Where should we intervene?

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Where should we intervene?

**How can we identify persons or communities at risk from trachoma and its blinding complications?**

Being able to easily identify subjects or communities at risk from trachoma, among which the blinding complications are more to fear, would facilitate the task of policy makers and program managers.

This identification currently rests on epidemiological investigations, during which a sample of the population is examined clinically by an ophthalmologist, or nurse specializing in ophthalmology. The major problem is not so much the cost of the investigations as the shortage of specialist personnel available for this work.

As regards West Africa, we have an appreciable knowledge of the prevalence in the general population in countries such as Mali, Senegal, Gambia, Ghana, Mauritania, Niger or Burkina Faso. In other countries, it is difficult to accurately determine the overall prevalence because most of the research has been done only on a local scale and in regions known as high-risk and unrepresentative. Extrapolation to a whole country from sporadic investigations is highly dubious.

Work carried out in recent years, mainly in West and East Africa, allow us to draw up a list of the trachoma risk factors. Does their knowledge, in principle, make it possible to identify the villages or communities to be treated, thereby saving on long and expensive investigations?

The WHO has developed a rapid method for evaluating trachoma to help the medical authorities of the countries to identify the most affected regions and districts and decide where to intervene in priority. This technique cannot replace real investigations in the general population for estimating the

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7 Tanzania, Kenya, Malawi.
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real prevalence. Nevertheless, it is possible that a certain number of determinants of the risk of trachoma serve as references to the campaigns.

**Children, principal reservoir of infection**

In hyper-endemic areas, trachoma appears in the first year and prevalence increases very quickly to reach a maximum at the age of 2-3 years if the level of endemic disease is high. In Mali, for example, in the national survey of 1996-1997, the peak is observed at three years of age, where half of children present an active trachoma. Prevalence then decreases with age and the infection leaves observable scar lesions, increasingly frequent over time.

Contamination generally takes place within the family. Children of siblings with trachoma are more likely to develop persistent serious trachoma causing significant scars. Nevertheless, some children develop inflammatory reactions more than others, and may sometimes even be affected by trichiasis.

In regions where inflammatory trachoma has mainly disappeared, trachoma is found primarily in the adults in scar form. Trichiasis and corneal opacity then reflect the infectious episodes of childhood in populations where trachoma was rife a few years ago. Whereas the blinding complications can continue to be alarming, the decline of infantile disease allows us to foresee that trachomatous blindness will also decrease in the future.

Whereas girls and boys are equally infected in childhood, adult women are more often affected than men. In all countries, the later after-effects of trachoma, such as entropion-trichiasis and corneal opacity, are also more frequent among women than men. The more frequent infection of adult women is explained by their contacts several times a day with the infected child. Thus, in adults, the question arises of only treating women, assuming that men play a minor role in the transmission of the infection.

**Can different immune reactions allow us to anticipate serious cases depending on the host?**

The intensity of clinical signs of inflammatory trachoma does not only imply virulence or bacteria. It also depends on the immune response of the host to *C. trachomatis*, which has been the subject of many works.
The body is far from remaining passive to bacterial infection. It organizes an immunity response, which generally leads to a cure. The existence of repeated eye infections with the same stock of *Chlamydia* suggests however that this immune response cannot remove the carrier of the infection.

Furthermore, the immune response is far from being always beneficial. It has inflammatory symptoms that can exceed their aim and persist after the disappearance of the bacterium. These reactions can be responsible for severe late manifestations of trachoma.

The immune reaction probably varies depending on the individual within a family or group. There is no proof that any ethnic group is more particularly sensitive to trachoma or its after-effects, although certain observations would suggest it.

In regions of hyper-endemic disease, certain sub-groups of children respond to the infection by inflammatory reactions sometimes intense. It is generally children with siblings affected by trachoma. Are these exacerbated immune reactions of genetic origin or communal reinfection due to a high level of overcrowding?

Currently, no tests are available for anticipating the intensity of the immunity response to trachomatous infection and the seriousness of inflammatory reactions, possibly leading to blindness.

**A dirty face, strongly associated with active trachoma**

Ocular and nasal secretions from young children are sources of infection. Children with dirty faces are more likely to have trachoma. In Mali, Senegal and especially in Burkina Faso, the risk of active trachoma is twice higher for them and severe trachoma three times higher.

A random study of community intervention, carried out in Tanzania, showed that after mass antibiotic therapy, facial cleanliness of children decreased the frequency of serious trachoma. Research carried out in Mali and other countries of the sub-region also shows that the frequency of trachoma decreases with the practice of cleaning faces and even more so after a daily bath.

The practices of hygiene and cleaning the faces of children depend closely on the availability of water. Schematically, the greater the distance from water, the less frequent is the practice of hygiene.
The home and habitat

The most isolated villages appear most likely to have a high prevalence of trachoma. The absence of school and medical facilities, an over-populated habitat, beds shared by many children, are all markers of risk.

The environment

*C. trachomatis* can be transmitted passively by certain species of flies, in particular *Musca sorbens* and *Musca domestica*. There is a very close relationship between the presence of flies on children’s faces and trachoma. *Musca sorbens* prefers laying on human excrement deposited on the ground. The presence of functional latrines near the house is associated with a lower prevalence of trachoma in several countries.

Research disagrees about the risk caused by the presence of cattle. *Musca domestica* is attracted by the excrement of cattle, but not *Musca sorbens*. Apparently, there is no more trachoma among stockbreeders. An explanation put forward is that owners of cattle enjoy a better standard of living, and can therefore take better care of their children.

Poor management of household refuse encourages the pullulation of flies, but little research has confirmed the connection with trachoma.

Socio-economic conditions

The prevalence of trachoma is conversely related to the socio-economic level of the families. In Mali, an inverse linear relationship has been demonstrated between the level of wealth and the prevalence of trachoma (fig. 1).

A low rate of education among parents and particularly the mothers is also a marker of risk of the disease.

The geographical situation

Investigations in Mali, Senegal and Mauritania show that, if trachoma among children is more frequent in the dry and arid regions of the north, it is not the same for scar lesions among adults. Trichiasis, in particular, appears more frequent and serious in the wetter regions of the south (fig. 2). Various hypotheses deserve to be explored to explain this paradox.
What is the risk of a person affected by trichiasis becoming blind?

Any person affected by trachoma can lose his sight because of bacterial keratitis, which causes the cornea to become opaque. However, the most frequent cause of blindness remains the ulcer caused by the friction of the eyelashes, which wound a cornea already weakened by dryness of the eye (due to deterioration of the secretion cells of the lachrymal glands). These ulcers are super-infected by bacteria or fungal infection leaving a scar on the cornea, which leads to a decrease in vision if the corneal opacity is central.

Trichiasis multiplies the risk of blinding trachoma by eight. Once trichiasis has appeared, a third of women under 35 years of age, and more than...
40% of older women will develop corneal opacity within ten years and will become blind.

**What influence has the prevalence of trachoma on the evolution of trichiasis?**

A comparative study between Gambia, a country where the prevalence of trachoma is low, and Tanzania, a hyper-endemic country, suggests that the risk of trichiasis among carriers of conjunctival scars decreases when the prevalence of active trachoma decreases. Cicatricial trachoma develops less quickly in Gambia than in Tanzania. Gambia’s example would thus tend to show the existence of a “virtuous circle”: the less trachoma, the less serious and blinding it is.
Nobody can predict with absolute certainty the evolution of cicatrical trachoma in the absence of reinfection. It is possible that the inflammatory process will continue. Certain authors have put forward the hypothesis that a local antiseptic eye lotion, applied daily, could reduce the risk of corneal ulcer of bacterial or fungal origin.

**CONCLUSIONS AND RECOMMENDATIONS**

Trachoma is more frequent in economically underdeveloped rural regions, where water supplies and basic medical services are lacking. However, in the hyper-endemic regions, the spread of trachoma remains unequal, with pockets of trachoma coexisting in a mosaic with healthy regions, in a way difficult to explain.

Certain social and medical conditions are incontestably favorable to trachoma. There are many trachoma risk markers, but knowledge of them is insufficient to identify with certainty communities where trachoma prevails and accurately target the action. Thus, one cannot avoid clinically examining a sample of children in regions where the disease is suspected.

Nevertheless, when preparing and implementing intervention programs and trachoma control, it is essential to locate the risk factors that can be controlled by collective or individual measures when deploying the components of the SAFE strategy.