Commentary: Malaria control in the 1990s

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In May 1955 the Eighth World Health Assembly adopted a Global Malaria Eradication Campaign based on the widespread use of DDT against mosquitos and of antimalarial drugs to treat malaria and to eliminate the parasite in humans. As a result of the Campaign, malaria was eradicated by 1967 from all developed countries where the disease was endemic and large areas of tropical Asia and Latin America were freed from the risk of infection. The Malaria Eradication Campaign was only launched in three countries of tropical Africa since it was not considered feasible in the others.

Despite these achievements, improvements in the malaria situation could not be maintained indefinitely by time-limited, highly prescriptive and centralized programmes. Also, vector resistance to DDT and of malaria parasites to chloroquine, a safe and affordable drug, began to affect programme activities.

A Global Malaria Control Strategy was endorsed by a Ministerial Conference on Malaria Control in 1992 and confirmed by the World Health Assembly in 1993. This strategy differs considerably from the approach used in the eradication era. It is rooted in the primary health care approach and calls for flexible, decentralized programmes, based on disease rather than parasite control, using the rational and selective use of tools to combat malaria. The implementation of the Global Strategy is beginning to have an impact in several countries, such as Brazil, China, Solomon Islands, Philippines, Vanuatu, Viet Nam and Thailand. The lesson from these areas is clear: malaria is being controlled using the tools that are currently available. The challenge is now to apply these tools among vulnerable individuals and groups experiencing high levels of morbidity and mortality, particularly in sub-Saharan Africa, for which long-term investments are required.

In May 1955, the Eighth World Health Assembly, meeting in Mexico, DF, adopted a Global Malaria Eradication Campaign based on the widespread regimented use of the insecticide DDT for indoor and outdoor spraying against adult mosquitos, of larvicides for treating mosquito breeding sites, and of antimalarial drugs to treat malaria and to eliminate the parasite in humans. This decision hinged on the idea that the transmission of malaria in a community would be interrupted if a sufficient number of adult mosquitos were killed before the parasite development in the vector was completed. The basis for this approach was provided by Professor George Macdonald et al., who developed a mathematical model of the epidemiology of malaria which "confirmed" that transmission could be interrupted by DDT and larvicides. In fact, such an approach had led to eradication of malaria in some countries by the end of the Second World War and, in 1954, the XIV Pan American Sanitary Conference had already adopted a plan for the eradication of the disease from the Americas. DDT had been shown to be highly effective in interrupting malaria transmission, important antimalarial organizations existed in most malarious countries (but not in the majority of countries in sub-Saharan Africa), long-term savings were expected from time-limited eradication rather than the continued control approach that previously had been carried out, and there was concern that the vectors would become resistant to DDT if control activities were maintained for long periods.

The resolution to establish the WHO Global Malaria Eradication Campaign was adopted by 46 votes in favour with only 2 against and 6 abstentions, but serious criticisms were voiced in public and particularly in private. For example, Dr J.N. Togba, Liberia, stated in Mexico that "Large-scale malaria control might present no great difficulties in a relatively well-developed country like Venezuela or an island like Ceylon, but the magnitude of the task of spraying residual insecticides in every village of Liberia, in the face of bad communication and adverse weather conditions, could hardly be imagined unless it had been experienced". "Furthermore, he therefore thought that it would be ill advised to arouse the hopes of governments and run the risk of censure when results failed to come up to expectations". He considered also that the proposed appropriation of funds "was not even a drop in the ocean" for the task ahead.[a] The delegates of France and the

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[a] *Eighth World Health Assembly, Mexico, DF, 10–22 May 1955. Resolutions, decisions, plenary meetings and annexes.* Geneva, World Health Organization, 1955.

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United Kingdom expressed great reservations on the affordability and the sustainability of the enterprise and indicated their doubts on the implied urgency. Sub-Saharan Africa was represented at the Eighth World Health Assembly by only three independent countries (Ethiopia, Liberia, and South Africa) and by the metropolitan governments of the colonial powers, Belgium, France, Portugal, Spain, and the United Kingdom. After the Assembly, even the colonial governments of Africa expressed disillusion at not having been consulted about the resolution.

The Assembly also authorized the Director-General of WHO to obtain financial contributions from governments and private sources to assist countries to implement the campaign, but contributions were meagre. Between 1956 and 1963, US$ 20.33 million were donated, of which the USA contributed US$ 17.5 million (86.1%). As a result, the Global Eradication Campaign started in 1956 as a time-limited, regimented, centralized, and insufficiently funded enterprise with political overtones.

The paper by Médecin-Colonel Bernard, published in 1956, reflects the concerns expressed at the World Health Assembly in 1955 and by many individuals following the initiation of the WHO Global Eradication Campaign. He pointed out that insecticide spraying had not had any impact on malaria transmission in tropical Africa and questioned the efficacy of the methods being used and whether the considerable expenditure was justified. While not ruling out the eventual eradication of malaria in this continent and even calling for a concerted action to do so, he suggested that there were other major problems apart from funding that needed to be addressed before such a campaign should be initiated in Africa. These problems included the following: the lack of personnel trained in malaria and its eradication; logistic problems related to transport difficulties particularly during the rains; the shortage of water needed to spray vast areas during the dry season; the different habits of African populations that affect malaria transmission, and without whose collaboration eradication could not be achieved; and the different biology of the vectors that would affect the impact of spraying. History was to show that these concerns were justified not only for Africa but also for most of the world where malaria was present.

In the event, this international effort to eradicate malaria excluded most of sub-Saharan Africa, with the exception of Ethiopia, South Africa, and Southern Rhodesia (Zimbabwe). Vector control interventions were not considered feasible in most of this region because of the intensity of transmission and the limited health infrastructure to support such a programme. However, as a result of the Campaign, malaria was eradicated by 1967 from all endemic developed countries and large areas of subtropical Asia and Latin America were freed or practically freed from the risk of infection. In India alone, morbidity and mortality was reduced to about 100000 clinical cases and 1000 deaths each year.

Despite these achievements, it was realized that the objectives of global eradication could not be reached without a well-developed and public-health-oriented infrastructure. It became obvious that improvements in the malaria situation could not be maintained indefinitely without substantial national commitments and international assistance in view of the mounting operational, financial, and technical problems faced by the programmes. In retrospect, it is easy to see that a solution was sought by oversimplification and standardization and that many programmes lacked the epidemiological and administrative expertise. These factors were overlooked because of the humanitarian appeal and urgency of the eradication effort. In addition, technical constraints such as resistance of vectors to DDT and of the parasites to chloroquine began to affect programme activities.

The recognition of these constraints led the Twenty-second World Health Assembly, held in Boston, MA, in 1969, to re-examine the strategy and conclude that, while complete eradication of malaria was the ultimate goal, there were regions where eradication did not yet appear feasible and that, in such areas, its control with the means available should be encouraged as a necessary and valid step towards eventual eradication. This effectively ended the WHO Global Eradication Campaign, and an almost immediate effect was the considerable reduction in financial support to antimalarial programmes. The capabilities of malaria-endemic countries to continue their antimalarial operations were further reduced by the world economic crisis in the early 1970s that resulted in a dramatic rise in the prices of insecticides and drugs and of shipping costs. As a result of the reduction in antimalarial activities, especially vector control, and the inability of countries to formulate and implement realistic and epidemiologically sound plans for combating the disease, malaria started a gradual and sometimes even dramatic resurgence.

Guarded optimism re-emerged in the 1980s. It was expected that the development of a primary health care approach to health services, as recommended by the International Conference on Primary Health Care, held in Alma-Ata, in 1978, together with a well-informed and actively participating community would ensure the necessary infrastructure for the delivery of antimalarial action. The implementation of malaria control based on the primary health

care approach was, however, slow. This was due in part to problems in interpreting this approach, a reluctance on the part of governments to move away from practices used during the eradication era, and to delays in the further development and implementation of national health services based on the primary health care approach. Thus, the malaria problem continued to increase through the 1980s and 1990s, often in epidemic proportions, compounded by insufficient financial and human resources, changes in climate, and in land use and migration as populations strove to increase their economic potential. Problems were most severe in areas burdened with war and civil unrest, illegal trade, and mass movements of refugees.

Hence, by the beginning of the 1990s, it was estimated that each year 300–500 million people were clinically ill with malaria, while 1.5–2.7 million people died from the disease. A total of 90% of these cases were in sub-Saharan Africa. Although the burden of malaria is confined to these areas of Africa, multidrug-resistant falciparum malaria that had started in the 1980s in parts of South-east Asia and South America continued to spread and threaten malaria control in other parts of the world.

In view of this deteriorating situation, WHO's Executive Board proposed in 1990 that a Ministerial Conference on Malaria should be held to mobilize affected countries and the international community to intensify their malaria disease control efforts. This conference, which took place in 1992 in Amsterdam, adopted a World Declaration on the Control of Malaria and a Global Malaria Control Strategy that was consequently confirmed by the World Health Assembly in 1993, and by both the Forty-ninth Session of the United Nations General Assembly and the Thirty-third Ordinary Session of the Assembly of Heads of State and Government of the Organization of African Unity in 1994 and 1997, respectively.

The objectives of the Global Strategy are to prevent mortality and reduce morbidity as well as social and economic loss due to disease through the progressive improvement and strengthening of local and national capabilities for malaria control.

It has four basic technical elements:

— to provide early diagnosis and prompt treatment;

— to plan and implement selective and sustainable preventive measures, including vector control;

— to detect, contain, or prevent epidemics; and

— to strengthen local capacities in basic and applied research to permit and promote the regular assessment of a country's malaria situation, in particular, the ecological, social, and economic determinants of the disease.

The strategy calls for disease- rather than parasite-oriented control programmes and the rational use of existing and future tools to combat malaria. It recognizes that malaria problems vary enormously from epidemiological, ecological, social and operational viewpoints, and that sustainable, cost-effective control must, therefore, be based on local analysis. The strategy is firmly rooted in the primary health care approach and calls for the strengthening of local and national capabilities for disease control, for community partnership and the decentralization of decision-making, for the integration of malaria control activities with related disease programmes, and for the involvement of other sectors, especially those concerned with education, agriculture, social development, and the environment. It emphasizes the vital importance of continuing research both locally and internationally, and of international teamwork in research and control.

This strategy differs significantly from past approaches to malaria, especially those used in the eradication era. Implementation of the strategy depends on a change of emphasis from highly prescriptive, centralized control programmes to flexible, cost-effective and sustainable programmes adapted to local conditions and responding to local needs. Thus, the strategy aims to control malaria through a concerted approach, using various methods of intervention based on knowledge of the local epidemiology of the disease, available resources, and the ability to maintain a sustainable impact. It is developed in such a way that it is able to accommodate any new tool, provided that it is effective, affordable and the results from its use can be sustained.

An Action Plan for Malaria Control that provides objectives, targets and a timetable of activities for the implementation of the Global Strategy for the period 1995–2000 has been developed by WHO with other United Nations Agencies and was adopted by the Economic and Social Council of the United Nations in 1995. Priority in this plan is given to country support, based on the development of realistic and affordable national plans of action after an assessment of needs and priorities. Training and operational research should be part of these national plans. The action plan emphasizes the integration of malaria control activities into other health delivery programmes and general health services, especially by strengthening the community's role in prevention and control. Emphasis is placed on better partnership among United Nations agencies and other organizations involved in malaria control. The plan translates research and technical developments into policy and guidelines, on which training and education materials are based.

Priority is given to malaria-endemic countries in sub-Saharan Africa, where over 90% of the world's malaria cases occur. These countries have an urgent need for the establishment of national malaria control programmes and for the implementation of the strategy at central and district levels. The focus in these countries is on strengthening the provision of early diagnosis and prompt treatment both at health service facilities and at the community level, the management of severe and complicated diseases, the detection and management of malaria epidemics, and the development of strong community-based programmes for malaria prevention and control.

In other parts of the world, priority has been given to reorienting existing malaria control programmes in line with the principles of the global strategy. This includes the strengthening of curative services at all levels of the health care system, the promotion of rational drug use, provision of health information, and the selective use of disease prevention methods, including vector control.

Within these priorities, two main objectives have been set:

— by the year 1997, at least 90% of countries affected by malaria should implement appropriate malaria control programmes; and

— by the year 2000, malaria mortality should be reduced by at least 20% compared to the 1995 level in at least 75% of affected countries.

Since the adoption of the Global Strategy, the foundations for reducing the impact of malaria have been laid. By mid-1997, 47 of the 49 countries of sub-Saharan Africa had completed national plans of action for malaria control with WHO's assistance. Because of limited human and financial resources, the majority of these national plans are only at the initial stages of implementation. However, US$ 10 million was allocated by WHO's Director-General for use in 1997 for accelerated implementation in 21 selected countries in the African Region and 3 African countries in the Eastern Mediterranean Region for which plans of action have been developed and are now being implemented; an additional US$ 10 million has been allocated to expand the project in 1998. By the end of 1996, over 10000 individuals were trained at the district and community levels, with priority being given to disease management. This number has increased markedly with the instigation of intensified implementation of malaria control in Africa in 1997.

Outside Africa, 20 countries in the Eastern Mediterranean Region, 17 countries of the Region of the Americas, and 18 countries in the South-East Asia and Western Pacific Regions have reoriented their malaria control programmes in line with the Global Strategy. Thus, globally the target that 90% of countries affected by malaria implement appropriate control programmes has been achieved.

It was recognized when the Global Strategy was adopted that, although malaria was a curable disease and could be controlled by existing methods, there was no "quick fix" approach and that research would continue to be essential to provide new tools and approaches required for control as the malaria situation evolves and changes. In most areas, particularly those in sub-Saharan Africa, long-term investments are required to achieve a marked reduction in morbidity and mortality. However, implementation of malaria control according to the Global Strategy is beginning to have an impact on malaria morbidity and mortality in countries such as China, Solomon Islands, Philippines, Vanuatu, Viet Nam, Thailand, some states in India, Brazil, and Oman, as well as allowing countries in North Africa and some Middle Eastern countries to maintain their malaria-free status.

Résumé

La lutte antipaludique dans les années 90

En mai 1955, la Huitième Assemblée mondiale de la Santé, réunie à Mexico, a décidé de lancer une campagne d'éradication mondiale du paludisme fondée sur l'utilisation à grande échelle du DDT pour la destruction des moustiques adultes à l'intérieur et à l'extérieur des habitations, de larvicides pour le traitement des sites de reproduction des moustiques et d'antipaludéens pour le traitement de la maladie et l'élimination du parasite chez l'homme. La résolution établissant la Campagne OMS d'éradication du paludisme a été adoptée par 46 voix contre 2 et 6 abstentions, mais des critiques sérieuses ont été formulées en public et surtout en privé.

L'Assemblée a aussi autorisé le Directeur général de l'OMS à recevoir des contributions financières gouvernementales et privées pour aider les pays à mettre en œuvre la campagne, mais ces contributions ont été maigres. Entre 1956 et 1963, elles se sont élevées à US $20,33 millions, dont US $17,5 millions fournis par les Etats-Unis d'Amérique (86,1%). En conséquence, la campagne, lancée en 1956, a pris la forme d'une opération limitée dans le temps, strictement réglementée et centralisée, avec un financement insuffisant et des connotations politiques.

Un article du médecin-colonel Bernard, publié en 1956, traduisait les préoccupations exprimées

par l'Assemblée mondiale de la Santé de 1955 et reprises par de nombreuses voix à la suite du lancement de la campagne mondiale d'éradication. Il faisait observer que la pulvérisation d'insecticides n'avait eu aucun impact sur la transmission du paludisme en Afrique tropicale et mettait en doute l'efficacité des méthodes utilisées en se demandant si les dépenses considérables engagées dans l'opération étaient justifiées.

En tout état de cause, la plus grande partie de l'Afrique subsaharienne, à l'exception de l'Ethiopie, de l'Afrique du Sud et de la Rhodésie du Sud (Zimbabwe) était tenue à l'écart de cette entreprise internationale d'éradication du paludisme. Les interventions antivectorielles étaient jugées irréalisables dans la plus grande partie de la région en raison de l'intensité de la transmission et de la faiblesse de l'infrastructure sanitaire sur laquelle elles auraient dû s'appuyer. Néanmoins, à la suite de la campagne, le paludisme était éradiqué dès 1967 dans tous les pays d'endémie développés et le risque d'infection avait pratiquement disparu dans de larges zones subtropicales d'Asie et d'Amérique latine. En Inde, par exemple, on ne comptait plus qu'environ 100 000 cas cliniques et 1000 décès par an.

En dépit de ces succès, il est apparu que les objectifs de l'éradication mondiale ne pourraient être atteints en l'absence d'une infrastructure bien développée et axée sur l'amélioration de la santé publique. Avec le recul, il est facile de voir que la campagne a péché par la recherche de solutions standard qui ne tenaient pas compte de la complexité de la situation et que beaucoup de programmes manquaient des compétences épidémiologiques et administratives nécessaires. Ces facteurs ont été sous-estimés en raison de la priorité accordée à l'aspect humanitaire et à l'urgence du problème. La prise de conscience de ces contraintes a conduit la Vingt et Unième Assemblée mondiale de la Santé, en 1969, à réexaminer la stratégie et à conclure que si l'éradication complète était le but ultime, elle n'était pas encore possible dans certaines régions où il fallait privilégier la lutte contre la maladie par tous les moyens possibles. Cela a mis fin en pratique à la Campagne OMS d'éradication mondiale, avec pour corollaire immédiat une réduction considérable de l'appui financier aux programmes de lutte antipaludique.

Les années 80 ont vu le retour à un optimisme prudent. On a alors espéré que le développement des soins de santé primaires, dont le principe a été énoncé à Conférence internationale d'Alma-Ata en 1978, assurerait la mise en place de l'infrastructure nécessaire à la lutte antipaludique. Toutefois, la mise en oeuvre des moyens de lutte fondés sur cette approche a été lente. En conséquence, la situation s'est détériorée au point qu'au début des années 90 on estimait que 300 à 500 millions de personnes présentaient chaque année les symptômes cliniques du paludisme et que la maladie faisait 1,5 à 2,7 millions de morts, principalement en Afrique sub-saharienne, où l'on comptait 90% du nombre total de cas.

Devant cette détérioration de la situation, une conférence ministérielle sur le paludisme s'est réunie en 1992 pour mobiliser les pays concernés et la communauté internationale en vue d'intensifier la lutte contre la maladie. Cette conférence a adopté une Déclaration mondiale sur la lutte antipaludique et une Stratégie mondiale de lutte antipaludique qui ont été confirmées par l'Assemblée mondiale de la Santé de 1993, puis par la quarante-neuvième session de l'Assemblée générale des Nations Unies et la trente-troisième session ordinaire de l'Assemblée des Chefs d'Etat et de Gouvernements de l'Organisation de l'Unité africaine, respectivement en 1994 et 1997.

La stratégie mondiale a pour objectifs de prévenir la mortalité et de réduire la morbidité ainsi que les pertes sociales et économiques liées à la maladie, grâce à la mise en place progressive et au renforcement de moyens de lutte locaux et nationaux. Elle prévoit des programmes axés davantage sur la maladie que sur les parasites et vise à favoriser l'utilisation rationnelle des moyens de lutte actuels et futurs. Elle reconnaît que les problèmes épidémiologiques, écologiques, sociaux et opérationnels posés par le paludisme varient énormément, de sorte que pour être efficaces et rentables à long terme, les moyens utilisés doivent s'appuyer sur une analyse locale. Elle s'inspire résolument du concept des soins de santé primaires et s'écarte nettement des méthodes antérieures, notamment de celles qui étaient employées lors de la campagne d'éradication. Sa mise en œuvre cesse de mettre l'accent sur des programmes de lutte centralisés très normatifs au profit de solutions souples, rentables et durables, adaptées aux conditions et aux besoins locaux. La priorité est accordée aux pays d'endémie de l'Afrique subsaharienne où l'on recense plus de 90% du total mondial des cas de paludisme.

Depuis l'adoption de la stratégie mondiale, un système visant à réduire l'impact du paludisme a commencé à se mettre en place. Au milieu de 1997, 47 des 49 pays d'Afrique subsaharienne avaient établi des plans d'action nationaux avec l'aide de l'OMS. Etant donné la faiblesse des ressources humaines et financières disponibles, la majorité de ces plans en sont encore aux premiers stades de la

mise en œuvre. Toutefois, le Directeur général de l'OMS a débloqué US $10 millions en 1997 pour accélérer leur application dans 21 pays de la Région africaine ainsi que dans 3 pays d'Afrique appartenant à la Région de la Méditerranée orientale, pour lesquels des plans d'action ont été élaborés et sont maintenant en cours d'application. Un budget supplémentaire de US $10 millions a été prévu pour l'extension du projet en 1998. En dehors de l'Afrique, 20 pays de la Région de la Méditerranée orientale, 17 pays de la Région des Amériques et 18 pays des Régions de l'Asie du Sud-Est et du Pacifique occidental ont réorienté leurs programmes pour les mettre en accord avec la stratégie mondiale. En conséquence, l'objectif prévoyant que des programmes appropriés de lutte antipaludique soient appliqués par 90% des pays touchés par la maladie a été atteint.

Lors de l'adoption de la stratégie mondiale, il a été reconnu que si le paludisme est une maladie guérissable et qu'il peut être endigué par les moyens existants, il n'existe pas pour autant de méthode miracle. Néanmoins, l'application de méthodes de lutte conformes aux principes de la stratégie mondiale commence à avoir un impact sur la morbidité et la mortalité du paludisme dans des pays comme la Chine, les îles Salomon, les Philippines, Vanuatu, le Viet Nam, la Thaïlande, certains Etats de l'Inde, le Brésil et Oman, tandis qu'elle permet à d'autres pays, comme ceux d'Afrique du Nord et certains pays du Moyen-Orient, de rester épargnés par la maladie.