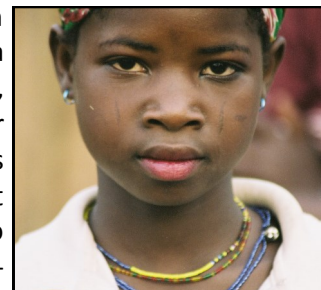


Policy Brief:

Effect of Water, Sanitation, and Hygiene on the Prevention of Trachoma

Summary: Trachoma is an infection that can cause blindness. Initial infection with *Chlamydia trachomatis* occurs primarily in young children. Trachoma is generally treated through community provision of antibiotics; and surgery is used in the end stage of the disease to prevent blindness. Face washing and fly reduction are key strategies currently promoted as part of the SAFE strategy to reduce risk of infection. This policy brief presents research on the role of water, sanitation and hygiene for the prevention of trachoma. We found that face washing, presence of latrines and soap use all contribute to large reductions in risk of infection.

Background. Trachoma is the world's leading cause of preventable blindness, with populations in 53 countries at risk [1]. Trachoma is caused by infection with the bacteria *Chlamydia trachomatis* and is most common in poor, rural areas lacking basic water, sanitation and hygiene services. *C. trachomatis* is spread via flies, hands, towels or other fomites, carrying the bacteria from the eyes and noses of infected persons, to others around them. Children are most likely to get infected, and repeated infections without treatment may eventually cause scarring that can invert the eyelids (entropion), leading to eyelashes scratching the surface of the eye (trichiasis). Without preventive surgery, the resulting abrasions and infections of the cornea can lead to blindness later in life [2-3].



Credit: International Trachoma Initiative

The SAFE strategy. The WHO has adopted the “SAFE” strategy to reduce blindness and infections caused by trachoma: Surgery, Antibiotics, Facial cleanliness, Environmental improvements. The preferred choice of treatment for infection is a single dose of Zithromax (azithromycin) or, if not available or contraindicated (e.g. for children under six months), six weeks of tetracycline eye ointment twice per day [5]. Facial cleanliness is important to reduce the ocular and nasal discharge, which transmit the infection and may attract flies that can spread the disease from one person to another. Trachoma can cause chronic inflammation of the eye that continues after clearing the infection. Surgery is an essential procedure to prevent blindness in individuals with extensive damage to eyelids. Increasing water and sanitation access promotes hygiene and contributes to fly reduction [6]. The bacteria which cause trachoma can also be passed via hands, towels or other items that come into contact with infected eyes. Because transmission happens quickly in endemic areas under poor hygienic conditions, antibiotics alone are insufficient and environmental and behavioral changes are needed to sustain interruption of transmission [7]. While the S and A components of the SAFE strategy have been widely implemented, evidence and specific targets are lacking for the F and E components, of which water, sanitation and hygiene (WASH) are critical elements [8]. Data on the impact of specific WASH factors on trachoma are needed to identify intervention points and to support policy and program recommendations.

Methods. We conducted a systematic search of peer-reviewed and grey literature. Our search resulted in 83 studies that reported on the relationship between WASH and trachoma. We conducted 15 meta-analyses to investigate the evidence available on the effect of individual components of WASH on trachoma and to identify research gaps [9].

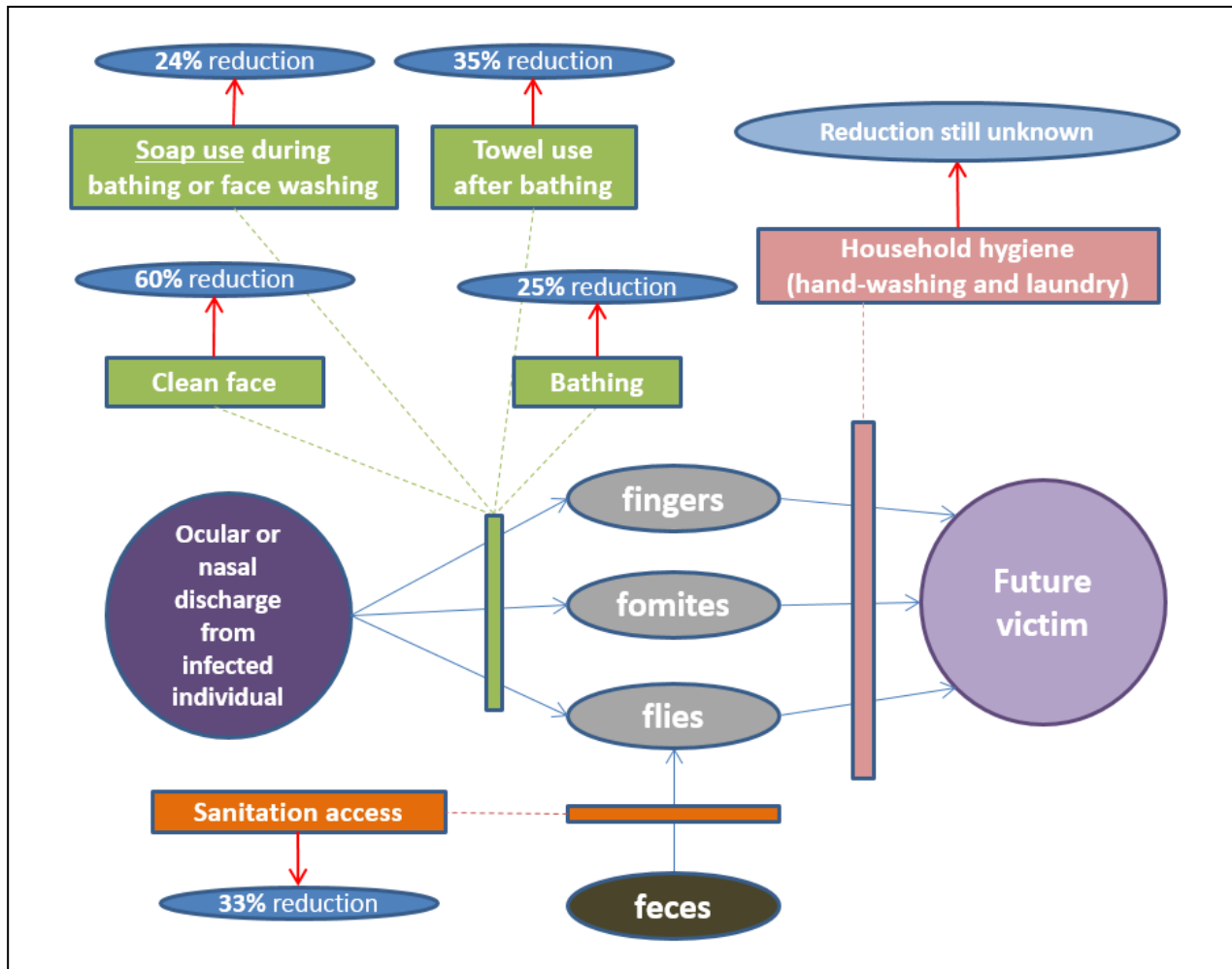
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Findings

Hygiene. Better hygiene in children, measured both as hygiene practices reported by parents and as observed facial cleanliness at the time of examination, was universally found to be associated with lower odds of trachoma. Children with clean faces at the time of examination had 60% lower odds of active trachoma than children with dirty faces. Similar reductions in odds were found for specific indicators of facial cleanliness: children without ocular discharge had around 60% lower odds of showing signs of active trachoma or being diagnosed with *C. trachomatis* infection, while children without visible nasal discharge had around 40% lower odds of active trachoma or *C. trachomatis* infection. In addition, children whose caretakers reported washing their children’s faces at least once daily had around 25% lower odds of trachoma, as did children who were bathed at least once daily. People who reported using soap during bathing and/or face washing, as well as those who reported using a towel to wipe their face after face washing, experienced similar reductions in odds of disease.

Sanitation. Access to sanitation, commonly defined as the presence of a household latrine, was found to be associated with 15% lower odds of active trachoma and 33% lower odds of *C. trachomatis* infection. However, few studies reported on sanitation *use*, and our analysis did not find any clear effect on active trachoma infection among those studies that did. This could be because sanitation *use* data relied on self-reported practices, or because reported *use* did not necessarily mean consistent use or widespread use in the community (which may lower overall fly presence). Few studies reported on latrine type, quality, or maintenance, but it appears that the presence of any type of latrine may be important for the reduction of both *C. trachomatis* infection levels and active disease.

Interventions to reduce trachoma transmission and infection



Findings (continued)

There was little evidence that private latrines are more effective against trachoma than shared latrines, or that indoor toilets are more effective than pit latrines. A few studies demonstrated a significant reduction of trachoma in communities after sanitation promotion or education.

Water. Most studies reported water access as distance to water source, generally measured by living within 1 km of a water source. Our analysis did not find a conclusive relationship between living within 1km of water and *C. trachomatis* infection or the presence of active trachoma. Data relating trachoma with other measures of water (such as type of water source) are poorly defined, and few discrete conclusions can be made. Additional research is needed to better define the links between water access and trachoma, since water is required for bathing and face washing.

Public health implications

Face hygiene and sanitation at home play a role in reducing trachoma. However, additional research is still needed to define the role of other aspects of sanitation and hygiene, and of water generally, in interrupting trachoma transmission. *What is the effect of handwashing on trachoma? What is the effect of shared latrines? Are trachoma levels different in households with clean versus dirty latrines? How does actual latrine use (versus presence) affect trachoma? What is the role of overall compound cleanliness and trachoma?* In order for these and other research questions to provide reliable evidence of the impact of WASH on trachoma, there is a need for partners to come together and define common indicators. A number of the reviewed studies could not be analyzed due to poor or inconsistent definitions of latrine use, latrine conditions, water access, etc. Well-defined and consistent indicators can be used for mapping areas of greatest need so that programs can be targeted appropriately. There are a number of online sources where a growing body of data is available, including trachomaatlas.org and WASHNTDs.org.

Surgery or antibiotic treatment in infected individuals and in highly endemic communities is necessary to prevent blinding trachoma and to reduce the overall level of infected individuals. However, without interventions to improve facial hygiene, use of soap, and access to latrines, sustained control of trachoma in these communities is unlikely to be achieved. Promotion of water, sanitation and hygiene hardware and services in trachoma-affected communities will not only reduce trachoma infection, but will also contribute to reductions in other illness such as diarrhea and respiratory infections [10-11].

Key messages for trachoma-endemic communities:

Face washing significantly reduces risk of trachoma infection. Individuals, particularly children aged 1-9, should wash their faces at least once daily. Daily bathing, and use of soap when washing, are also recommended for reducing trachoma. Every household should have access to a latrine. Households with latrine access are far less likely to be infected with trachoma, and it appears community-wide latrine coverage is important.

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