

A STORY TO BE SHARED: THE SUCCESSFUL FIGHT AGAINST MALARIA IN VIETNAM

For release 11/6/2000
WHO WPRO

Abstract:

A case history of a success story is presented. It chronicles the evolution of the Malaria Program in Vietnam in the post-liberation war era.

A questionnaire provided by the Roll Back Malaria team in Geneva was used to document relevant technical background information on the Program in a standardized manner and is presented as an annex. Otherwise, the case history gives a lightly readable account of the key developments in the Program's history including its challenges and successes; both process and outcomes are looked at. Lessons that can be learned are highlighted.

Officers of the Institute of Malariology, Parasitology and Entomology (IMPE) in different parts of the country, as well as program implementation staff were interviewed and documentary records checked to get the needed chronological overview of the Program's implementation. Field visits and discussions with other people familiar with the Program were carried out as needed to round up the report.

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A bird's eye overview:

1. The Malaria Program was launched in NVietnam in 1958 and was expanded to the whole re-united country in 1976. As elsewhere, malaria in Vietnam is closely related to the environment and to human behavior. In the early years of the Program, and after an initial attack phase, malaria was reduced more than 20 times in the North and four times in the South of the country. But from the end of the 1970's on, there was a resurgence in the number of cases due to several factors. Among them, an acute lack of resources (with investments for malaria control falling below 50% of the requirements), big post-war population movements (migration) of susceptible individuals and a weakness in the health services network (e.g. shortages of antimalarial drugs and insecticides, the latter resulting in an interruption of DDT spraying for mosquito control). This negative trend -- which in the South had started much earlier due to the impossibility of carrying out work in malaria infested areas due to the war-- peaked in 1991 when over a million cases of malaria resulted in almost five thousand deaths in around 150 outbreaks that year (a big proportion of them in the center of the country).

2. Chloroquine, quinine and Fansidar resistance of *Plasmodium falciparum* (the main agent of malaria in Vietnam) --which had first been detected in Vietnam in 1965 in a US soldier-- was in 1991 found in all southern provinces and in some provinces in the North. *P. falciparum* is now mostly found in mountainous areas and currently accounts for about 74% of all cases nationwide (51% in the North, and 83% in the central highlands). Drug resistant *Plasmodium vivax* (the other major agent) has not been reported in the country.

3. From 1991 on, the country completely changed its strategy from a malaria eradication (with mass treatment and DDT spraying at its core) to a malaria control approach that allocated significantly more funds, distributed drugs and mosquito nets, carried out intensive twice-yearly residual (home) insecticide spraying and intensive ad-hoc health education starting with village heads, Women's Union cadres and commune health staff; additionally, communities in (endemic) malarial areas were effectively mobilized by the trainers that were then trained. In so doing, and over the next six years, the Program succeeded in reducing malaria deaths by 97% and reducing the number of malaria cases by 59% (a drop of from 25 to 8% per year); the number of epidemic outbreaks (both by *P. falciparum* and *P. vivax*) was reduced by 92% (from an average of 54 outbreaks per year in the 1980s). The number of cases, as diagnosed by positive blood tests using microscopic examinations, decreased by about 5% per year in the same period.

4. Between 1992 and 1997, the total number of clinically diagnosed malaria patients with no confirmed blood tests decreased 2.9 times (from 1.2 million per year to 440,000); the positivity rate of blood test slides also decreased 2.9 times (from 8% to 2.7% of all patients tested); the number of deaths decreased 19 times (from 2600 to 152 per year), and the number of outbreaks decreased 10 times (from 115 to 10).

The result is that, today, malaria causes fewer deaths than tuberculosis or acute respiratory infections, and most rural areas and medium and major urban areas have largely remained malaria-free.

5. Fifteen million people (out of a population of 77 million) still live in high endemic areas in the country though (in 2,000 communes in 115 district in 24 provinces). But one third of all malaria cases and almost two thirds of its deaths concentrate in only 84 (out of almost 600) districts in 15 (out of 61) provinces where 7.2 million of the population lives. These also are the areas most affected by *P. falciparum*. In the South, in areas where shrimp farming is practiced, the incidence of malaria has remained constant since 1993 mostly due to the surrounding stagnant brackish water that foster the breeding of *Anopheles* mosquitoes.

6. As pertains the use of antimalarial drugs, also between 1992 and 1997, great progress was made when the new drug artemisinin was safely and successfully introduced closely following its early successes in China. In 1992, half a million doses of artemisinin were given at a time when 21,000 cases of severe malaria cases were recorded; in 1994, 1.1 million doses were given and only 7,500 severe cases reported; in 1997, only 350,000 doses were needed and only 1,500 severe cases reported. At present, artemisinin is used in less than 50% of the cases nationwide with important regional variations. It is the drug of choice for all confirmed cases of *P. falciparum* and for any severe case even before confirmation. The most important contribution of this new drug has been the decreasing of malaria mortality and the decreasing percentage of severe cases of it.

7. Around the same time, insecticides of the pyrethroid group became widely used both in impregnating bed nets and in the residual spraying of homes. (DDT is no longer being used since 1991).

8. In the vector (mosquito) control front, the distribution of impregnated bed nets took off slowly; early on, this Program component only received help from one or two international NGOs in the early 1990s. Only later did it take off gradually achieving a quite massive expansion, the distribution surpassing the targets set. From 1991 to 1996, the National Program distributed free nets in pilot high endemic areas; the rest of the exposed population was sensitized to buy their own and the Program impregnated the nets for them free of charge. From 1996 on, the Government budgeted funds for further free distribution of nets in neediest areas; at the same time, NIMPE collaborated with UNICEF and the Women's Union to sensitize their members to acquire bed nets at half price with the donor paying the other half; this turned out quite successfully. So, already by the end of 1996, 9 million people were protected by nets or by spraying. Education on bed nets use and their maintenance was also given to the population during their distribution.

From 1999 on, already over 11 million people are protected by impregnated nets in use in high endemic areas, and this could be the maximum level that the Program will strive to attain. Now, the relatively small number of additional bed nets can be provided for free. The target for coverage of vector control activities (bed nets plus house spraying combined) was 12 million people for these areas in 1999 -- a number close to adequate. (Impregnated bed nets can be said to reduce the incidence of malaria by 20-30% for each year of use).

In average, one net is used for 3 persons at a cost of around US\$ 5 per net each with a life span of about 5 years. By now, it is estimated that half of the population can buy their own nets once they are sensitized to their need. Un-impregnated nets are now also available in the open market. The twice yearly re-impregnation with permethrin is carried out (at no cost) by staff of the district mobile teams and commune health stations for a cluster of villages at a time in a twice-yearly campaign that lasts around two weeks; impregnation costs around US\$ 0.42/net. Cost recovery is not sought for re-impregnations at this time. All in all, over US\$ 25 million have been spent on bed net operations since 1991.

9. Given what has been achieved, the proportion of malaria patients who are adults is steadily increasing, suggesting that the Program is now reaching the state of maturity where the remaining malaria problems require the targeting of special high risk groups, mainly adult men who contract ma-

alaria when away from their usual home. This because in some areas, by now, malaria practically is an occupational disease, affecting only young adults who spend the night in the forest. This means that malaria is now found mainly in populations which need to learn the use of appropriate personal protection measures. Otherwise, children and pregnant women are still vulnerable and anemia, in part due to malaria is not uncommon in endemic areas.

10. The above does not deny the fact that, in Vietnam, malaria still is a social disease with the great majority of sufferers being underprivileged rural populations, minorities and migrants.

11. At the end of 1999, the country reported 348,500 cases of malaria of which roughly only 1,350 were severe cases, and there were 190 deaths. In 1999/2000, the South of the country reported a slight increase in the number of new cases of malaria. This is explained by an increased wave of migration to a province created by a split of an existing province into two; new land became available after this split; additionally, new coffee plantations there attracted seasonal workers from the North at harvest time. Faced with this, the National Program has increased the malaria budget and technical assistance for this province from this year on.

12. Through all the measures put in place, the current malaria situation in most of Vietnam can be said to have reached a phase of sustained achieved success. As will be shown below, this does not mean the war against malaria has been won yet. A roll back malaria situation is still in place in remaining endemic areas.

Causes of success:

The theory:

13. As accepted by many agencies worldwide, success --no matter where-- depends on both **contextual** and **program** factors.

14. **Contextual factors** are those more related to existing factors that, when present, contribute to the success of health and development interventions.

They include:

- the existence of continuously committed individuals and organizations,
- high literacy rates,
- a preexisting culture of community participation,
- existing and functioning community organizations,
- the presence of charismatic leaders,
- a relatively strong status of women in society,
- a political support to activities being implemented stemming from the highest levels,
- the availability of a functioning infrastructure delivering basic services,
- preexisting or concomitant poverty alleviation programs, and
- a staff with solid minimum professional skills.

15. **Program factors**, on the other hand, are more related to processes set in motion by intervening and are thus more amenable to steer in the direction of potential greater success. Program factors need to be firmly rooted in and depart from existing contextual factors.

16. Program factors include:

- the use of approaches that create greater community awareness and involve said communities in the actual decision-making,
- the identification, training and deployment of a large enough number of community mobilizers and facilitators (e.g. village health workers and their supervisors),
- giving increased attention to overall processes that lead to greater community mobilization and those that enhance the status of women in general,
- making sure people understand and address the multi-level determinants of the problems being tackled (i.e. the immediate, underlying and structural causes of the problem),
- communities exercising de-facto co-management and involved in monitoring the process set in motion and the outcomes obtained,
- working with communities for them to generate, mobilize and control their own and the external resources needed to tackle the problems they are trying to resolve and, in the process, strengthen their organization making sure they gain ownership of the activities,
- making available employment and income generation activities for women including access to credit,
- making available literacy/skills building courses for women,
- focusing more on targeting households and individuals at risk and setting up effective follow-up mechanisms,
- making it a priority to reallocate government and external financial resources to meet the new challenges together with reorienting resources currently wastefully used,
- setting up effective and cost-conscious, locally accountable management procedures that include a working support supervision component,
- close collaboration with community-supportive NGOs working locally,
- planning for the geographic convergence of interventions, and
- starting-up activities following a good baseline survey to measure progress against.

17. The above is taken straight from the literature. But it is interesting to see how many of these contextual and program factors apply when we analyze the success of the Vietnam Malaria Control Program. This will become very clear as this case history unfolds.

The real context:

18. Achievements in the 84 national priority districts (22 of which are in the South of the country) show that 95% of patients are receiving correct treatment (against 75% in the rest of the country); 70% of patients suffering from malaria seek treatment within 24 hours of onset of symptoms; and all intercommunal polyclinics and hospitals do microscopic blood examinations (approximately 2.5 million slides are examined each year). When a slide comes back positive for a patient, all remaining members in her/his household are treated.

In these same districts, at least 70% of the population uses treated bed nets and 10-20% of the population (often the most remote) is protected by residual house spraying which now uses an insecticide called Icon that has a one-year residual effect.

19. In a nutshell then, it is the proactive measures taken in the area of improved diagnosis and treatment (quality of care) and increased coverage, as well as improved vector control that have been the main contributors to success. But the full story is actually much more than this.

20. What follows is an attempt to capture as many as possible of the many successful moves (and problems faced squarely) that have resulted in so greatly reducing the threat of malaria in Vietnam.

The evidence:

Getting the needed support:

21. Historically, the breakthrough came in 1991 when the Malaria Program became a priority national health program (ranked second among the seven government priority health programs) and got steeply increased direct funding from the Government. Funding went from US\$ 540,000 in 1991 to US\$ 6.3 million in 1995 and then down to around US\$ 3.2 million in 1999 when the magnitude of the problem had decreased and when donor funding came on line; over the same period, provincial governments added 5-10% above that.

22. In 1991, after the National Assembly manifested its explicit concern about the fact that investments for malaria control had fallen so sharply, the whole Government (central and local) felt a responsibility for malaria; not only the MOH. As a result, up to approximately 2,000 people in the country eventually ended up working in the public sector primarily on malaria control.

23. From 1991 to 1997, altogether about US\$ 28 million were invested to cover the needs in malaria treatment and prevention of between one third and half of the population of the country.

24. Also after the 1991 epidemic, senior authorities were briefed directly and invited to become members of malaria steering committees from the central to the local level. In the process, they acquired a genuine understanding of the problems. Examples of this are the facts that, in 1992, the Prime Minister himself was invited to and did chair the National Conference on Malaria and the vice Prime Minister followed up with repeated visits to the field. Thereafter, the Central Steering Committee was headed by the Minister of Health in person.

25. In endemic areas, local steering committees have always been headed by the vice-chairmen of the provincial and district people's committees and these committees actually sign yearly contracts with the Minister of Health in which they commit themselves to certain targets. The National Program then supports provinces to enforce such contracts. Still today, the National Program makes it a point to invite senior officers of key ministries like the ministries of Planning and of Finance to major review and forward planning meetings of the Program.

Breakthroughs in the treatment of malaria:

26. From 1990 on --and after research that had started already in 1984-- the country decisively embarked on the local production and use of artemisinin and its derivatives for the treatment of falciparum malaria (an investment of US\$ 7 million by itself). Over the years, at least 80% of the increased production of antimalarials has been borne by the Government.

From 1992 to 1997, almost 4 million doses of artemisinin were safely distributed. [Artemisinin clears the parasite from the blood resulting in a drop of the patient's fever within two days (a time lapse shorter than that of other antimalarial drugs) and needs to be taken for at least 5 days due to its short half-life in the blood]. The widespread use of artemisinin and its derivatives as the first line falciparum antimalarial treatment much reduced the proportion of severe malaria cases and of malaria mortality.

The degree of success of artemisinin is quite obviously linked to the characteristics of each region, with its prevailing parasite and drug resistance pattern; it has been most dramatically effective in endemic areas with resistant *P. falciparum*. In the northern provinces, little artemisinin was used up

to 1995, yet malaria mortality also declined in the early 1990s; artemisinin, therefore, was not the only factor responsible for falling mortality rates.

27. Drug resistance of *P. falciparum* is being monitored regularly and suitable new treatment guidelines have been issued for each region as needed. The latter treatment guidelines are part of a 10 pages District Level Manual on Malaria Diagnosis and Treatment that was last updated and distributed nationwide in 1997. (Additionally, these guidelines include case definitions for the different types of clinical malaria, their diagnosis and treatment regimens by region, suggested preventive and presumptive treatment and drug dosage tables by age; they were issued as an MOH Ministerial Decision thus carrying significant weight).

Because of this, now, different treatment regimens are utilized, in different schedules and in different combinations tailored to the best knowledge the authorities have of different local situations. From now on, treatment guidelines are scheduled for review every 3-5 years as needed.

28. A whole spectrum of antimalarial drugs are now easily available and have been free of charge nationwide all along, at least including artemisinin, artesunate, quinine, chloroquine, Fansidar, and Mefloquine. Recently, in 2000, artemisinin suppositories have been introduced for use. Injectable artesunate started to be produced nationally in 1999 and does not need to be imported any longer. Mefloquine is imported, part of it provided by a couple of donor projects. Of the current national budget for malaria of around US\$ 5 million/yr, about US\$ 2 million are needed in hard currency.

29. Yearly drug planning is based on distributing doses equal to twice the number of recorded patients plus some extra for severe cases. The average cost per treatment is now US\$ 0.7-1.

Early treatment overall and in remote areas:

30. Early treatment is now mostly carried out at the commune and village levels (currently, close to 80% of all treatments are carried out at this level, around 10% are treated by mobile teams while only around another 10-15% are treated in hospitals). A greater proportion of all severe cases now reach a hospital compared with earlier years.

31. Given the fact that malaria does not respect national borders, a working group on border malaria was set up in 1998 and comprised five provinces. They all carried out special remote area surveys in 1999 to identify problems that then helped to design work plans, especially on civilian-military cooperation since military health personnel has for long now been engaged as a partner in malaria control activities in border areas.

Surveillance:

32. The epidemiological surveillance of malaria has been strengthened through 400 mobile teams in the high endemic districts and through hundreds of village health workers who have been taught to recognize malaria and take blood samples for examination; they are retrained about once a year now using a new decentralized approach of training trainers that use an updated curriculum that trains these workers 'by doing'.

33. Through these ongoing surveillance and support supervision activities, malaria outbreaks in high risk areas are now picked up quite early allowing control measures to be taken promptly. The commitment to malaria control of facility-based and village health workers in endemic areas is remarkable in this sense.

Since 1994, the National Program has given cash incentives to more than 17,000 commune and village health workers in nearly 3000 of the most affected communes. This is seen as a key to success. They get the equivalent of US\$ 3-5/month.

34. Many new microscopic testing points of blood slides have been set up (to reach 2,000 points in total nationwide up from 1,700 in 1997) and most microscopists have been retrained. The regular training of microscopists is carried out by NIMPE in the North in a 3 years course; in the South, laboratory technicians already trained are given special malaria microscopy courses in the Tropical Diseases Hospital in Ho Chi Minh City. Proportionally, microscopy is used as a basis of diagnosis in a still modest percentage of all clinical cases presenting with high fever, with wide local variations. Follow up microscopy of patients after the treatment, to make sure they are clear of the parasite, is difficult, because patients do not come back as told and home follow-up by health workers and mobile teams is cumbersome.

35. Local outbreaks have thus remained local due to successful quick responsive case management and vector control. Drugs and insecticides are stocked ready for outbreak control. Both village health workers and community leaders now play an important role in this malaria surveillance and detection and the former also provide first line treatment with chloroquine. Mobile teams are quickly mobilized in cases of outbreaks. House spraying and net dipping are reinforced during these emergencies as house-to-house information and education campaigns are carried out. Posters and brochures are distributed and displayed all the way to remote villages. Appropriate drugs and insecticides are supplied, records are kept and all activities are closely supervised. Strong support is always received from local people's committees. In 90% of reported outbreaks, outbreak control measures are started within 1 week.

Reliable data collection:

36. A monthly information system from the communes to the higher levels is in function. But the means for informing about outbreaks is as a rule much quicker. Some provincial malaria centers carry out periodic surveys of facilities to double-check the reliability of data. Additionally, periodic review meetings of the malaria status and control measures are carried out at central and provincial level to adjust objectives, targets and control measures; district staff and people's committee leaders attend these meetings.

The epidemiologic information is analyzed monthly in all endemic areas. Special attention is paid to closely following up statistics in the 84 priority districts. Data collection forms are distributed nationwide and now include questions on operational information and on disease management. The system is computerized in the most affected provinces.

Training issues:

37. From 1992 to 1997, several workshops for high-level Malaria Program managers, and more than 1,000 courses for health workers were held. Nevertheless, capabilities are still unevenly distributed among provinces. The training of village health workers is difficult; often only around two thirds of them pass the final exam and qualify thus the need to keep training courses going.

38. Despite the fact that malaria control activities have been progressively more coordinated with the general Primary Health Care Program --as is needed in terms of curative approaches, drug supplies and training of the village and commune health workers-- one of the greatest remaining needs is the application of existing norms for the management of malaria so the staff applies correct diagnostic criteria and uses antimalarial drugs more rationally. Since more training was needed here, a

program was started in seven provinces 1999 to train trainers health staff. An expansion should follow.

39. Printed materials are produced especially for minorities and for schools. Videos have also been produced.

Vector control:

40. Vector control coverage using insecticides (all imported) expanded quickly. The population protected went from 4 million in 1991 to 12 million in 1997/98. The population covered by impregnated bed nets (for personal protection) increased from 300,000 in 1991 to 10 million in 1997. From 1998 on, the selection of vector control measures follows epidemiologic trends (number of new cases recorded, risk of outbreak and presence of specific mosquito species).

House spraying (cost per person covered US\$ 0.53) used to cover up to 2 million people/yr and this need is gradually decreasing. People tended to like this spraying though, because it also reduced flies, lice and cockroaches in the domestic environment. But *grosso modo*, a shift has been taking place from residual spraying to the use of impregnated bed nets. Interestingly, Vietnam uses only half the dose of permethrin recommended by WHO for (re)impregnating nets. But this lower dose has worked. A new study is under way to make sure this lower dose, that works for mosquito control purposes, does not risk fostering resistance in the vectors.

Research:

41. As verified by a 1995 Knowledge/Attitudes and Practices (KAP) study, a large proportion of the population now correctly understands the causes of malaria; They understand that sleeping under the bed nets can prevent malaria, but many said they could not afford them. When suffering from malaria, people in the North mainly use public health services while people in the South use private services in up to 40% of the cases; a considerable proportion of people also store antimalarial drugs in their homes for self-treatment. Most people know that Western drugs, nets and spraying are effective for malaria control.

42. Results of a comprehensive evaluation of the Malaria Program, carried out in 30 districts also in 1995, were used to adjust the 1996 - 2000 national plan of action.

43. Research activities have for long now been linked to the needs and practices of control activities. For example, research has focused on the use of village health workers in the early diagnosis of malaria, on improving the activities of communal, intercommunal and district microscopy points, on cost analyses for different antimalarial drug regimens and vector control methods, on the efficacy of artemisinin alone and used in combination with other drugs, on the application of different nets and insecticides to control mosquitoes, on methods of monitoring resistant Plasmodium strains, on finding better control methods for shrimp farming areas and rubber and mulberry tree plantations, and on the geographic distribution of different species of mosquitoes (more than fifty species and sub-species of anopheles have been identified).

Cooperative arrangements and social mobilization:

44. Moreover, cooperation has been sought with other sectors and with mass organizations such as the Women's Union, the Youth Union, the Red Cross and schools especially to improve the quality of and to expand health information/education/communication (IEC) efforts, as well as to encourage more community participation in malaria. Journalists have been motivated to report on malaria by organizing annual essay contests on the topic.

45. In the past, in the 1960s and 70s, Soviet aid was the main external help to the Malaria Program (it was the largest Soviet aid in the health sector), and from 1980-85 one Dutch NGO assisted the Program; from 1985 to 1993 there was almost no international funding available to the Program. At present, donors to the Malaria Program play a modest, but important role in its financing; they are: Ausaid, Belgian aid, GTZ, Dutch aid, UNICEF, WHO, the Red Cross, PATH, the WB and the EC.

46. Additional funding has been progressively mobilized from the central to the local level including the above funds from international cooperation. The latter funds and technical assistance have helped improving the quality of technical measures and the capacity of program management at sub-national levels.

Main obstacles encountered:

47. Not all has been rosy in the long road to arrive at where the Program has gotten at present:

- a) Although significant success has been achieved, the fundamental causes of malaria transmission, the climatic conditions and the disease reservoir have changed little; the risk of a malaria resurgence is thus still high in highly endemic areas. The rate of human parasite carriers is still relatively high and these carriers are often difficult to identify since 40 to 60% of them are asymptomatic. Malaria transmission is seasonal in some areas and perennial in others with fluctuations mostly related to rainfall. The peak transmission seasons vary widely; vigilance therefore has to be constant.
- b) In areas where malaria has decreased, so has the immunity of the population to it, and this in just 3-5 years. Epidemic outbreaks may thus still occur (especially in the still vulnerable central provinces) if preventive and follow-up measures are not continued. Investments therefore need to be maintained. People cannot be allowed to forget malaria prevention...
- c) Migration to endemic areas of people never exposed to malaria continues to be a problem even in 2000; part of this migration is seasonal (e.g. at coffee harvest time). [The northern province district visited in preparation of this case history by itself contributes an estimated 10,000 seasonal workers to other malaria endemic areas of the country. This results in the fact that over 50% of the cases of malaria seen are actually 'imported']. The living standards and educational level (on malaria and overall) of ethnic minorities plus their migration habits are also still problems. Especially during crop failure years, people migrate in search of food and income, sometimes to the forest, and this puts them in a situation of increased risk and of decreased protection.
- d) The number of patients who die from malaria in hospitals is still high meaning that patients get hospitalized late.
- e) Initially, more bed nets were distributed in the North and their provision remained limited for several years, so progress was slow. (Some minority people given bed nets do not use them regularly; also, some families with torn nets are ashamed of it and do not bring them for re-impregnation with insecticide; overall, it is estimated that 10% of households do not bring their nets for dipping on the regular twice-yearly schedule).
- f) Insecticide impregnation of bed nets with permethrin carried out only once a year has proven to be ineffective other than in provinces that have cold (mosquito free) winters. Re-impregnation activities need to be kept at twice a year as impregnated nets represent better than 70% of total vector control coverage.
- g) Because of the high percentage of coverage with impregnated bed nets, residual spraying may, in fact, often be an (expensive) double coverage. In areas where this is the case, this needs to be evaluated and remedied as soon as possible. (Only in very special high risk of epidemic areas is this double coverage approach still justified).

- h) At least one species of Anopheles changed its habitat from indoors to outdoors and is thus not affected by house spraying any longer. There is a small risk that neither impregnated nets nor spraying will be effective in certain areas of the center of the country where malaria transmission is very intense and the vector primarily bites outside homes.
- i) Mosquito resistance has to be continuously monitored to stay a step ahead of resistance to insecticides.
- j) Some few remote districts still lack village health services and the knowledge of health workers on malaria diagnosis is limited resulting in significant over-treatment. In others, the coverage and the quality of technical measures are still limited. In yet others, operations have maintained old campaign practices rather than supporting ongoing malaria-related commune health station practices.
- k) The quantity of antimalarial drugs distributed has been slightly excessive and there still is too much preventive treatment. Moreover, quite a few patients do not comply with the prescribed 5 days treatment for artemisinin when taken as the sole antimalarial drug.
- l) Artemisinin given alone has a 10 to 50% recrudescence and reinfection rate (recurrence means the parasite persists in the body and rekindles the disease again without having a new mosquito bite). Given over 3 days with Mefloquine added as a single dose on the third day renders recrudescence negligible. But this increases the cost of the treatment. (In Vietnam, artemisinin alone costs only around US\$ 0.5 per course, against US\$ 0.06 for chloroquine, US\$ 1.2 for quinine, US\$ 0.2 for Fansidar and around US\$ 2.5 for Mefloquine).
- m) Overall, resources are still limited and unstable (especially for equipment and means of transportation); this has led to some neglect of malaria control activities in some places.
- n) More microscope points are needed in the North and the Program is aware that quality and quantity of microscopy services are difficult to maintain in areas with few cases. (The blood examination rate should in average be about 10% of the population in endemic areas, but positive cases are few).
- o) The private health sector is not being effective in applying the prescribed malaria control regimens and there are no quality assurance measures in place. In the South, over 40% of the patients with febrile episodes go to private practitioners in some areas, although there are big urban/rural and inter-province variations.
- p) The coordination with other sectors and the mobilization of the community has not yet reached the desired levels in all areas.
- q) Only from 8 to 12% of the funding was initially reserved for support supervision and surveillance activities, for case detection, for training and health education/IEC. This has proven insufficient.

Main measures still to be taken:

48. Although what follows are measures in different stages of implementation, there are lessons in them too for other countries to learn.

49. It is the aim of the Program that 50% of all the districts in the country should achieve the national malaria control criteria so that there should be no more outbreaks and morbidity and mortality continue to fall. Along those lines, malaria is to become part of Primary Health Care and, to avoid overtreatment and underdiagnosis, should progressively use less mass approaches and more targeted control approaches.

50. Having been successful has not meant closing the eyes to tasks still to be completed. Some of these are briefly listed here below:

- a) Malaria control activities now need to concentrate more on remote, minority, severe and border malaria areas; microscopy activities need to be started up in these same areas for diagnosis and follow up repeat tests. [The newly available dipstick method for *P. falciparum* antigen diagnosis (which is about 80% accurate), although expensive (US\$ 0.8/test) may become cost effective in terms of saving on drugs. Ten thousand of them are now being piloted with WHO help for use in areas that have no microscopy].
- b) Mobile teams should change their role and do more training and support supervision of village health workers and health staff, on top of their role of helping in outbreaks.
- c) The organization of bed nets re-impregnation teams to do twice yearly rounds is a priority. The supply of bed nets to poor people will have to be subsidized and funds will have to be sought for that.
- d) In the immediate future, enough insecticides will have to be made available to protect 15 million people and enough antimalarial drugs to treat 2 million people.
- e) The planning and management of antimalarial drug supplies need fine-tuning to avoid over-supplies.
- f) A reduction of preventive treatment has to be pursued proactively, instead relying more on vector control measures for the same prevention. Preventive treatment has to be replaced by a more focused presumptive treatment in clinically suspected cases, the latter with a full curative dose; and for this to happen, people themselves must also learn what the proper dose is. This means putting more emphasis on an active vigilance. (Suggestions have been made to give patients treated for malaria a card acknowledging that they were in a malarial zone and asking them to carry the card with them when they travel plus giving them perhaps stand-by drugs, an impregnated net and education on how to recognize malaria symptoms and signs).
- g) Close collaboration with neighboring countries on malaria control in border areas, especially with Cambodia and Laos, is now indispensable when control measures have succeeded inside the country.
- h) The malaria information and surveillance systems, and the case management and follow-up of high-risk people in the areas where the cases of malaria have significantly declined in recent years cannot be allowed to deteriorate.
- i) Yearly targets are to be set for the different components of the Program with each endemic province having its own targeted yearly plan of action.
- j) Central and decentralized annual planning should work in a way that the planning at district and province level is channeled to the specialized central institutions in Ho Chi Minh City and Hanoi. The National Malaria Control Program should continue to devote much energy to national consultative meetings as well.
- k) Certain elements of verticality need now to be horizontalized so that more problems can be resolved at the local level in coordination with other health interventions. A pilot program has been launched in the center of the country to better use village health workers in malaria work.
- l) Grassroots level activities that educate and inform the population (e.g. rural plays with a malaria message) also need further strengthening, especially for minority ethnic groups. The mass media should be used more aggressively, launching special campaigns and also covering primary schools. These campaigns are needed both in malaria 'receiving' and 'providing' areas so as to tackle the problems associated with migration. Microscopy should be intensified around the Vietnamese New Year season when people return home from endemic areas. Malaria posters have to be deployed in buses and trains and in their respective terminals and stations especially emphasizing that the diagnosis and treatment of malaria are free.
- m) Preventive efforts need to concentrate on education and on promoting the further use of impregnated nets, both making better use of the mass media.
- n) Competent manpower is needed ongoingly so training has to be commensurate with the changing needs. This includes training more staff on the correct use of the clinical guidelines

and on closely supervising this correct use. Guidelines have already been prepared for such supervision activities.

- o) The whole malaria network needs to be strengthened through more training, importantly including private practitioners who need to improve their malaria management skills. But this will have to go together with revamping outdated top-down training methods. Emphasis is to be put on surveillance, early diagnosis and prompt treatment to minimize human carriers.
- p) In 1998, the National Malaria Program issued a seven points guideline for private practitioners who are called to sign a contract with the local health authorities. Its stipulations are: private practitioners have to accept to undergo training so they then follow the existing diagnosis and treatment guidelines for their respective area; for this, they will receive a certificate. They then have to follow the guidelines. They agree to refer severe malaria patients to the hospital only giving the first dose of the treatment. All private practitioners have to have access to malaria microscopy (or the new falciparum dipstick test). They have to use antimalarials from a reputable and reliable source and particularly those from the essential drug list. They cannot use the free drugs from the National Program. They have to report all cases. And they have to agree to participate in campaigns when these are organized locally. This approach has been piloted one year in one province in the South with good results. It should now be replicated in more provinces.
- q) Research should at this time focus on new antimalarial drugs and new treatment regimens, as well as on more effective insecticides. Relevant results should then be applied. Future progress in malaria control will require a continuous cycle of problem definition, research, training, communications, implementation and monitoring.
- r) A better management information system on vector control is needed (one that reports on the number of houses sprayed and households using nets).
- s) International donor resources need to be used more effectively by closely working together with donors. Regular meetings should be held with them and participating NGOs.
- t) A malaria control day should be celebrated every first of April.

Some final words of wisdom:

51. As one senior interviewee put it, the lessons learned from the Vietnamese experience are that what ultimately triumphed was tenacity, ingenuity, creativity and courage. There are no 'magic bullets' in this field. There is no one measure that will bring about success; it is the whole host of measures described above that are needed. Moreover, difficulties just have to be expected and one has to be prepared for a long haul fight. The need for a strong national program cannot be overemphasized, one with a dedicated team, high level support and a fair amount of vertically controlled components. A national health infrastructure that reaches the sub-district levels is also considered indispensable.

52. NIMPE staff is aware that the remaining challenge in Vietnam is now one of developing the sustainability phase in which the malaria control results so far achieved need to be maintained. Nothing can be taken for granted; in malaria work, one cannot sleep on one's victories; the natural history of malaria is for it to recur.

53. A high degree of agreement amongst the experts and field staff interviewed was found as regards the key elements of the Vietnamese success they want to share with others.

In their view, these have been:

- The high level political and financial commitments received that were effectively used, among other, to pursue active mobilization for malaria control actions from the central to the village level.
- Having been able to offer free drugs and insecticides (for house spraying) to the affected population.
- Having had an initial vertical structure that followed WHO's guidelines for malaria control.
- Having incorporated village health workers in malaria work in the field and having achieved high knowledge, attitudes and practice levels on malaria in the population at large in endemic areas.

54. These four factors alone (one contextual and three programmatic), they contend, will at least decrease malaria mortality and epidemic outbreaks (significantly) in other parts of the world. They are quick to note though that an oversimplification of the tasks that need to be undertaken carries a risk of underestimating the scope of all things that need to be done. For example, the organizational aspects of any national program, they contend, are also crucial. Money alone (from donors or from national budgets) is not enough.

55. In Vietnam, the introduction of artemisinin was a significant success factor as well. This being the case, it should clearly be considered for worldwide use.

56. Some of the major problems that need immediate priority addressing, no matter where in the world, are, in their view: controlling significant population movements in and out of endemic areas, making sure the private sector commits to cooperate, reaching remote areas, and being able to rely on long-term continuity in the availability of funds.

57. It is the hope of the Vietnamese cadres working on malaria that this case history inspires others to find their own path to roll back malaria in their own countries. They will be glad to help if asked.

Annex:

Technical responses to the "Questionnaire for developing case histories that demonstrate impact of malaria control" suggested by the Roll Back Malaria team in Geneva.

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