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Improve WATSAN and eliminate blinding trachoma

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TRACHOMA IS A disease of the poor. WHO estimates that six million people worldwide have been rendered blind or severely visually disabled through trachoma and a much larger number have suffered loss of vision. It is estimated that 150 million are affected and in need of treatment (WHO, 1997 and 1998). Infection often first happens in childhood and after repeated infections, blindness can then result in adulthood. But blindness due to trachoma can be prevented and many of the interventions are related to appropriate hygiene practice, sanitation and water.

This paper brings together key information and lessons to-date on trachoma, its transmission routes, prevention measures and impacts. It aims to encourage a greater awareness in the practitioners working in the water, hygiene and sanitation sectors of the potential impacts of their work on preventing this devastating, but preventable disease. With minor shifts in WATSAN programme emphasis, programmes could increase the benefits for the communities they are working with, whilst at the same time helping to assure success of the elimination of the world's leading cause of preventable blindness.



Figure 1. Flies provide a major transmission route for trachoma

Photo credit: Elizabeth Gilbert, Ethiopia

The impacts of blindness

Blindness from any cause is devastating to an individual, their family and community. Trachoma, however, is particularly severe as it blinds women at three times a greater rate than men, usually during their most productive years.

'Because the disease causes blindness in the most productive years of a person's life, trachoma can ruin the economic

well-being of entire families and communities. Women are two to three times more likely than men to be blinded by trachoma. A woman who becomes visually impaired because of the disease can no longer perform vital activities for her household, such as collecting firewood and cooking. To fill this gap, an older daughter may be taken out of school to assume those responsibilities, forgoing her opportunity to break the cycle of poverty with a formal education. If many adults in a village become blind from trachoma, an entire community may be debilitated. Without intervention, trachoma keeps families shackled to a cycle of poverty as vulnerability to the disease and its effects are passed from one generation to another' (ITI).

Stages, transmission and prevalence of trachoma

Trachoma is caused by an infection of the eyelid lining by a bacterium *Chlamydia trachomatis*. There are various stages in the development of trachoma. The first stages which are together known as 'active trachoma' include the development of light coloured follicles under the eyelid and then an inflamed thickening of the inner eyelid. Frequent and repeated episodes of active trachoma over a period of time can lead to the next more severe stages, which include the visible scarring of the underside of the eyelids. As the scars slowly contract, this in turn can cause the lid and eyelashes to turn inwards and the eyelashes to then in turn to rub the eyeball (see fig 3). This is excruciatingly painful and causes the sufferer to rub the eyes and sometimes, as the pain becomes unbearable, to remove the eyelashes all together. The eyelashes rubbing on the eyeball can in turn lead to ulceration of the eyeball, further scarring and visual loss (WHO, undated, WHO, 1997).

Trachoma is sometimes called the 'silent disease' as the majority of cases of active trachoma are mild and affected people rarely seek treatment. It is the repeated infections over time, which leads to the risk of the more severe symptoms and the risk of blindness.

Possible routes of transmission of trachoma include the following (modified from those identified by MacCallan, 1931 in Emerson, 2000):

- Direct spread through play, or sharing a bed
- Through touch on fingers, such as between mother and child
- Indirect spread on towels, tissues, handkerchiefs etc.
- Through eye seeking flies, particularly the Bazaar fly (*Musca sorbens*)
- Coughing or sneezing



Figure 2. Eyelashes turning inwards - one stage on the way to blindness through trachoma

Photo credit: WHO

Trachoma tends to occur in clustered cases, particularly in families, which would indicate that the kind of prolonged close contact as is found in families can lead to increased levels of infection. Analyses of past research also showed that trachoma tends to be higher in households with lower income, where there is less adequate water supply, where head of the household is poorly educated, and in the disadvantaged and dispossessed (Emerson et al, 2000 and Feurstein, 1997).

Trachoma is mainly prevalent today in largely the hot parts of the world such as Sub-Saharan Africa, the Sahel, the interior of Australia and the highlands of Ethiopia and India. But it also used to be prevalent in more temperate climates such as the UK, Eastern Europe, Scandinavia and North America (Kuper et al, 2003 and Emerson et al, 2000). It is suggested that the link is possibly more to do with poverty than a function of the hotness of the climate. *'It has long been known that trachoma is associated with poverty and that, with economic development, the active disease disappears or its severity and prevalence decrease'* (WHO, 1997).

WHO notes that blinding trachoma still constitutes a serious public health problem for the poorest in 46 endemic countries (WHO, 1998). The following statistics highlight the extent of the disease in selected countries (ITI):

- One in three children in Mali has active trachoma and more than 3% of women have trachoma which has reached the stage where the eyelashes turn inwards.
- In Tanzania 10 of the 20 regions are thought to be endemic for trachoma.
- Trachoma in Vietnam had previously affected more than 60% of the entire population in 1960, but through the efforts of the Government of Vietnam by 1996 it has already reduced the prevalence to less than 10%.
- In Nepal, the countries only extensive survey on eye health undertaken in 1981, identified trachoma as the countries second leading cause of blindness with an overall prevalence of trachoma in the country of 6.9% of the total population.

- In Ethiopia infection with trachoma is estimated at 20% of the total population.

Preventing blindness

WHO recommends the 'SAFE' strategy for community control of trachoma.

'SAFE' stands for:

Surgery – to treat the end-stage disease

Antibiotics – to reduce the reservoir of infection

Facial cleanliness – to reduce the chances of the disease spreading

Environmental improvement – improving water and improving sanitation to reduce fly populations and reduce transmission

Simple **Surgery** to rotate the eyelashes away from the eye by trained health workers can be successful in providing immediate relief from the symptoms and preventing further scarring of the outer covering of the eyeball. This addresses the needs of people at imminent risk of blindness.

Antibiotics are used against the active trachoma to treat infection in individuals and in turn reduce the opportunities for transmission through the household and community. Today one off or once yearly oral doses of antibiotics, such as Zithromax (azithromycin) which is supplied free of charge through the programmes supported by the International Trachoma Initiative (ITI), can clear the infection of the bacteria causing trachoma and prevent the severe inflammation that results in scarring. Previously, and where the oral antibiotics cannot be administered, a six week schedule of a tetracycline ointment is used, but this does not treat the reservoirs of the disease. It is also more complex to administer.

The role of the water, sanitation and good hygiene practice

The **Face cleanliness** and **Environmental sanitation** components of the SAFE strategy are those that help to prevent transmission of the bacteria which causes trachoma, either through personal hygiene or through reduction in the fly populations. An analysis of past documented research has shown that a number of actions such as face washing, improvements in access to water and in environmental sanitation affect the incidence and transmission of trachoma. No single factor is the whole answer and it is the combined approach that will have the impact in reducing the incidence of this disease (Emerson et al, 2000).

Hygiene practice

One of the major transmission routes of trachoma is from secretions from an infected child's eye to another person's

eye, either via hands, cloths such as towels or handkerchiefs, or via flies. It has been shown that regular and sustained face washing can lead to a reduction in active trachoma. Face washing reduces the number of excretions on the face which attract flies and therefore there is less chance of the infected secretions from being taken by flies to infect another person. It possibly also reduces the chances of automatic re-infection.

Hygiene promotion for face washing, as well as for improved excreta disposal and environmental sanitation, can have positive effects. As the peak rates of active trachoma occur in children aged 2 to 7 years (WHO, 1997), child-to-child hygiene promotion is a particularly useful method of transferring the messages. Innovative hygiene promotion techniques used in water, hygiene and sanitation programmes are needed. The ITI supported programmes in Tanzania implemented through a range of partners, have included hygiene promotion messages through radio spots and through film, drama and dance, which has accompanied the distribution of the antibiotic Zithromax. In Nepal health promotion activities have also included posters and household and community education and school programmes.

Reduction of fly numbers

Flies, which are the major vector for trachoma transmission, can be reduced through effective excreta disposal, improved environmental sanitation and hygiene or chemical treatment of fly populations.

The aim is to reduce breeding sites, avoid attracting flies into the environment where people live and limiting contact

of people with flies. There is only one species of fly, which is currently proposed as the main vector for trachoma, the Bazaar fly, *Musca Sorbens*.

'The larval medium for M.sorbens is faeces, and it shows a marked preference for human faeces over any other type (Hafez and Attia, 1958). It only uses human excreta available in the environment: larval stages have not been found in latrines and adults have not been caught emerging from them (Curtis and Hawkins, 1982)' (in Emerson et al, 2000).

The effective use of latrines therefore provides a break in the chain of fly breeding and its larval stages. Hence if latrine use is community wide and accepted and used by the men, women and children concerned, then it can provide an effective barrier to the spread of trachoma through the vector of the fly.

The improvement of environmental sanitation generally can also have a marked impact on fly population numbers. Proper disposal of refuse, removal of wastewater, removal of animal manure and covering of food can also reduce fly numbers.

Chemical treatment for the eradication of high-density fly populations in high-risk areas is effective, although not feasible as a long-term solution globally. Lachrin and Reed (1999) identify chemicals and procedures, which can be used for chemical spraying of fly populations.

Increased availability and quantity of water

Links between water availability and trachoma have been proposed in terms of increased frequency to be able to undertake laundry, increased access to water for hygiene purposes particularly face washing and washing hands and fingers, and that improved access to water can release time for the above activities to take place (Kuper et al, 2003, Emerson et al, 2000). Therefore programmes improving community water supplies can contribute to the overall prevention of trachoma.

It is clear that for effective trachoma control the affected communities must be involved throughout, whether this is in the mobilisation activities for surgery and antibiotic distribution, or in the activities relating to the development and use of improved water, hygiene and sanitation practices or facilities.

GET 2020

GET 2020 is 'The Alliance for the Global Elimination of Trachoma by the year 2020'. It is a worldwide alliance of governments, research institutions, medical personnel, non-governmental organisations and donors established by WHO in 1997. It aims to eliminate trachoma totally by the year 2020.

International trachoma initiative

The International Trachoma Initiative is the international agency dedicated solely to the elimination of blinding



Figure 3. Hygiene promotion plays an important part in the prevention of trachoma

Photo credit: BBC/World Service Trust, Nepal

trachoma. ITI supports trachoma control programmes in Morocco, Tanzania, Sudan, Mali, Ghana, Ethiopia, Niger, Vietnam and Nepal. Working with countries that WHO has documented as having widespread trachoma, ITI collaborates with governmental, nongovernmental and international agencies to mobilise people and resources and develop plans for implementing the SAFE strategy.

Projects supported by ITI and its partners

Through the ITI supported programmes ITI's partners have provided more than 40,000 sight-saving surgeries for in-turned eyelashes and have administered more than 6 million treatments of the donated oral antibiotic Zithromax. They have also undertaken numerous health promotion activities and in some countries such as Ethiopia and Tanzania, have started working on the improvement of water and sanitary facilities. Partners implementing these programmes are numerous and broad and include organisations such as the Ministry of Health in Niger where it has a National Blindness Prevention Programme, the Sudan Trachoma Control Programme, the Nepal Netra Jyoti Sangh, a non-governmental, humanitarian organisation dedicated to the improvement of eye care services in Nepal, Helen Keller International in Morocco, the BBC World Service Trust and WaterAid in Ethiopia, UNICEF in Tanzania and the Christoffel Blinden Mission in the Sudan who along with other NGOs train surgeons for the sight-saving surgery.

Towards the Millennium Development Goals and engagement with the WATSAN community

Due to the impacts of blinding trachoma on the poorest, in particular women and the most disadvantaged people, implementing the SAFE strategy, whilst aiming for the GET 2020 target of eliminating trachoma by the year 2020, also contributes to the Millennium Development Goals. It responds to the areas of ensuring environmental sustainability through improved water, hygiene and sanitation, working towards gender equality through reducing burdens on girl children to look after parents who have become blind and to eradicating extreme poverty and hunger through increasing potential for economic well-being of families through the prevention of blindness.

The objectives of GET 2020 and general objectives of water, hygiene and sanitation programmes are complementary. For increasing benefit for communities being targeted, by either trachoma control programmes or general water, hygiene and sanitation programmes, there is a need to increase dialogue and share experiences, particularly across the medical and water, hygiene and sanitation sectors, with governments and international and local organisations and with the men, women and children in the affected communities.

The International Trachoma Initiative and others working to toward the elimination of blinding trachoma are mindful that many disparate determinants determine vul-

nerability to trachoma and other poverty-related conditions. The elimination of trachoma in Europe and North America in the early 20th century came as a result of improved standards of living, particularly improved access to and utilization of water and sanitation, rather than improved antibiotics or medical treatment. Effective outreach to organisations or individuals working in the water, sanitation and hygiene promotion sectors, can make a difference at the global and national levels and, most importantly, to those in society who continued to shoulder that fundamentally unfair burdened posed by poverty. Anyone wishing to find out more about the prevention of trachoma, GET 2020, or the ITI and its projects and partnerships, please contact Jeffrey W. Mecaskey, ITI, phone: +1(212)490 6460, email: mecaskey@trachoma.org, web: www.trachoma.org

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