



APPENDIX 3

Four Success Stories: Malaria Control in Brazil, Eritrea, India, and Vietnam

Summary

In the last decade, while many countries have struggled to slow the spread of malaria, four countries—Brazil, Eritrea, India, and Vietnam—have successfully and dramatically reduced their malaria burden. The keys to these successes have been multiple, including:

- Conducive country conditions
- A sound and targeted technical approach, using a package of effective tools
- Data-driven decision making based on good surveillance and operational research
- Strong leadership and commitment at all levels of government
- Community involvement in planning and implementation
- Decentralized control of finances and implementation supported by a strong national control program
- Ability of managers to efficiently navigate bureaucratic hurdles
- Infrastructure and skilled technical capacity at national and subnational levels

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- Proactive technical and programmatic support from partner agencies
- Sufficient financing to take control activities to scale
- Flexibility in approach by the World Bank.

No single factor or small group of factors appears to be sufficient in achieving these successes. Many of these key success factors could be adapted to other country contexts.

The World Bank played an essential role in both providing sufficient financing to achieve appropriate scale and mobilizing necessary supervisory support for the projects. A more proactive engagement by the Bank in other countries could yield similar successes.

If the goals of RBM are to be achieved, governments and their partners must work to address as many of these key factors as are feasible and relevant. The World Bank must take a more active and flexible role in supporting countries to roll back malaria.

Introduction

In recent years, several new and highly effective tools have been developed in the fight against malaria. Insecticide-treated bed nets can reduce all-cause child mortality by as much as 25 percent. Intermittent presumptive treatment of pregnant women can significantly reduce low birth weight in their newborns. In addition, ACTs hold great promise for reducing severe morbidity and mortality from malaria and for curtailing onward transmission of infection.

Despite these great advances, progress in reducing the global burden of malaria has been slow. Many malaria-affected countries have experienced great difficulty taking these interventions to scale. Lack of sufficient financing, poor public health infrastructures, limited skilled human capacity, poor quality health services and commodities in the private sector, and lack of intersectoral collaboration have all been posited as possible barriers to scaling up malaria control interventions. Such challenges have led some to question whether the RBM Partnership, which was formed in 1998 to assist countries to take proven malaria control measures to scale, will be successful in achieving its goal of halving the global burden of malaria by 50 percent by 2010.

RBM, though, has not been without its achievements. With the support of the World Bank and other RBM partners, four countries have been successful in reducing malaria morbidity and mortality during the last decade. The experiences of Brazil, Eritrea, India, and Vietnam provide strong evidence that control of malaria is possible with existing tools. These success stories offer hope to other affected countries that control of malaria is possible. This report briefly documents the malaria control efforts of these four countries and discusses key factors that led to the success of these programs.

Methods

Information for this report was gathered from a number of sources. World Bank project supervision documents and available published and unpublished reports were reviewed. Informal interviews were conducted with some World Bank staff persons who were involved in the design or supervision of these projects. Information and insights were also sought from key country-level informants, including National Malaria Control Program Managers and WHO regional and country office staff. This report also reflects the viewpoints of the author, who was involved in the design and supervision of the Eritrea HIV/AIDS, Malaria, STD and TB (HAMSET) Control Project and in the supervision of the India Enhanced Malaria Control Project (EMCP).

All information was evaluated looking for common factors in the four countries that may have contributed to the success of the malaria control program. Draft versions of this manuscript were then shared with key World Bank and country informants for review and comment.

Findings

Brazil

From 1989 through 1996, the Ministry of Health of Brazil implemented the Amazon Basin Malaria Control Project or PCMAM. Financial support was provided by the World Bank (US\$73 million) and technical support from the Pan American Health Organization (PAHO). This project originally focused on vector control activities, including indoor residual spraying

(IRS) and environmental management, with a lesser focus on case management and disease surveillance.

During the project period, two significant events would greatly affect the progress of malaria control efforts. Control of implementation of malaria control activities was devolved from SUCAM, the national malaria control program, to municipalities as part of a larger government decentralization initiative. SUCAM retained responsibility for procuring and distributing commodities, including drugs and insecticides, setting standards, and providing technical support. Decentralization provided municipalities for the first time with the financial resources to invest in malaria control activities and generated local ownership of these efforts.

During the same period, Brazil's national malaria control strategy was revised in line with WHO's global strategy. Features of the new strategy included highly selective targeting of control efforts to high-risk municipalities. This required strengthening of malaria case detection and better use of surveillance data in decision making. The new strategy also shifted emphasis from vector control activities to more aggressive management of clinical cases, which included the introduction of artemisinin-based drug treatments. Antimalarials were made widely available, including in local shops in mining areas. All cases of fever in these areas were presumptively treated for malaria.

Malaria transmission was controlled elsewhere in Brazil by 1980, but in the Amazon Basin cases increased steadily until 1989, to almost half a million a year and the coefficient of mortality quadrupled in 1977-1988. A World Bank project supported the program from late 1989 to mid-1996, and in 1992-1993, with advice from the Pan American Health Organization, facilitated a change toward earlier and more aggressive case treatment and more concentrated vector control. The epidemic stopped expanding in 1990-1991 and reversed in 1992-1996. The effect of this change was to reduce incidence much below the level it would have reached, preventing an estimated 1.73 million cases. The result of fewer cases and lower fatality from those cases that did occur was to avert an estimated 231,000 deaths over the 7-1/2 years of the program. Converting the savings in lives and in morbidity into Disability-Adjusted Life Years (DALYs) yields almost nine million DALYs, 5.1 million from treatment and 3.9 million from prevention. Nearly all the gain came from controlling deaths and therefore from controlling *falciparum* (Akhavan, Musgrove, Abrantes, and Gusmao 1999)

Eritrea

In response to a large malaria epidemic in 2000 and growing concerns about HIV/AIDS, the Ministry of Health of Eritrea established a new strategy for control of its high-burden communicable diseases. The combined program to control HIV/AIDS, malaria, STDs, and TB was dubbed HAMSET. The World Bank provided US\$40 million support through the HAMSET Project. Coincident with this investment, USAID provided significant resources to the Ministry of Health for technical support on malaria through their Environmental Health Project (EHP).

The technical strategy employed in Eritrea stressed more targeted use of IRS to the highest-risk areas, use of environmental management, scaling up of ITNs, and expansion of diagnosis and effective treatment. Key to these efforts was a strengthening of disease surveillance and operational research activities, and the use of these data in priority setting. EHP provided essential technical support to these efforts, including support for expatriate staff to develop capacity in entomology and epidemiology at national and subnational levels.

One of the objectives of the HAMSET program was to decentralize implementation of control activities to *zoba* (zonal) and sub-*zoba* levels. Zobas were provided with financial resources based on approved annual work plans. Many activities were focused on building technical and managerial capacity at *zoba* and sub-*zoba* levels. In addition, communities were actively involved in malaria control activities, including the distribution and retreatment of ITNs and environmental management (for example, filling of temporary water bodies and larviciding).

To date, the use of ITNs by children under five years in malarious areas of Eritrea has risen from 20 percent in 2000 to 63 percent in 2003, while the use of IRS has decreased. Despite recent heavy rains and large epidemics in neighboring countries, Eritrea has reduced malaria morbidity from 179,501 reported cases in 1999 to 65,540 cases in 2003, a 63 percent decline. Deaths from malaria fell from 176 to 78 during the same period, a decrease in mortality rate from 13.3 percent to 3.9 percent.

India

In 1997, the World Bank provided US\$165 million in financing for the Enhanced Malaria Control Project (EMCP). EMCP invested in the 100

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highest-risk districts in eight North Indian states. One of the primary objectives of EMCP was to assist India's Ministry of Health to transition from its unsuccessful eradication strategy to a more modern control strategy. Widespread use of IRS would become more targeted and supplemented by a broader range of control activities, including early diagnosis and prompt treatment of malaria cases, promotion of ITNs, use of alternative vector control methods (including environmental management and larvivorous fish), and strengthening of malaria surveillance.

Progress during the first years of the project was slow, in part because the initial project design excluded state health departments from implementation activities. Districts were to be supervised directly by the National Anti-Malaria Program. After an unsatisfactory mid-term review, the project was redesigned. Most notably, state malaria control societies were provided with financing and took on a primary role in supervising and supporting district health staff.

After the redesign, implementation remained slow, causing the Bank to suspend disbursement. A change in leadership within the Ministry of Health and the National Anti-Malaria Program brought renewed interest in revitalizing EMCP. Outstanding issues were quickly addressed, the suspension was lifted, and the implementation took off rapidly.

Since the restart of the project, more than 300,000 village-based volunteers have been trained in malaria case management and provided supplies of chloroquine. Laboratory capacity has been greatly expanded; approximately 14 million blood slides were examined last year. Almost 3 million ITNs have been distributed and more than 20,000 larvivorous fish hatcheries established. Local governments, community groups, and NGOs have become actively involved in a number of activities, including distribution and retreatment of ITNs, breeding and stocking of larvivorous fish, and community awareness campaigns.

Reported cases of malaria declined by 93.3 percent, 80.8 percent, and 40.6 percent for the states of Maharashtra, Gujarat, and Rajasthan, respectively, from 1997 to 2002.²⁰

Vietnam

After many years of good control, Vietnam experienced a dramatic upsurge in malaria burden during the late 1980s and early 1990s. Vietnam's National

Institute of Malariology, Parasitology, and Entomology (NIMPE) developed an aggressive plan to control malaria and the Government of Vietnam requested financial support from the World Bank to implement this plan. In 1997, a Health Sector Support Project was launched with a sizable malaria control component (US\$25 million). This project supported procurement of insecticides, drugs, and some equipment for all 61 provinces, but focused most of its resources on 15 high-burden provinces.

These 15 provinces were targeted for training in case management, strengthening of surveillance activities, public awareness campaigns, and improvement of laboratory capacity. Technical support for implementation activities was provided by the WHO Regional Office for the Western Pacific.

As with the other successful programs, the technical approach included targeted use of IRS, promotion of ITN use, and use of effective treatment for clinical cases. National drug policy was changed to replace ineffective treatments with mefloquine and later artemisinin-based drugs. More than 1 million ITNs were distributed with support from the project. Community groups (such as youth leagues and women's unions) and village heads played key roles in information, education, and communication (IEC) activities, distribution of ITNs, and community-based treatment activities.

During the project period, the number of malaria cases dropped in 2003 to 37 percent of 1997 levels (445,200 to 164,706 cases). Malaria mortality decreased from 153 in 1997 to 50 in 2003, a mortality rate of 0.06 percent. Outbreaks of malaria ceased.

Key Success Factors

Epidemiologic factors

The four countries are in different geographic regions, have different mosquito vectors, and are subject to different climatic conditions. Despite these differences, there are some similarities in the epidemiologic pattern of malaria.

All four countries are characterized by wide geographic variability of disease risk and burden. The variability in risk is strongly related to variations in local climate. Arid, temperate, and mountainous regions have low to no risk, while risk is higher in tropical and subtropical areas and in areas with

heavy rainfall.

The population at risk of severe disease and death is greatly affected by the intensity of transmission. In contrast to tropical Africa, where most of the burden is borne by young children, malaria in these four countries kills and severely debilitates people of all ages. In each of the four countries, development of new program strategies was preceded by periods of large epidemics or markedly increased malaria burden that heavily affected people in their productive years of life.

Although overall transmission intensity is moderate to low in these four countries, one cannot necessarily conclude that similar success is unachievable in countries with intense transmission. Each of these countries has been successful in reducing malaria burden in pockets of high-level transmission where these efforts were primarily targeted. This should give hope that control is possible in other high transmission areas.

In addition, malaria burden in Brazil, India, and Vietnam is most heavily concentrated in areas with sizable tribal or indigenous populations. The health infrastructure in these areas is generally much weaker than in the rest of the country and comparable to that of many parts of Africa. These populations are usually the most disconnected from public health structures and most resistant to health promotion activities.

Country context

These four successful programs were launched in periods of relatively strong economic growth and political stability in these countries. Vietnam was rapidly recovering from a period of economic crisis. Brazil and India had growing economies. The effect of such favorable economic conditions on the health sector was most notable in Vietnam, where government investments in health almost tripled in the period between 1991 and 1994. Eritrea appears to be the one exception, as the country's economy has deteriorated somewhat since the launch of the project.

In each of these countries, commitment to malaria control was strong at the highest levels of government. At the core of this commitment was the recognition that malaria was a barrier to economic development. Evidence of such commitment moved well beyond simple rhetoric to increased investment of government resources in malaria control.

Technical approach

All four countries adopted strikingly similar technical approaches to control malaria. Prior to the implementation of these programs, their malaria control strategies focused heavily on vector control, particularly use of IRS. The new strategy sought to use multiple approaches to controlling malaria, balancing case management with prevention measures, and introducing new technologies, particularly ITNs. In three of the four projects (India, Brazil, and Vietnam), this shift in strategy was explicitly listed as an objective of the World Bank-assisted project.

The new strategy shifted emphasis to improving and expanding the availability of effective case management. Vector control efforts, particularly IRS, became more targeted as alternative vector control measures were scaled up. Such alternative measures included environmental management (all countries), larviciding (Eritrea), and use of larvivorous fish (India). With the exception of Brazil, distribution of ITNs became a key prevention strategy.

Another fundamental change in the approach to malaria control was the emphasis on targeting interventions to high-risk areas. In Vietnam, Brazil, and India, a significant portion of the Bank's resources was for use only in such high-risk areas. In India, these were the 100 most heavily affected districts in eight states. Similarly, investments were highly targeted to high-risk municipalities in the Amazon Basin in Brazil and the 15 high-burden provinces in Vietnam. Even in Eritrea, where targeting was not central to the project design, control efforts were more focused on the most heavily affected zones. Such targeting was possible only because these countries invested heavily in improving their malaria surveillance systems. Laboratory capacity was strengthened and case reporting was streamlined, integrated, and computerized. These efforts improved both the completeness and timeliness of case reporting. There also was a strong emphasis in developing capacity at the subnational level to analyze and interpret surveillance data, which then impacted decision making at the district level.

Programmatic factors

Prior to the implementation of these programs, all four countries had vertical, centrally managed implementation strategies. Under this arrangement, village-level functionaries were paid by the national malaria control program and worked solely on malaria control. The most extreme example

of this was in Brazil, where malaria treatment was provided by free-standing malaria clinics, which had no formal link to local public health facilities.

With the development of new control strategies in these countries, there was a significant move toward integration and decentralization of implementation. Brazil decentralized most government functions during the first few years of the malaria control program, shifting the responsibility and resources for malaria control to municipalities. In Eritrea and India, much of the responsibility for implementation was shifted to zonal and state health authorities, respectively. The decentralization of responsibility and resources frequently stimulated local governments to become more involved in malaria control efforts. Local involvement has been seen as pivotal to the success in India, Brazil, and, to some extent, Eritrea.

Despite this move toward integration, the national malaria control programs remained strong and continued to play important roles in program implementation. The national programs were still looked to for technical support and for procurement of essential commodities, including drugs, insecticides, ITNs, and laboratory equipment.

These four programs were led by directors who had strong technical and managerial skills. They understood the systems in which they worked and were capable of moving things quickly through their bureaucracies. These skills were likely acquired from years of managing vertical programs.

All four countries appear to have benefited from the extensive networks that remained from the earlier vertical programs. These networks provided the basic infrastructure necessary for efficient and effective implementation of program activities.

In general, these countries had much more developed public health infrastructures than many other malaria-affected countries, particularly those in Sub-Saharan Africa. It must be noted, though, that the areas targeted by these projects often had infrastructures that were much weaker than the rest of the country.

One characteristic that distinguishes these four country programs from most other malaria-affected countries is the presence of skilled technical staff at the subnational level. India's experiences during the first half of the project period demonstrate that their program would not have achieved such success without the involvement of the state malaria control programs. The same could be said of the zonal malaria control officers in Eritrea. These programs also built technical and programmatic capacity at district and, in some cases, subdistrict levels.

Partnership issues

These four countries were notable in the limited number of major implementation partners involved at the national level. Beyond the involvement of the World Bank, Vietnam, Brazil, and Eritrea had only one major partner in their efforts. In Vietnam and Brazil, it was the regional offices of WHO (Regional Office for the Western Pacific and the Pan American Health Organization) that played key roles in providing technical guidance and support. In Eritrea, USAID's Environmental Health Program played a similar technical support role.

At the local level, partnerships have flourished. In India, the local health departments have often partnered with tribal welfare, education, and agricultural departments, as well as NGOs, community groups, local governments, and private providers. Private shopkeepers also played an important role in expanding treatment in Brazil's mining areas. These partnerships have generally been focused on specific activities. For example, NGOs in India are contracted to distribute and re-treat ITNs and tribal welfare workers offer malaria treatment to the surrounding community.

Financing

The financing provided by the World Bank coupled with increases in resources provided by the government represented a dramatic increase in funding for malaria control activities in India, Eritrea, and Vietnam. Most strikingly, Vietnam's investment in malaria control increased almost 12-fold from 1991 to 1995 (from US\$0.55 million to US\$6.4 million).

In all countries, the investments provided by governments went beyond support solely for salaries and minor operating expenses. In India, government support to the National Anti-Malaria Program was quite substantial and included resources for procurement of all required stocks of DDT. Several state governments also invested some of their own resources in malaria control.

Notwithstanding the slow rate of implementation in the first years of each project, disbursement and use of funds was rather brisk compared to health projects in many other countries. What could account for the rapidity of disbursement was the control exerted over the available resources by the national malaria control program managers. These program managers had either direct control or easy access to those who did control the purse

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strings. They also had a great capacity to move their bureaucracies so that finances flowed and procurements were made in a timely manner. This is in contrast to many African countries, where malaria control program managers have often reported significant barriers to accessing funds that have been allocated to their programs from World Bank grants and credits.

One factor that was felt to be pivotal to the success of the program in Brazil was the decentralization of control of resources to municipalities. This allowed these local authorities to prioritize spending on malaria, based on local needs. It also provided a strong sense of ownership to municipal governments. The experience was similar for India, where the program initially faltered until state health departments were given control of some resources. Providing resources directly to zonal health authorities was also a key component of the Eritrea project.

World Bank factors

The World Bank's approach to supervision of these projects was much more hands-on. The Bank ensured active technical supervision either through its own resources or through partner agencies, including WHO and USAID. Substantial programmatic support also was provided. In Eritrea, for example, when implementation was behind schedule, the Task Manager worked with the Ministry of Health to break large activities into a series of smaller tasks with benchmarks. This "Rapid Results Initiative" quickly accelerated implementation of project activities.

Another feature of the Bank's involvement in these four countries was its flexibility. In India, after an unsatisfactory mid-term review, the Bank worked aggressively with the government to significantly restructure the project and remove major bottlenecks to implementation. The Bank also demonstrated flexibility in the procedures for procuring insecticides. Similarly, the Bank reallocated funds from an earlier health sector project in Eritrea so that the Ministry of Health could purchase antimalarial drugs in response to a large malaria epidemic.

The Bank was not averse, though, to restricting the use of funds when progress was not satisfactory. In India, for example, when progress remained slow after the project redesign, the Bank suspended disbursement on all project components until the government met a series of benchmarks, which included the review and revision of some malaria control policies.

Conclusions

Clearly, the success of these four malaria control programs was the result of the confluence of a number of factors. A sound targeted technical approach, skilled human resources and good infrastructure at national and subnational levels, strong technical and programmatic support from the World Bank and its partners, and sufficient finances were all essential for these programs to accomplish their goals.

Many of the lessons learned from these program successes could be adapted by other countries. Countries interested in achieving such successes must strive to address most or all of these key factors. Focusing on only a few of them is unlikely to achieve these goals.

These country examples also point out that design does matter. Control efforts faltered in India and Brazil until the programs were redesigned. Notably, decentralization of program implementation and financing greatly facilitated the progress of these programs. It also was important, though, that a strong central malaria control program be maintained.

The World Bank played an important role in the success of these programs that went beyond simply providing financing. Consistent and proactive technical and programmatic support mobilized by the Bank was an important contribution to their success. So, too, was the willingness of the Bank to be flexible, supporting the redesign and reallocation of financing to overcome barriers and meet the changing needs of the program. The Bank also used its leverage with governments that were reluctant to effect changes in policy or program implementation.

If forced to select the most important factor in the success of these programs, it would have to be strong commitment and leadership at all levels of government. Decision makers in these countries did not consider these interventions to be World Bank projects, but rather their country programs. Government and community leaders from national to local levels considered malaria a priority problem and dedicated their resources and manpower to address it. Managers of national malaria control programs understood what worked in their countries and knew how to effectively navigate their bureaucracies. Without this leadership and ownership, it is doubtful that these programs would have gotten off the ground even if all other success factors had been in place.

