CASE 9
Controlling Trachoma in Morocco

Geographic Area: Morocco

Health Condition: In 1992, a national survey found that just over 5 percent of Morocco’s population had the blinding disease trachoma. Nearly all the cases were concentrated in five poor, rural provinces in the southeast of the country where 25,000 people showed a serious decline in vision due to trachoma, 625,000 needed treatment for inflammatory trachoma, and 40,000 urgently needed surgery.

Global Importance of the Health Condition Today: Trachoma is the second leading cause of blindness in the world, after cataracts, and the number one cause of preventable blindness. More than 150 million people in 46 countries have trachoma. Economic development and improved hygiene have eliminated the disease from North America and Europe. But it plagues millions in hot, dry regions where access to clean water, sanitation, and health care is limited.

Intervention or Program: In 1991, Morocco formed the National Blindness Control Program to eliminate trachoma by 2005. Between 1997 and 1999, the program implemented a new strategy called SAFE (surgery, antibiotics, face washing, and environmental change), giving Morocco the distinction as the first national-level test of the four-part strategy. Mobile teams have performed simple, inexpensive surgeries in small towns across the provinces, some 3 million doses of the antibiotic azithromycin have been distributed, health education efforts promoting face washing and hygiene have been conducted, and latrines have been constructed and safe drinking water supplied.

Cost and Cost-Effectiveness: The Moroccan government has provided the bulk of the financing for the program, with external support from the United Nations Children’s Fund and a public-private partnership called the International Trachoma Initiative. Through this partnership, the pharmaceutical company Pfizer has donated millions of dollars worth of its antibiotic Zithromax®.

Impact: Trachoma prevalence has fallen 75 percent since 1999, and in some provinces has been eliminated. Overall, the prevalence of active disease in children under 10 has been reduced by 90 percent since 1997.
where access to clean water, sanitation, and health care is limited. The heaviest burden of blindness from trachoma affects the populations of sub-Saharan Africa.

Modern antibiotics, combined with prevention and other treatment methods that can be deployed in low-income countries, hold much promise in the fight against trachoma. Morocco, the first country to start a large-scale campaign against trachoma with a newly developed strategy, is leading the way.

**Disease of Poverty**

Trachoma is highly contagious, marked by chronic conjunctivitis, or “pink eye.” Children are its first victims. Active infection is caused when the bacterium *Chlamydia trachomatis* is spread (mainly among young children) through direct contact with eye and nose secretions from affected individuals, contact with contaminated towels and clothing, and through fluid-seeking flies. Disease transmission is rapid and intense in conditions of overcrowding, poor hygiene, and poverty. In endemic areas, prevalence rates in children aged 2 to 5 years can reach 90 percent (Mecaskey et al. 2003).

Active trachoma alone is not immediately threatening to sight. Repeated trachoma infections over many years, however, cause problems that can eventually lead to blindness. The upper lid frequently becomes chronically inflamed, resulting in scarring and a condition called “trichiasis,” or in-turning of the eyelash. If this condition is not treated, the eyelash painfully rubs the eye, resulting in corneal scarring, opacity, and blindness. Blindness from trachoma, whose seeds are first sown in early childhood, usually strikes when a person is between 40 and 50 years old.

Trachoma is linked closely with poverty—both as a symptom of underdevelopment and as a cause. The economic impact of trachoma on endemic areas is profound, as blindness develops during the most economically productive years. An estimated $2.9 billion worth of potential productivity is lost annually due to the disease (Kumaresan and Mecaskey 2003). The disease disproportionately impacts women, who are infected through their close contact with children, at a rate two to three times more frequently than men.

**New Strategy: SAFE**

In the mid-1980s, the Edna McConnell Clark Foundation brought renewed attention to trachoma by funding extensive research on the disease’s epidemiology and the viable options for its control. Their scientific findings contributed to the development of a new, comprehensive strategy to treat and prevent trachoma called “SAFE,” which stands for surgery, antibiotics, face washing, and environmental change—the four main interventions within the strategy. The community-based SAFE strategy seeks to confront the underlying causes of the disease as well as the imminent threats of blindness, and differs from earlier approaches by emphasizing the need to effect not just medical but also behavioral and environmental changes.

**Surgery.** Surgery is needed to halt corneal damage in the later stages of trichiasis and prevent the onset
of blindness. Researchers in Oman designed a simple, quick, and inexpensive surgical procedure, which can be applied to treat large numbers of patients at the community level. Health professionals are trained to make a slit in the outer part of the eyelid and restitch it in a way that pulls the edge and lashes away from the eye’s surface. The simple procedure has a success rate of approximately 80 percent and in low-income countries like Ghana can cost as little as $6 per person (Mecaskey et al. 2003).

**Antibiotics.** Antibiotics are used to treat active trachoma infections and can reduce the community pool of infections and prevent scarring (West 2003). Until the discovery of the one-dose azithromycin, the available antibiotic was a 1 percent topical tetracycline eye ointment applied daily in a six- to four-week regimen. Due to the time-intensive treatment and its side effects of stinging sensation and blurred vision, however, compliance with the earlier treatment was often poor.

**Face Washing.** Studies have shown that regular face washing, especially among children, can break the cycle of reinfection and prevent the spread of trachoma-causing bacteria. Washing helps remove the discharge from infected eyes, which attracts disease-spreading flies seeking fluid and salt. Children’s faces can be kept clean even with small amounts of water—one liter can clean as many as 30 faces.

**Environmental Change.** Improving living conditions and community hygiene has reduced the spread of trachoma. Construction of latrines is an important way to reduce the prevalence of the flies associated with trachoma (West 2003). Health education and the provision of adequate water have also proven effective in reducing the spread of infection.

**Medical Breakthrough and International Movement**

A major advance for the SAFE strategy occurred in the mid-1990s with the discovery of a much more potent antibiotic, which strengthened the “A” component of the strategy. Studies showed that a single dose of the antibiotic azithromycin was as effective as (or even more effective than) the six-week regimen of the widely used tetracycline antibiotic. Pfizer, the global pharmaceutical giant that manufactures the prescription version of the drug (Zithromax®), and the Clark Foundation began pilot tests of the drug in the early 1990s in Africa. Their results established that the drug is a powerful one-dose cure and a substantial improvement over the current antibiotic treatment because it assures a higher compliance rate.

With the discovery of the new antibiotic treatment and the development of a comprehensive strategy to prevent and treat the disease, the global health community now had powerful weapons in the fight against trachoma. The mounting evidence demonstrating the feasibility of eliminating trachoma was first outlined in a 1996 WHO global scientific meeting.

Momentum was boosted further in 1998 when Pfizer and the Clark Foundation announced the formation of a public-private partnership called the International Trachoma Initiative (ITI) aimed at eliminating trachoma from the world by 2020. The initiative was first financed with $3.2 million grants from each of the two main partners and set out to help the governments of endemic countries start national trachoma programs based on the SAFE strategy.

Pfizer’s pledge to contribute $60 million worth of Zithromax® was key to ITI’s strategy and represented a shift in the company’s philanthropy. Zithromax® has a broad consumer market and is the most prescribed branded oral antibiotic in the United States, accounting for more than $1 billion annually of the company’s revenues (Barrett, Austin, and McCarthy 2000). The company donated large quantities of the drug, despite the risk that the donated drugs could be sold on the black market.

With funding, leadership, momentum, and a strategy in place, the international movement embarked in 1999 on the first national-level test of the SAFE strategy, choosing Morocco as the site.

**Morocco Leads the Fight Against Trachoma**

Morocco, a North African country of just under 32 million people, has a long history of trachoma control efforts. The country’s fight against the disease
began nearly a century ago, when the disease ravaged all parts of the country. Dr. Youssef Chami Khazrazi, head of Morocco’s National Blindness Control Program (NBCP), wrote that, “There is not a single Moroccan among two to three generations who does not remember the years where the fight of (trachoma) represented one of the major and permanent activities of the Ministry of Health” (Khazrazi 2002).

Initially, the disease was regarded as primarily a medical problem, and in the 1970s and 1980s it was tackled by treating schoolchildren in the most-affected provinces with tetracycline eye ointment twice a year. Medical treatment was not yet integrated with improvements in sanitation and standard of living among the rural poor. So while economic development led to the virtual disappearance of trachoma from most urban areas in the previous few decades, the disease pervaded many of the country’s poorer, rural areas.

A national survey in 1992 found that approximately 5.4 percent of the population showed signs of trachoma, with virtually all of these cases concentrated in five rural provinces in the southeast of the country: Errachidia, Figuig, Ouarzazate, Tata, and Zagora. These five arid provinces constitute a quarter of the total area of the country and have a widely dispersed population of approximately 1.5 million people. Poverty, scarce water, agricultural subsistence, and weak infrastructure and sanitation characterize the region. There, the problems of trachoma were great: 25,000 people showed a serious decline in vision due to trachoma; some 625,000 needed treatment for inflammatory trachoma; and surgery was urgently needed for 40,000 people with trichiasis.

Morocco’s political leaders were committed to eliminating trachoma by 2005 and in 1991 formed the NBCP. Between 1997 and 1999, the SAFE strategy was integrated into the program. “We now recognized,” says Dr. Khazrazi, “that trachoma at the level of these regions is not strictly a medical problem; it is essentially the reflection of a socioeconomic problem.” The “real enemies,” he explains, “are the disfavored rural communities, illiteracy, family overcrowding, lack of water, the accumulation of animal wastes, and the proliferation of domestic flies. In sum, the enemy to combat is not Chlamydia but poverty” (Khazrazi 2002).

To address the disease’s wide-ranging causes, the NBCP formed a comprehensive partnership including five government divisions (Ministry of Health, Ministry of National Education, Ministry of Employment, Ministry of Equipment, and National Office for Potable Water), international organizations (ITI, UNICEF, WHO, and Helen Keller International), bilateral and multilateral agencies, and local nongovernmental organizations (NGOs). With scientific evidence, political resolve, and financial support in place, the NBCP was launched.

**Putting SAFE in Motion**

Each of the four elements of the SAFE strategy were mobilized.

**Surgery.** Government officials in the Ministry of Health moved quickly to decentralize surgery so that eyelid correction was readily available in small towns and villages. Before surgical teams arrived in the countryside, village leaders and outreach workers were briefed so that they could publicize the procedure and explain its benefits. In partnership with the Hassan II Foundation of Ophthalmology, the ministry deployed mobile surgical units staffed by doctors and specialist nurses trained to carry out the vision-saving procedures. Forty-three physicians and 119 nurses have worked in 34 centers throughout the five provinces. Between 1992 and 2000, more than 26,000 people underwent eyelid surgery. At the same time, education campaigns were launched to motivate infected individuals to come forward for treatment.

**Antibiotics.** Azithromycin was first field tested in Morocco during the mid-1990s, when 10,000 patients were successfully treated. Widespread treatment with the donated drug began in the five southeastern provinces in 1999, and approximately 3.5 million doses were distributed in the first quarter of 2004 (ITI statistics through first quarter 2004). A successful strategy was soon developed, built on the recognition that trachoma is a community disease and reinfection is very likely to occur if only isolated cases are treated. Different approaches were developed depending on the prevalence. When more than
one-fifth of the children under 10 showed signs of active trachoma, everyone in the community was treated. Where infection rates were lower—between 10 and 20 percent—treatment focused on affected children and their families; at less than 10 percent, infections were treated individually. Treatment campaigns are launched annually, between the months of September and December.

Face Washing. Health education has proven effective in increasing awareness and changing attitudes, thus increasing face washing and preventing disease transmission. Campaigns promoting individual and community hygiene have centered on information, education, and communication to explain the disease’s causes and the means of prevention. Outreach workers, health professionals, and teachers have used slide shows, videos, films, community theater, meetings, photos, notices, pamphlets, and even megaphones to communicate the messages. Newspaper articles and radio and television broadcasts have also been effective. To educate children, the primary carriers of the disease, the Ministry of Education designed a model lesson on trachoma that has been incorporated into the curriculum of primary schools in the five provinces.

The education campaigns depend in large part on the active engagement of the local community. Mosques, lodgings for young women, local associations, and schools have proved to be ideal venues for communicating the campaign’s message.

Environmental Change. The National Office for Potable Water has overseen the construction of latrines in 32 villages. Supporting these efforts are 350 local village associations that have drilled wells, built latrines, and found ways of storing animal dung safely, so that this valuable natural fertilizer does not spread flies through the village. The national office is also leading the provision of drinking water: 74 villages in Errachidia and Zagora have been supplied with water, and access to potable water is reported to have increased from 13 percent of all rural communities in 1992 to 60 percent in 2000.

Interventions to reduce poverty and improve literacy among women are now acknowledged to be central to the fight against trachoma. In Zagora, for example, the work of the Ministry of Employment and Helen Keller International has helped 8,500 women learn to read. Helen Keller International has also implemented economic programs aimed at increasing the incomes of women.

Trachoma Nearly Eliminated

The implementation of the SAFE program has had a dramatic impact in Morocco and represents the most rapid elimination of trachoma in a single country in history. Prevalence has fallen 75 percent since 1999, from 28 percent to just 6.5 percent in 2003 (Mecaskey et al. 2003). Acute infections have been significantly reduced in children and in some places, such as Figuig and Ouarzazate, eliminated. In Zagora province, which remains the hardest hit, annual epidemiological surveys beginning in 1997 revealed a drop in prevalence from 69 to 8.4 percent in 2003. In Tata, Ouarzazate, and Figuig provinces, no cases of active infection were reported in 2003. Overall, the intervention has achieved a 90 percent reduction in the prevalence of active disease in children under 10 since 1997 (figure 9.1).

The elimination of blinding trachoma as a public health problem by the end of 2005 in Morocco is indeed a real possibility. Several challenges, however, face the program. In particular, the country faces a backlog of about 15,000 cases needing eyelid surgery, and many more operations need to be carried out urgently in the next year or two. Evaluation of these challenges and the impact of the trachoma control program is ongoing, with researchers at the London School of Hygiene and Tropical Medicine assisting in the task.

Cost

The elements of the SAFE strategy likely to be the most costly are improving environmental infrastructure and providing the drugs. Although quantitative information about total spending on the initiative is unavailable, to date the Moroccan government has provided the bulk of the funds to improve village
sanitation—supplemented with grants worth over $2 million from ITI between 2001 and 2004.

The dramatic reduction in trachoma achieved in Morocco over the past few years would probably have been impossible without Pfizer’s donation of the antibiotic, which would likely be valued at tens of millions of dollars. The company has also provided grants for public education to support other components of the SAFE strategy.

The US fund for UNICEF has supported the implementation of the face washing and environmental change components of the SAFE strategy with a grant of $225,000. Total costs for surgical treatment have been estimated at $15 to $25 per person, with funding from the Moroccan government as well as ITI. A further grant from ITI—$180,000 from 2000 to 2004—supported the Moroccan Ministry of Health’s evaluation of the impacts of interventions.

**Elements of Success**

Dr. Joseph Cook, former executive director of ITI, has identified four factors as the keys to success, in addition to the array of effective interventions. First, the disease-control program rested on solid scientific evidence. Second, the program was locally organized and responded to local circumstances. Third, treatment was closely linked with prevention and the development of a strong public health infrastructure. Finally, the program fit within a broader agenda of health promotion, disease control, and health equity.

Dr. Khazrazi also reported that the solid support of the government of Morocco was invaluable. “One of the major assets is commitment and political will. Political will is, first of all, the commitment of the Ministry of Health.” This support is evidenced by visits of the Ministry of Health to endemic areas to affirm the government’s commitment to the disease’s elimination.

**Catalyst for Global Efforts**

The success of the trachoma program in Morocco has provided a catalyst for efforts to eliminate the disease worldwide. Paula Luff, the director of Pfizer’s international philanthropy program, explained that Morocco’s program “showed remarkable results.

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**Figure 9.1 Prevalence of active disease in five provinces in Morocco, 1997–2003**

Note: In Morocco, the prevalence of active disease in children under 10 has been reduced by 90 percent in five years.

*Source: Mecasky et al. (2003).*
There came to be an understanding that we needed to do something to bring this to scale quickly in order to meet the goal of trachoma elimination. In 2000, after data demonstrated that prevalence rates in Morocco had been reduced by more than half in just one year, the ITI accelerated its international efforts. Pfizer committed to donating 10 million additional doses of Zithromax® and $6 million in operational funding, the Clark Foundation contributed another $6 million, the UK Department for International Development provided approximately $1.8 million, and the Bill & Melinda Gates Foundation awarded $20 million over five years—its largest donation to international blindness. With the additional funding in place, Morocco’s SAFE model has been replicated in Ghana, Mali, Tanzania, Ethiopia, Nepal, Niger, Sudan, and Vietnam. In these countries, representing half of the global burden of trachoma, more than 99,000 surgeries have been performed and more than 11.5 million doses of Zithromax® distributed (ITI statistics, through first quarter 2004).

In November 2003, recognizing the effectiveness of the SAFE strategy as well as the estimated 400 million people still in need of antibiotic treatment, Pfizer announced that it would donate up to 135 million doses of Zithromax® over the next five years (John Donnelly, “Pfizer to Donate US$500 Million in Drugs,” The Boston Globe, November 12, 2003). Pfizer’s contribution represents one of the largest donations of a patented drug in history. ITI plans to expand the number of developing countries receiving support. In 2004, programming has begun in Mauritania and Senegal, and according to Pfizer’s Chairman and CEO Hank McKinnell, “by 2020 we hope to have all of (the endemic countries).” Thus, ITI and its many partners have helped ensure that Morocco’s success with SAFE, like the disease that it has nearly eliminated, is contagious.

References


