

## Helpdesk Report: Trachoma

Date: 4 July 2011

**Query:** What are the main organisations involved in trachoma control and are they global in scope or regional? Are they governmental or NGOs? Is there a global plan for control/elimination/eradication and if so what are the key features? How great is the challenge and is there an estimated cost for meeting it? What is the main approach to trachoma? Is it effective and what does it involve? If medicines, are any of them donated?

**Enquirer :** DFID UK

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### 1. Overview

Nearly 110 million people live in areas where trachoma is endemic and are therefore at risk of infection. Another 210 million people live in regions where trachoma is suspected but where no data is available. In the confirmed districts, an estimated 4.6 million people suffer from the final stages of the disease and require surgery to prevent them from going blind and it is believed that a further 3.6 million are in the advanced stages in areas where data is unavailable. A prolonged exposure to *Chlamydia trachomatis* infection throughout childhood and young adulthood appears to be necessary to produce the complications experienced in later life.

Trachoma is endemic in more than 50 countries with more than 80% of the burden concentrated in 14 countries, and predominantly in the savannah areas of East and Central Africa and the Sahel of West Africa. Roughly half of the global burden of active trachoma is concentrated in Ethiopia, India, Nigeria, Uganda and Sudan, and that of trichiasis in China, Ethiopia, Nigeria and Uganda. Overall, Africa is the most affected continent

#### GLOBAL STRATEGY

The World Health Organization (WHO) has an international plan for the implementation of policies and strategies to combat Neglected Tropical Diseases (2008-2015) which includes

trachoma. The plan focuses on the provision and coordination of treatment for the NTDs and not the broader components needed to eliminate trachoma.

At the 14<sup>th</sup> GET 2020 Alliance meeting in 2010, the International Coalition for Trachoma Control (ICTC) was tasked to develop a trachoma action plan template to delineate specific actions and milestones focused on elimination by 2020 at the level of individual nations. This provided the catalyst for the development of a global plan (summarised in the resource section). Strategic drivers for elimination outlined in the plan:

- Additional data should be collected, but should not delay scale-up.
- Hit the fastest timeline possible in each district.
- Focus early on high-burden countries.
- Proactively tailor approaches based on progress.
- Plan beyond elimination.

At the country level, national trachoma task forces are responsible for implementing the SAFE strategy and consist of a range of government representatives, NGOs, donors, academic institutions and other stakeholders. The task forces develop a national plan, bring together different groups to make the plan work, coordinate operational research, monitor and evaluate and share information with all involved including the public.

WHO and its partners use the SAFE strategy to ensure the Global Elimination of Trachoma as a cause of blindness by the year 2020 (GET2020). GET2020 is one element of a broader strategy known as 'VISION 2020: The Right to Sight', which has as its goal the elimination of all avoidable blindness by the same year.

<http://www.vision2020.org/main.cfm?type=WIBTRACHOMA>.

The SAFE strategy (Surgery for trichiasis, Antibiotics to treat *Chlamydia trachomatis* infection, and Facial cleanliness and Environmental improvement to reduce transmission of *C. trachomatis* from one person to another) is recommended for the control of trachoma

- Surgery for trichiasis (the stage of trachoma that leads directly to blindness) - Blindness due to trachoma is irreversible but the scarring and visual change for trachoma can be reversed by a simple surgical procedure performed at village level.
- Antibiotics to treat *Chlamydia trachomatis* infection – In districts where prevalence of trachomatous inflammation – follicular (TF) in 1 to 9-year-old children is 10% or greater, WHO recommend antibiotic treatment of all residents annually for 3 years. Where prevalence is less distribution can be more targeted. Two antibiotics are recommended: tetracycline eye ointment and azithromycin. Tetracycline is difficult and unpleasant to apply. A single oral dose of Azithromycin is effective at reducing infection rates but is relatively expensive. 225 million doses of Zithromax have been donated by Pfizer - the company that owns the patent of azithromycin.
- Facial cleanliness with clean water among children at risk of disease.
- Environmental improvement to reduce transmission of *C. trachomatis* from one person to another, for example, the reduction of fly breeding sites, improved access to water and proper disposal of human and animal waste.

There's strong evidence that surgery reduces trichiasis and that antibiotic distribution (if coverage is high and coordinated) reduces *Chlamydia trachomatis* infection rates. Limited evidence is available on the effectiveness of the other two components. However, all components of SAFE are needed to avoid individuals becoming reinfected with trachoma and prevalence rising to pre-intervention rates in communities. The SAFE strategy has had large-scale success reducing prevalence of trachoma in some countries including Morocco, southern Sudan, the Gambia and Ghana.

## Challenges

- Not all countries in which blinding trachoma is suspected to be endemic have undertaken a proper assessment of the epidemiological situation of trachoma.
- The WHO SAFE strategy does not yet cover 100% of the populations in trachoma-endemic countries.
- International partners who are members of the WHO GET 2020 Alliance do not implement the entire SAFE strategy, but only certain components.
- Most trachoma endemic communities do not have access to safe water and sanitation facilities.
- The available resources for trachoma control are not sufficient to achieve the ultimate intervention goals in all countries.

## **COST**

Cost of implementing the SAFE strategy in all remaining known endemic countries:

- \$420 million-\$720 million (estimate).
- \$4 spent per person on trachoma elimination in endemic districts could enable implementation of full SAFE in endemic areas.

## **2. Organisations and alliances**

**The main international alliances responsible for trachoma control:**

**The Alliance for Global Elimination Blinding Trachoma (GET 2020)** has adopted the 'SAFE' strategy to combat trachoma. GET 2020 supports and collaborates with WHO to carry out activities such as epidemiological assessment, including rapid assessment and mapping, project implementation, coordination, and monitoring, disease surveillance, project evaluation and resource mobilisation. It is open to all parties - governments, international organisations and nongovernmental organisations - that are willing and ready to contribute to international efforts.

**The International Coalition for Trachoma Control (ICTC) (works closely with Get 2020)**

[www.trachomacoalition.org/](http://www.trachomacoalition.org/)

For a list of members: [www.trachomacoalition.org/about-us/members](http://www.trachomacoalition.org/about-us/members) . ICTC:

- promotes and supports coordination among international organisations and partners to enable national programmes to realise their intervention goals
- shares information (programmatic and technical) about developments in trachoma control
- mobilises resources, both individually and as a consortium, to support national programmes in expanding the SAFE strategy
- advocates to raise awareness of the burden of trachoma and solutions available to address the problem at global, national and local levels.

**Bilateral Organisations, UN Agencies and NGOs working in trachoma control**

The following table is from Sightsavers' international plan – website addresses (that feature resources) and a column on where each partner works (where information is relevant or available) have been added as well as information about three research institutes.

<b>Partner</b>	<b>Roles</b>	<b>Where work</b>
Ministries of Health	Overall Coordination	
Ministries of Education	School health and hygiene promotion	
Ministries of Water	Provision of Water	
Ministries of Local Government	Provision of sanitation	

DFID	Funding	
USAID	Funding and technical support	
Standard Chartered Bank	Funding	
Research Triangle Institute (RTI)	Funding and Technical Support	Mainly Africa and Haiti, Bangladesh, Indonesia and Nepal (NTD programmes)
The Carter Center: Trachoma Control Program	Provision of surgery; lead organisation focusing on F&E facets of the SAFE strategy.	Ethiopia, Ghana, Mali, Nigeria, Niger, and Sudan
<a href="http://www.cartercenter.org/health/trachoma/index.html">http://www.cartercenter.org/health/trachoma/index.html</a>		
International Trachoma Initiative	Provision of Zithromax® and Technical support, assists development of supply chain capacity, operational research and programme evaluation, education and advocacy.	19 countries in Africa and Asia (Nepal and Vietnam)
<a href="http://www.trachoma.org/">http://www.trachoma.org/</a>		
UNICEF	Provision of water and sanitation in schools	
WaterAid	Provision of Water and sanitation	Tanzania and Ethiopia
WHO	Training of health workers, advocacy and technical support	Global focus
<a href="http://www.who.int/topics/trachoma/en/">http://www.who.int/topics/trachoma/en/</a>		
Lion's Club	General support for eye care, advocacy	
Sigh Savers	Supporting integration of eye care with primary health services, antibiotics, surgeries and training of surgeons.	2 Asian countries (Pakistan and India) and 19 African countries
<a href="http://www.sightsavers.org/learn_more/causes_of_blindness/trachoma/default.html">http://www.sightsavers.org/learn_more/causes_of_blindness/trachoma/default.html</a>		
Swiss Red Cross	Support for Surgery	
Christian Blind Mission (CBM)	Support for surgery	
Operation Eye Sight Universal	Support for Surgery	India, Ghana, Kenya, Rwanda and Zambia
Fred Hollows Foundation	Support for Surgery	Australia
Helen Keller International (HKI)	Support for Surgery, antibiotic distribution	Burkina Faso, Mali Mozambique, Niger Nigeria, Nepal, Tanzania
<a href="http://www.hki.org/preventing-blindness/trachoma-control/">http://www.hki.org/preventing-blindness/trachoma-control/</a>		
Islamic Relief	Provision of water, sanitation facilities and Hygiene Promotion	
Eau Vive	Provision of Water and sanitation	Burkina Faso, Mali, Niger Senegal
World Vision International	Provision of Water and sanitation	Global
DANIDA	Provision of Water	
Collin Glassco Foundation	Provision of Water	Zambia
Czech Dev. Agency	Provision of Water	

Oxfam	Provision of Water and sanitation	
Development Aid from People to People (DAPP)	Provision of Water	
Concern Universal	Provision of water and sanitation facilities and hygiene promotion	
Action Aid	Provision of Water and sanitation	
Amref	Provision of Water and sanitation	Kenya and Ethiopia
Lion Aid Norway	Eye Health	Uganda
MITOSATH	Support for surveys and workshops	Nigeria
Adventist Development Relief Agency	Provision of Water and sanitation	
Fresh Water	Provision of Water	
Human Resource Development Society (HRDS)		
Active Citizen Participation Programme of British Council		
United Nations Children's Fund	Provision of Water and sanitation in schools	
John Hopkins University	Research	Involved in joint studies on the impact of mass treatment and surgery techniques in the Gambia, Tanzania and Niger (PRET)
International Centre for Eye Health, LSHTM	Research	
University of California, San Francisco	Research	
<a href="http://www.hopkinsmedicine.org/wilmer/danacenter/research/pret/index.html">http://www.hopkinsmedicine.org/wilmer/danacenter/research/pret/index.html</a>		

### 3. Plans

#### 2020 INSight

*The Coalition for Trachoma Control (ICTC) of the International Trachoma Initiative (ITI) International, March 2011*

<http://www.trachomacoalition.org/sites/default/files/uploads/resources/ICTCEnglishJuly21.pdf>

As the result of development and targeted interventions, trachoma is now limited to an estimated 50 countries, often affecting the poorest populations of the world. The effectiveness of the SAFE strategy has been firmly established and continues to be improved through innovation. While progress has been made, a significant effort is needed to realise the 2020 goal of trachoma elimination.

This global strategic plan was written in the spring of 2011 with input from a diverse set of stakeholders to accelerate progress. It has three specific objectives:

- outline the current situation of trachoma and lay out what is left to be done
- describe milestones needed to reach global elimination of blinding trachoma by the year 2020
- convince donors and partners that the elimination of trachoma is worth funding.

To achieve GET 2020, more data is needed to map the full extent of the challenge. However

the collation of additional data should not delay scale-up. A significant scale-up is needed across all components of the SAFE strategy. This needs to happen in close coordination with the broader Neglected Tropical Disease (NTD) agenda (especially for the A component) and with the help of other development activities (especially for the F and the E components). Reaching the milestones will depend on country leadership, international coordination, logistical and planning support, and adequate financing. It is important to prepare for post-elimination when trachoma control efforts will likely be reduced but not completely discontinued. The main driver of success is integration of trachoma surveillance initiatives within the local health, water, and sanitation systems.

The total cost of implementing the SAFE strategy in all remaining known endemic countries can be estimated at \$420M-\$720M.

### **WHO Global plan to combat neglected tropical diseases**

WHO Department of Control of Neglected Tropical Diseases  
Geneva, WHO, 2007

[http://whqlibdoc.who.int/hq/2007/who\\_cds\\_ntd\\_2007.3\\_eng.pdf](http://whqlibdoc.who.int/hq/2007/who_cds_ntd_2007.3_eng.pdf)

WHO and partners formulated this strategy to ensure cost-effective, ethical and sustainable control towards eradication of several NTDs.

The 'tool-ready' category of diseases (which includes trachoma) is those diseases for which powerful and inexpensive control tools are currently available and for which well-developed implementation strategies are immediately feasible. The major tasks for control of the 'tool ready' diseases are to expand coverage of packaged preventive chemotherapy interventions in order to access hard-to-reach populations at risk with innovative delivery systems and to continue regular treatment.

An intersectoral and interprogrammatic approach can improve cost-effectiveness and ensure that all necessary treatments are simultaneously delivered to neglected populations who nearly always suffer from several overlapping diseases linked to poverty.

### **Challenges**

The major challenges for controlling NTDs and zoonoses are:

- procurement and supply of anthelmintic medicines
- quantification of the burden of NTDs among neglected populations
- provision of treatment and other interventions free of charge to communities in need
- a system for delivery of medicines to cover the entire at risk population
- delivery of multi-intervention packages
- urgent development of diagnostic tools, medicines and pesticides
- production of more effective medicines and insecticides
- promotion of integrated vector management
- advocating an intersectoral, interprogrammatic approach to control of NTDs
- early protection of children
- post-implementation surveillance and monitoring.

The Global Plan has nine strategic areas:

1. Assessment of the burden of NTDs and zoonoses
2. Integrated approach and multiintervention packages for disease control
3. Strengthening health care systems and capacity building
4. Evidence for advocacy
5. Ensuring free and timely access to high-quality medicines and diagnostic and preventive tools
6. Access to innovation
7. Strengthening integrated vector management and capacity building
8. Partnerships and resource mobilisation

## 9. Promoting an intersectoral, interprogrammatic approach to NTD control

Member States, WHO collaborating centres for NTDs, other relevant international partners and the WHO secretariat will be part of a steering committee that monitors implementation and reviews progress.

### **Ten-year Strategic Plan for Fast Tracking Elimination of Blinding Trachoma in 21 Countries**

Sightsavers, March 2011

Sightsavers aims to fast track the elimination of blinding trachoma in 21 countries by 2020: 19 in Africa and 2 in Asia (Pakistan and India).

#### **Programme Activities**

Sightsavers will work with governments and other NGOs to strengthen the health systems based on a primary health care approach through training of health care staff at all levels. Community-based activities will be integrated into the primary health care system and structure and communities will be encouraged and assisted to take ownership and fully participate in all community-based activities. It is expected that governments will take up the leadership and coordination roles whilst Sightsavers provides technical and some financial support for programme activities.

**Surgery** - To achieve 50% reduction in the backlog and maintain a recurrence rate below 10%, 1,000,000 people with trichomatous trichiasis (TT) will need to be provided with surgery. Strategies include:

- Yearly training /retraining of health workers and volunteers for case detection.
- TT surveillance will be institutionalised in the endemic districts and included in the national Integrated Disease Surveillance and Response (IDSR) information system.
- Training and retraining and certification of at least 1000 TT surgeons, including ophthalmic nurses.
- For quality assurance, ophthalmologists and cataract surgeons will supervise the work of the TT surgeons and surgery audit will be carried out periodically.

**The Antibiotic component** - expand antibiotic distribution to cover all endemic districts/communities in the 21 countries and achieve a coverage of at least 85-90% of the eligible population.

- The WHO MDA approach will be followed.

**Face cleanliness** - have at least 80 percent of children 1-9 years old with clean faces in the endemic communities in the target countries.

- Advocacy, health education and hygiene promotion activities by programme staff.
- The media will be used to reach out to members of endemic communities.
- Countries and other partners involved in the water and sanitation sector will be approached and encouraged to prioritise trachoma endemic areas for the provision of water and latrines.
- Communities will be empowered to do their own advocacy as well.

**Environmental Improvement** - intensify advocacy toward increased access to water by about 20% and sanitation by about 30% in all endemic communities in the target countries as a human rights issue.

- Advocate for the provision of 120,000 boreholes and other safe water sources as well as 3 million household and school latrines in endemic communities by 2020.

#### **Other aims:**

- Conduct both basic and operational research to enhance learning and provide evidence.

- For any innovative approaches, to use the scalability principle - pilot projects, provide evidence, make reality adjustments, and build capacity and partnerships for scaling up.

**Programme Costs/Support:**

The total cost for 'SAFE' and Administration without the provision of water and latrines is \$102,816,000 for ten years with an average cost of \$10.2million per year.

**4. Epidemiology**

See also Hu et al 2010 (*summarised in Section 6*)

**The global burden of trachoma: a review**

Burton MJ, Mabey DCW (2009)

*PLoS Neglected Tropical Diseases* 3(10): e460. doi:10.1371/journal.pntd.0000460

[www.plosntds.org/article/fetchObjectAttachment.action?uri=info%3Adoi%2F10.1371%2Fjournal.pntd.0000460&representation=PDF](http://www.plosntds.org/article/fetchObjectAttachment.action?uri=info%3Adoi%2F10.1371%2Fjournal.pntd.0000460&representation=PDF)

Trachoma is the commonest infectious cause of blindness worldwide. Recurrent infection of the ocular surface by *Chlamydia trachomatis*, the causative agent, leads to inturning of the eyelashes (trichiasis) and blinding corneal opacification. Trachoma is endemic in more than 50 countries. It is currently estimated that there are about 1.3 million people blind from the disease and a further 8.2 million have trichiasis. The reported numbers of people affected by trachoma appears to be steadily declining. However, several estimates for the burden of disease from trachoma have been made, giving quite variable results. The variation is partly because different prevalence data have been used and partly because different sequelae have been included. There is variability over whether to include trichiasis. The most recent estimate from the WHO placed the burden of disease at around 1.3 million Disability-Adjusted Life Years (DALYs). In order to develop better estimates of the burden of trachoma there needs to be a coordinated effort to conduct population-based surveys with a national sampling frame in representative countries from endemic regions. Clarification of the situation within India and China is particularly important, given the size of their populations. A consensus also needs to be reached on whether trichiasis should be included in the calculation of DALYs and what weight it should be given. There is limited evidence of premature mortality due to blindness in general. Further studies on this specifically in relation to trachoma would be of value.

**Mapping the global distribution of trachoma**

Polack S, Brooker S, Kuper H, Mariotti S, Mabey D & Foster A

*WHO Bulletin* 2005; 83:913-919

The lack of data on active trachoma and trichiasis in many countries remains an important obstacle to trachoma control efforts. Information on trachoma prevalence at country level has not been systematically collated, analysed and reported. This is the first attempt to summarise and map the existing population-based data. Reported data on active trachoma in children and reported trichiasis in adults from 139 population-based surveys in 33 countries was collated into one database. This information was used to generate a global map of the prevalence of trachoma and trichiasis. Detailed distribution maps play an important role in assessing the magnitude of the problem, defining priority areas for control, monitoring changes, and advocacy. The data highlighted important regional differences and marked national variations in prevalence of active trachoma and trichiasis. In 23 countries suspected of having endemic trachoma no reliable district-level population-based data were available. In China and India, data were limited to a few districts.

## 5. National Trachoma Control Programmes

### Participatory evaluations of TCP in 8 countries

Kuper H, Solomon AW, BuchanJC, Zondervan M, Mabey D and Foster A  
*Tropical Medicine and International Health*, Volume 10 no 8 pp 764–772 August 2005  
<http://onlinelibrary.wiley.com/doi/10.1111/j.1365-3156.2005.01451.x/pdf>

Mapping and assessment of disease prevalence:

- This was completed in four of the 8 countries (Mali, Morocco, Nepal and Niger) and at various stages in the other 4. However except in Morocco, there was a lack of reliable recent epidemiological data. Efforts are underway to develop an epidemiologically sound rapid method to classify communities by prevalence to replace the current trachoma rapid assessment (TRA) method that does not produce prevalence estimates.
- The quality of trachoma grading was of concern in Mali and Niger.

Quality and coverage of Trachoma control activities:

- This is insufficient, with the exception of Morocco, including antibiotic distribution.
- Integration of trachoma control activities into national planning and district-level service provision varied ranging from the trachoma control programme being part of a comprehensive eye care programme in some countries to being almost completely independent in others.
- Intersectoral partnerships (including NGOs and ministries of health and water) under a national taskforce to implement the SAFE strategy were established in a few countries.
- The delegation of responsibility for trachoma control at regional/district level to specific identified (focal) people was important in dissemination of information down to the community level and also in reporting back on activities to national level.

Surgeries:

- In all countries, the number of surgeries performed annually was insufficient; and quality of surgery was rarely monitored. Community barriers to uptake of surgery, include fear, and provider barriers include the cost of surgical fees (in some countries) and access to a trichiasis surgeon. Surgeons are performing relatively few surgeries because there was little proactive case finding of trichiasis cases or education about trichiasis surgery, so people remain unaware of their need for surgery or the availability of surgery.

Antibiotic distribution:

- Mass distribution of antibiotics was carried out well and good coverage was achieved, although the strategy for antibiotic distribution varied. For instance, in one country, mass distribution was only to women and children, while in others, to all people.
- The cost of mass distribution is high. Adoption of a community-directed distribution of azithromycin, as is used for ivermectin distribution, may reduce costs and encourage more community ownership of the programme. Integration of antibiotic distribution for trachoma with other drug distribution programmes, such as those for onchocerciasis and lymphatic filariasis, may also reduce the cost of this programme.

Health promotion and environmental change:

- The distribution of azithromycin appeared to be a 'vehicle' for encouraging health education and thereby community knowledge of the disease and its control.
- Inadequate water and sanitation remained a major problem in countries. Improvement of water supplies depended on strong collaboration between governmental agencies and NGOs, as was beyond the budget and skills of the trachoma control programme alone.
- Health promotion was vital for encouraging the construction and use of household latrines, because community acceptance of and/or desire for latrines was often low.

Monitoring of programme activities

- Generally inadequate either because indicators were not appropriate or because systems were not in place to aid reporting.

The Morocco programme is an example from which lessons and processes can be learnt and adapted to other programme countries.

### **Case 10: Controlling trachoma in Morocco**

In *Case studies in global health: Millions saved*. Sudbury, MA: Jones and Bartlett.

[www.cgdev.org/doc/millions/MS\\_case\\_10.pdf](http://www.cgdev.org/doc/millions/MS_case_10.pdf)

After the Moroccan Programme for the Prevention of Blindness (Programme Marocain de Lutte contre la Cécité) completed a nationwide survey of the prevalence of visual impairment in 1992, trachoma was made a key priority. Overall, the prevalence of active disease in children under 10 has been reduced by 99 percent since 1997.

The Moroccan Programme for the Prevention of Trachoma developed in two key phases:

1. integrating prevention activities into existing eye health and primary health care systems, establishing structured coordination units to enable collaboration at every level between different sectors, training relevant staff, and engaging the community through local development groups.
2. the introduction of the WHO strategy in 1997. Mobile teams performed simple, inexpensive surgeries in small towns across the provinces, 4.3 million treatments of the antibiotic azithromycin were distributed, health education efforts promoting face washing and hygiene have been conducted, latrines have been constructed, and safe drinking water supplied. Partners included: WHO, Helen Keller International (HKI), the Edna McConnell Clark Foundation, the International Trachoma Initiative (ITI) and Pfizer Inc.

The key strengths of the Moroccan Programme for the elimination of trachoma-related blindness:

- political engagement at all levels
- inclusion of prevention in eye health services and primary health care systems
- integrated implementation of the comprehensive SAFE strategy promoting greater integration of activities, collaboration across sectors and partners, and a community-focused approach.
- a strong focus on the provision of safe drinking water and improved sanitation for at-risk populations (as well as the S and A of SAFE).
- adoption of evaluation as a fundamental component to support follow-up and planning. For example, evaluation of surgical outcome showed a high rate of recurrence. Consequently the strategy was modified so that surgeries are performed by an 'elite' team of experienced surgeons, resulting in a fall in recurrence rate.
- decentralisation of planning, follow-up and evaluation
- communication with the public on the progress of the trachoma prevention programme (site visits by media professionals, press interviews).

The Moroccan government provided the bulk of the financing for the programme, with external support from the United Nations Children's Fund and the International Trachoma Initiative through which the pharmaceutical company Pfizer donates Zithromax.

## **6. Evaluating strategies for trachoma control – reviews**

### **Epidemiology and control of trachoma: systematic review**

Hu, V.H.; Harding-Esch, E.M.; Burton, M.J.; Bailey, R.L.; Kadimpeul, J.; Mabey, D.C.; Tropical Medicine and International Health, 2010

<http://onlinelibrary.wiley.com/doi/10.1111/j.1365-3156.2010.02521.x/pdf>

Trachoma is the commonest infectious cause of blindness. Recurrent episodes of infection cause conjunctival inflammation in children who go on to develop scarring and blindness as adults. Chlamydia trachomatis infection causes trachoma and is probably transmitted between individuals by hands, clothing and flies. Risk factors include not using sufficient water to wash children, latrine access, flies and over-crowding. Women are also at higher risk because of their contact with children. Migration is thought to facilitate the reintroduction of infection.

The highest prevalence of active disease and trichiasis is in Africa but it is also endemic in a number of countries in the Middle East, Asia, Latin America and the Western Pacific. There is uncertainty around estimates because of a lack of data from India and China. Population-based prevalence surveys, trachoma rapid assessments and acceptance sampling TRA are used to determine prevalence. Survey methods rely on clinical signs as a measure of trachoma infection. However, they can be poorly correlated with actual infection. Tests may have to be carried out in certain situations to determine prevalence.

The SAFE strategy has been associated with significant reductions in the prevalence of active disease over the past 20 years, but there remain a large number of people with trichiasis who are at risk of blindness.

#### Surgery

Surgery has been shown to improve comfort, reduce ocular discharge and improve visual acuity in major trichiasis cases but does not reduce the progress to corneal opacity. A major problem is high reoccurrence rates. Trials of post-operative azithromycin give mixed results. Patient barriers include a lack of awareness about eye health, transport difficulties and the need for an escort. Community-based surgery has greater attendance rates than health centre-based surgery. Provider-level barriers include lack of trained surgeons and sterilised equipment. Ophthalmic nurses can be successfully trained to be surgeons. Individuals living in endemic communities also need training on recognising trichiasis. Non-surgical alternatives have had positive results but have not been formally tested.

#### Antibiotics

Mass treatment of whole districts and communities with a single oral dose of azithromycin is recommended especially in high-prevalence areas. Targeted strategies can be expensive and time-consuming and those that are asymptomatic can also act as reservoirs of infection. There is concern that wide-spread use may lead to drug resistance. Where treatment can be targeted sensitive diagnostic tests are needed. To maximise coverage it is important to build a good relationship with the community, conduct education on eye health and maximise antibiotic distribution. There is evidence to support the need for repeated antibiotic treatment. However, if the 'F' and 'E' components of the SAFE strategy are not effectively implemented then pre-intervention infection rates may return.

#### Face cleaning

Improving facial cleanliness through health education and improving water supply is promoted. However, there is a limited evidence base for this control strategy. What studies have been conducted show mixed results and programmes promoting face washing are labour intensive and expensive.

#### Environment

Through increasing water supply and quality, improving access to latrines, decreasing fly density, reduced crowding and providing health education, transmission of trachoma can be interrupted. Health education has had positive results but it is unclear whether it provides additional benefits over mass treatment with antibiotics. Insecticide spraying reduces the prevalence of trachoma, however again it does not appear to provide additional benefits over mass treatment. A study of latrine provision did not provide statistically significant results.

## SAFE

Implementing all four elements of the SAFE strategy together has an additive effect in trachoma control however it is difficult to elucidate the relative impact of each component in countries where the SAFE strategy has been implemented.

### **The SAFE strategy for trachoma control: using operational research for policy, planning and implementation.**

Paul M Emerson, Matthew Burton, Anthony W, *WHO Bulletin* 2006

[www.who.int/bulletin/volumes/84/8/05-028696.pdf](http://www.who.int/bulletin/volumes/84/8/05-028696.pdf)

The SAFE strategy is based on evidence from field trials and is constantly being refined by operational research that informs national policy and planning. The strategy has affected programme delivery and implementation. As a result of the effects of the research findings :

- Surgery is now generally conducted by paramedics rather than by ophthalmologists in hospitals.
- Yearly mass distribution of a single dose of azithromycin has replaced topical tetracycline
- The promotion of better hygiene, face-washing and the use of latrines are used to reduce transmission.
- Those who implement programmes have been equal partners in conducting operational research thus minimising the delay that often exists between the completion of trials and putting their results into practice.
- Initiatives such as the GET2020 Alliance has aided the networking of people working on trachoma.

National programme coordinators have a reasonable expectation that trachoma control programmes based on SAFE will work.

### **Cost-effectiveness of trachoma control in seven world regions**

Baltussen RM, Sylla M, Frick KD, Mariotti SP, *Ophthalmic Epidemiology* 2005 April; 12(2): 91-101.

[www.ncbi.nlm.nih.gov/pubmed/16019692?dopt=Abstract](http://www.ncbi.nlm.nih.gov/pubmed/16019692?dopt=Abstract)

As individual components of the SAFE strategy, trichiasis surgery for trachoma is a cost-effective way of restoring sight in all epidemiological sub-regions considered, as is the use of azithromycin, if donated or at reduced prices. Mass treatment of all children with tetracycline and targeted treatment with azithromycin are *not* cost-effective. Providing trichiasis surgery to 80% of those who need it would avert over 11 million DALYs per year globally, with cost effectiveness ranging from I\$13 to I\$78 per DALY averted across regions. Mass antibiotic treatment of all children using azithromycin at prevailing market prices would avert more than 4 million DALYs per year globally with cost-effectiveness ranging between I\$9,000 and I\$65,000 per DALY averted.

(NB we were unsure of the 'I' in front of the dollar sign but have not removed it as this was in the original)

### **Antibiotics for trachoma**

Evans JR, Solomon AW. *Cochrane Database of Systematic Reviews* 2011, Issue 3. Art. No.: CD001860.

[www.update-software.com/BCP/WileyPDF/EN/CD001860.pdf](http://www.update-software.com/BCP/WileyPDF/EN/CD001860.pdf)

Antibiotic treatment reduces the risk of active trachoma and ocular chlamydial infection in people infected with *C. trachomatis*, but the size of the treatment effect in individuals is uncertain. Mass antibiotic treatment with single-dose oral azithromycin reduces the prevalence of active trachoma and ocular infection in communities

### **Face washing promotion for preventing active trachoma**

Ejere HOD, Alhassan MB, Rabiou M. *Cochrane Database of Systematic Reviews* 2004, Issue 3. Art. No.: CD003659. DOI: 10.1002/14651858.CD003659.pub2

[www.thecochranelibrary.com/userfiles/ccoch/file/Water%20safety/CD003659.pdf](http://www.thecochranelibrary.com/userfiles/ccoch/file/Water%20safety/CD003659.pdf)

Face washing combined with topical tetracycline can be effective in reducing severe trachoma and in increasing the prevalence of clean faces. However, face washing alone or in

combination with topical tetracycline does not reduce active trachoma. The study did not look at face washing in combination with azithromycin.

### **Environmental sanitary interventions for preventing active trachoma**

Rabiu M, Alhassan M, & Ejere H. *Cochrane Database Systematic Review* 2005 April 18;(2):CD004003.

[www.thecochranelibrary.com/userfiles/ccoch/file/Water%20safety/CD004003.pdf](http://www.thecochranelibrary.com/userfiles/ccoch/file/Water%20safety/CD004003.pdf)

The role of insecticide spray as a fly control measure in reducing trachoma remains unclear. Latrine provision as a fly control measure has not demonstrated significant trachoma reduction. Health education may be effective in reducing trachoma. These aspects of environmental interventions were evaluated separately and there is insufficient data to determine the effectiveness of all aspects of environmental sanitation in the control of trachoma.

## **7. Evaluating SAFE – country-based studies**

This is not an exhaustive list of studies. The studies featured here focus on the implementation of SAFE. The systematic review by Hu et al summarised in the previous section covers all studies on trachoma epidemiology and control.

### **Associations between active trachoma and community intervention with Antibiotics, Facial cleanliness, and Environmental improvement (A,F, E)**

Ngondi J, Matthews F, Reacher M, Baba S, Brayne C and Emerson P. *PLoS Neglected Tropical Diseases*: 2008; 2(4): e229. doi:10.1371/journal.pntd.0000229

[www.plosntds.org/article/fetchObjectAttachment.action;jsessionid=AE0ED2590B2CB213B2C9F07D1B0548E8.ambra02?uri=info%3Adoi%2F10.1371%2Fjournal.pntd.0000229&representation=PDF](http://www.plosntds.org/article/fetchObjectAttachment.action;jsessionid=AE0ED2590B2CB213B2C9F07D1B0548E8.ambra02?uri=info%3Adoi%2F10.1371%2Fjournal.pntd.0000229&representation=PDF)

This study aimed to investigate associations between active trachoma and A,F, E interventions in communities in Southern Sudan. Surveys were undertaken in four districts after 3 years of implementation of the SAFE strategy. Children aged 1–9 years were examined for trachoma and uptake of SAFE assessed through interviews and observations. Analysis showed independent protective effects against active trachoma of mass systemic azithromycin treatment, facial cleanliness, face washing, and use of pit latrines in the household. This strongly supports continued use of all the components of the SAFE strategy together.

### **Effects of intervention with the SAFE strategy on trachoma across Ethiopia**

Roba AA, Wondimu A, Patel D, Zondervan M. *Epidemiol Community Health*. 2011 Jul: 65(7):626-31 [www.ncbi.nlm.nih.gov/pubmed/20693489](http://www.ncbi.nlm.nih.gov/pubmed/20693489)

Surveys were conducted in four programme areas across Ethiopia before and after intervention with the SAFE strategy. Considerable decline in the magnitude of trachoma and its risk factors was observed in areas where the strategy was implemented.

### **The impact of community level treatment and preventative interventions on trachoma prevalence in rural Ethiopia**

Cumberland P, Edwards T, Hailu G et al. (2008) *International Journal of Epidemiology* 37, 549–558 <http://ije.oxfordjournals.org/content/37/3/549.full.pdf+html>

Health education aimed at changing long-standing behaviours that are deep-rooted in culture is not easy. Increases in knowledge and good practice responses were about 40% since baseline, however, percentages reporting correct treatment methods remained low. Antibiotic administration remains the most effective intervention but community-based health education programmes can impact to additionally reduce prevalence of *C. trachomatis*.

### **Evaluation of three years of the SAFE strategy (Surgery, Antibiotics, Facial cleanliness and Environmental improvement) for trachoma control in five districts of Ethiopia hyperendemic for trachoma**

Ngondi J, et al. *Transactions of the Royal Society of Tropical Medicine and Hygiene* (2009) [www.cartercenter.org/resources/pdfs/news/health\\_publications/trachoma/EvaluationOfThreeYearsOfSAFEstrategy-TRSTMH-Nov08.pdf](http://www.cartercenter.org/resources/pdfs/news/health_publications/trachoma/EvaluationOfThreeYearsOfSAFEstrategy-TRSTMH-Nov08.pdf)

This large 3-year evaluation of SAFE revealed substantial declines in active trachoma signs and trachomatous trichiasis (TT) following 3 years of SAFE interventions. However *C. trachomatis* infection was still prevalent; therefore, continued intervention with the SAFE strategy is still needed beyond the 3 years recommended by WHO. Furthermore, it is likely that blinding trachoma is correlated to the presence of TI rather than TF (which can persist of antibiotic treatment). Thus, exclusion of TI from the current WHO trachoma control programme evaluation protocol probably fails to capture the true effect of the SAFE strategy.

### **Trachoma control in Southern Zambia-an international team project employing the SAFE strategy**

Astle WF, Wiafe B, Ingram AD, Mwanga M & Glassco CB (2006) *Ophthalmic Epidemiology* 13, 227–236.

The introduction of SAFE measures led to a reduction in prevalence of total trachoma in children under ten years from 55% at baseline to 10.6% at 2 years. The prevalence of Trachoma Follicular (TF) in children and Trachomatous Trichiasis (TT) in adults also fell.

## **8. Guides**

### **Trachoma control: A guide for programme managers**

WHO 2006

[http://whqlibdoc.who.int/publications/2006/9241546905\\_eng.pdf](http://whqlibdoc.who.int/publications/2006/9241546905_eng.pdf)

This guide is for managers of national and district trachoma control programmes. It sets out what is needed to assess the magnitude and extent of the trachoma problem in the area and how to plan, implement, monitor and evaluate a programme to control, and ultimately eliminate, trachoma. To reach the target of eliminating trachoma, the SAFE strategy is recommended for districts and communities with endemic disease.

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The WHO trachoma grading card can aid in the examination of the clinical signs of trachoma which is important in determining whether an individual has trichiasis and therefore requires surgery and in measuring the prevalence of clinical signs of trachoma. The need for services is predicted by the burden of disease which can be determined using the Trachoma Rapid Assessment (TRA) method – it is a simple, fast, cheap way for setting priorities for trachoma control.

To reach the target of eliminating trachoma, the SAFE strategy is recommended for districts and communities with endemic disease.

- For treatment of cicatricial trachoma (TT), WHO recommends the bilamellar tarsal rotation procedure. However, because re-training of surgeons is expensive and time-consuming, it is not recommended that established programmes change their technique, unless the incidences of surgical failure, complications or recurrence of TT

- are high. Regular surgical sessions should be held at fixed sites, such as district hospitals, and periodic outreach sessions held in trachoma-endemic communities. Select, train and equip surgeons and identify cases. A surgical log should be kept on each patient and follow-up conducted.
- Both tetracycline eye ointment and azithromycin are on WHO's essential drug list and are recommended for treatment of trachoma. If the baseline district prevalence of trachoma follicular (TF) in 1–9-year-old children is 10% or greater, antibiotic treatment of all residents should be undertaken annually for 3 years. Then a repeat district survey should be carried out. If the baseline district prevalence of TF in 1–9-year-old children is less than 10%, the prevalence should be determined at community level. Procurement, storage, distribution, preparing the community and treatment (by trained personnel) all have to be planned for to ensure high coverage (more than 80%) as well as follow-up and managing side-effects.
  - Health promotion plays many roles in implementation of the SAFE strategy. It is essential for: educating people about trachoma and how it is spread; encouraging acceptance of surgery; increasing acceptance of antibiotics; encouraging facial cleanliness; promoting a clean environment; and creating demand for household latrines. To be effective, health promotion should be planned in partnership with the community.
  - The 'E' component of SAFE aims to reduce transmission of *C. trachomatis* by promoting better personal and environmental hygiene, for example, providing access to latrines and water. This requires specialist expertise and more money than is usually available to trachoma control programmes. The role of the programme might therefore be to find out which organisations are already working to improve water and sanitation and encourage them to give priority to communities where trachoma is endemic.

A national trachoma task force that includes representatives of as many groups as possible should be formed to oversee the work of the programme. The task force should meet at least twice a year. A district trachoma task force should be constituted in each programme district and meet at least quarterly.

### **Woman and Trachoma: Achieving gender equity in the implementation of SAFE**

Cromwell E, Emerson P, Courtright P, The Carter Center, Atlanta, 2009

[www.cartercenter.org/resources/pdfs/health/trachoma/women\\_trachoma.pdf](http://www.cartercenter.org/resources/pdfs/health/trachoma/women_trachoma.pdf)

Women are more susceptible to trachoma infection (and therefore trichiasis) due to their disproportionately high contact with children as compared to men, and women can face more severe economic and social barriers in accessing prevention efforts. Trachoma control efforts should consider gender roles and responsibilities in order to reach the goal of GET 2020: the global elimination of blinding trachoma by the year 2020. Existing monitoring tools have to be revised in order to better assess the success of programmes in eliminating blinding trachoma, this include the collation of sex-disaggregated data. Experiences from a number of African countries give important lessons on how to engage women and girls in aspects of trachoma control, such as, house-to-house distribution of antibiotics in Niger. This manual also gives practical guidelines to addressing behavioural change related to use of surgical services, hygiene and sanitation issues, and improved environmental conditions, to enable the managers and planners of trachoma control programs to provide a gender-equitable SAFE strategy, for example, understanding perceptions of hygiene and sanitation among different community members and promoting existing examples of positive behaviours in the community.

### **Implementing the SAFE Strategy for Trachoma Control, a Toolbox of Interventions for Promoting Facial Cleanliness and Environmental Improvement**

Emerson P and Frost L, The Carter Center and the International Trachoma Initiative, 2006

[www.cartercenter.org/documents/2302.pdf](http://www.cartercenter.org/documents/2302.pdf)

This manual provides programme managers and planners with guidance for designing interventions for facial cleanliness (F) and environmental improvement (E) in trachoma control programmes including:

- how to learn about risk practices, identify appropriate F and E interventions, and identify target groups for interventions
- offers a toolbox of F and E interventions with specific examples and case studies
- explains how to communicate about a trachoma control programme through the media
- provides steps for evaluating a trachoma control programme.

**Other guides by the World Health Organization:**

- **A Guide: Trachoma Prevention Through School Health Curriculum Development: Alleviating human suffering through education and Empowerment**  
WHO 2006  
<http://www.who.int/blindness/CHF%20GUIDE%20FINAL%20EN.pdf>
- **A guide for environmental sanitation and improved hygiene**  
WHO 2000  
[http://www.trachoma.org/sites/default/files/guidesandmanuals/SAFE\\_en.pdf](http://www.trachoma.org/sites/default/files/guidesandmanuals/SAFE_en.pdf)

## 9. Other useful resources

GET 2020 Meeting reports

[www.who.int/blindness/publications/get2020/en/index.html](http://www.who.int/blindness/publications/get2020/en/index.html)

Include presentations and discussion of the latest developments in trachoma control.

Health Education Materials website:

[http://www.cartercenter.org/health/trachoma\\_education/mtResources.html](http://www.cartercenter.org/health/trachoma_education/mtResources.html)

Trachoma Atlas, London School of Hygiene & Tropical Medicine/ ITI/Carter Center

[www.trachomaatlas.org](http://www.trachomaatlas.org)

Zithromax In The Elimination Of Blinding Trachoma: A Program Manager's Guide, ITI, 2010

[www.trachoma.org/guides-and-manuals](http://www.trachoma.org/guides-and-manuals)

WHO documents for SAFE

[www.who.int/blindness/causes/trachoma\\_documents/en/index.html](http://www.who.int/blindness/causes/trachoma_documents/en/index.html)

Including:

- The WHO guides featured above
- Trachoma epidemiologic survey control, WHO/PBL/93.33, WHO, 1993
- WHO grading protocol
- WHO protocol for sampling populations

## 11. Additional information

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