO Neglected Tropical Diseases Programme	Massive Open Online Course to be launched on the FutureLearn	**157K**	LSHTM (Burton/Patel)

skills relevant to trachoma elimination among district-level trachoma, prevention of blindness and neglected tropical disease programme managers	Managers' Training Course	platform in late 2016	Proposal being discussed with Queen Elizabeth Diamond Jubilee Trust	
5. Build understanding of and skills in leadership amongst national trachoma programme managers	Previous: KCCO leadership training course, Cape Town, April 2015 Ongoing: Francophone training now being planned	3 x small group, face-to-face courses	**75K** (ITI)	KCCO (Courtright)
6. Provide members of GET2020 with periodic updates on research findings of immediate relevance to programmes	Trachoma Information Service has been revived		**3K** (ITI)	KCCO (Courtright)

Activities for objective C: To collaborate in the collection, collation and dissemination of information about trachoma elimination and reference substances relevant to trachoma elimination programmes

Activity	Relevant previous and ongoing work	Suggested approach (potential locations)	Tentative cost (US$), possible funders	Nominated lead(s) to develop proposal
1. Draft, circulate and coordinate revisions to "Trachoma control: a guide for programme managers" to produce a second, updated edition	First edition	Coordinate a group to undertake the revision	**7K** required for printing and distribution can be met by WHO	WHO (Solomon)
2. Convene the second global scientific meeting on trichiasis	First global scientific meeting on trichiasis, Moshi, January 2012	Held in Cape Town, November 2015 – report in preparation	**90K** (Sightsavers + HKI's USAID MMDP grant)	KCCO (Courtright)
3. Refine the standard operating procedures on	Current standard operating procedures developed by	Test the current standard operating procedures in Latin	**20K**	Dana Center (West)/ WHO (Solomon)

where to map and where not to map for trachoma	WHO/GTMP	America		
4. Bank conjunctival swabs for CT whole genome sequencing by the Wellcome Trust Sanger Centre	Harris et al, Nat Genetics 2012	Opportunistic collection of conjunctival swabs from individuals with signs of active trachoma seen in surveys or research projects. Joint database	Incremental cost to collect swabs is small Cost of sequencing supported by the Wellcome Trust	LSHTM (Thomson)/ Dana Center (Quinn)
5. Maintain a library of validated antigens for use in anti-CT antibody studies	1. Lu et al, Invest Ophthalmol Vis Sci 2012 2. Goodhew et al, PLoS NTDs 2012 3. Martin et al, PLoS NTDs 2015	Joint database of antigens and constructs available	Cost for vector and antigen storage is minimal	CDC (Martin)/ LSHTM (Holland)

Activities for objective D: To help standardize the use of terminology and data about trachoma

Activity	Relevant previous and ongoing work	Suggested approach (potential locations)	Tentative cost (US$), possible funders	Nominated lead(s) to develop proposal
1. Draft, circulate and coordinate revisions to a standard list of preferred terms and abbreviations relating to trachoma	None	Once agreed, the list will be maintained on the WHO trachoma website, and periodically updated as needed	Negligible	LSHTM (TBD)
2. Use and encourage the use of preferred terms and abbreviations relating to trachoma, and the latest data on trachoma prevalence and implementation activities, in all outputs	None	Use and encourage the use of preferred terms and abbreviations relating to trachoma, and the latest data on trachoma prevalence and implementation activities, in all WHOCC outputs (and in the course of peer review).	Negligible	All

Activities for objective E: To coordinate efforts towards research and development; capacity building and training; collection, collation and dissemination of information and reference substances; and standardized use of terminology and data.

Activity	Relevant previous and ongoing work	Suggested approach (potential locations)	Tentative cost (US$), possible funders	Nominated lead(s) to develop proposal
1. Coordinate efforts towards research and development; capacity building and training; collection, collation and dissemination of information and reference substances; and standardized use of terminology and data	Ad hoc	Appoint an academic with experience in trachoma (lecturer or senior lecturer level) to coordinate activities of the Network, and lead some activities; email, phone calls and teleconferences as required, plus face-to-face, annual meetings in conjunction with the meeting of the WHO Alliance for GET2020.	630K over four years (Task Force for Global Health/ Sightsavers/ Fred Hollows Foundation)	LSHTM (Mabey)

Annex 1. List of participants

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Annex 2. Agenda

Sunday, 26 June 2016

Time	*Topic*	*Speakers*
12:00–13:00	*Lunch*	
13:00–13:15	Welcome and introductions Purpose, outcome and planned outputs of meeting Adoption of agenda Administrative matters related to the meeting	Anthony Solomon
13:15–13:30	Update on designation of WHO collaborating centres for trachoma	Anthony Solomon
13:30–13:45	Review vision, aim and objective of the Network	All
13:45–14:30	Reports of progress against activities identified at the Inception Meeting	All
14:30–15:30	Review activities: are amendments, deletions, or additions to the list needed?	All
15:30–16:00	Funding opportunities	All
16:00–16:10	Next steps, meeting feedback and close	All