

Round Table Discussion

Rolling back malaria: action or rhetoric?

The Roll Back Malaria Initiative (RBM) is a partnership of countries with endemic malaria, United Nations agencies, bilateral development agencies, the research community, the private sector, nongovernmental organizations, foundations, and the media. The participants see it as the beginning of a societal movement to bring malaria under control.

The RBM partnership was formed in response to the realization that current efforts to combat malaria are disproportionate to the enormous burden this disease places on health and development in poor countries. The objective is to halve the malaria burden in countries participating in the initiative.

The technical strategy of RBM is adapted from the one formulated in 1992 at the Ministerial Conference on Malaria in Amsterdam. It is based on the early detection and prompt treatment of malaria cases, the detection and control of malaria epidemics, mosquito control, and the prevention of malaria in pregnancy.

The principal mechanism RBM will use to achieve its objectives is national action intensified by a global partnership within which regional and local partnerships focus on malaria control in the context of health sector development. Technical support networks provide the information and expertise that enable these partnerships to take effective action.

RBM also supports research on the development of better tools for prevention and control. Its main concern is to reduce the massive toll of malaria deaths in Africa, but it is global in its scope, and recognizes the burden malaria imposes on endemic regions throughout the world.

For optimists and pessimists alike, RBM raises big questions. Most of them concern the science, the strategy, the statistics and the money involved.

- From a purely technical standpoint, are the necessary tools available, particularly for tackling current problems such as parasite resistance to drugs and mosquito resistance to insecticides? Are new drugs forthcoming? Are not alternative insecticides to DDT prohibitively expensive?
- RBM aims to strengthen health systems and is thus a horizontal rather than a vertical programme. Can a horizontal programme deal with a single disease such as malaria?
- RBM aims to halve the malaria burden, but do accurate measurements of that burden exist, and if not, how will RBM's performance be assessed?
- Many of the conditions that favour malaria will be difficult or impossible to eliminate. They include poor, marginalized, largely inaccessible communities; increasing numbers of countries ravaged by conflict and without basic social and health infrastructures; environmental changes that facilitate malaria transmission and cause epidemics, and the HIV/AIDS epidemic which is undermining capacity in tropical Africa. What chance has RBM to fulfil its objectives in the face of these obstacles? And how does it propose to meet the increasing costs of malaria interventions in poor endemic countries?

Keywords: malaria, prevention and control; cost of illness; health plan implementation, methods; national health programmes; Africa south of the Sahara.

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Malaria control stymied in 2010, mastered in 2025

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Are the tools available? In one sense yes: the development of artemisinin and other compounds to supplement the current use of chloroquine, pyrimethamine/sulfadoxine, tetracycline, mefloquine, quinine, primaquine and related drugs would provide

effective therapy. But are these drugs readily accessible at low cost to all who need them? No! Insecticide-impregnated bednets decrease overall childhood mortality, acquisition of parasitemia and other malaria-related indices, at least in the short run. But are they available and accessible at low cost to the populations living in endemic areas? No! Are other satisfactory tools (vector-targeted and immunological interventions) available and accessible to decrease severe illness and transmission? No — but research will bring them closer.

Can Roll Back Malaria be a horizontal programme and deal with a single disease? Not with maximum effectiveness: most “horizontal” programmes try to

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do too much for too many with too few resources. While strengthening health systems in developing countries is imperative, the best way to achieve that goal is to combat the diseases that cause the greatest burden, and to do it with tenaciously focused efforts. With success in combating one important disease, credibility and confidence are gained for dealing with all diseases. HIV/AIDS is so pervasive in Africa that its management must be considered when dealing with every disease. For example, if there is widespread distribution of sulfamethoxazole/trimethoprim to prevent opportunistic infections in HIV/AIDS patients, there may be accelerated development of *P. falciparum* resistance to sulfadoxine/pyrimethamine.

Do accurate measures of the malaria burden exist? No! Lack of accurate measures will make it exceedingly difficult to measure success. Process, outcome, and impact measures are needed urgently, nationally and internationally (1, 2). When programmes begin, basic epidemiological data should be collected on the following:

- patients admitted to hospitals (total, with malaria and anaemia);
- patients dying in hospitals (total, with malaria and anaemia);
- percentage of patients properly and promptly managed in hospitals and peripheral health units (this includes assessment of clinical and laboratory diagnoses, treatment, health education and referral);
- percentage of low-birth-weight babies born in urban and rural areas, and percentage of newborns in hospitals with and without maternal and placental malaria. Such data are essential indices for every malaria programme. As programmes mature, other important measures can be added, focusing on events in rural areas and on disease sequelae.

What chance has RBM of fulfilling its objectives?

Scenario 1. It is 2010. Over 80% of the population in every village in malarious areas of Africa are sleeping under insecticide-impregnated mosquito nets every night. Fever clinics with effective antimalarial drugs exist within 5 km of 80% of the villages. Eighty per cent of all villages have a village health worker with major responsibility for management of malaria patients. Data on fever, laboratory-diagnosed malaras, and other malaria indices are sent electronically to each nation's capital and RBM centres monthly. The data are analysed, sent back to the field monthly in newsletters, and used for programme planning. At least 20% of malaria control resources available within countries and internationally are used for training, programme monitoring and laboratory, clinical and epidemiological research. Ministries of Economic Development, Defence, Science & Technology, Education and others are working closely with the Ministry of Health to control malaria. The Multilateral Initiative on Malaria (MIM), which aims to build up research capacity in developing countries, is catalysing increasing support. Phase III (commu-

nity-wide) field trials of malaria vaccines are being completed: one vaccine candidate shows great promise for protecting very young children and pregnant women. International and national leaders of malaria control programmes have four priorities: to manage by pursuing specific objectives; to support staff in the field; to tell the malaria control story clearly, creatively and often; and to attract support.

Ten African countries show that malaria is being controlled. In these countries, childhood deaths, anaemia patients admitted to hospitals and low-birth-weight babies are 15–35% lower than in 2000. Integrated management of sick and well children is now occurring at all fever clinics.

On the other hand, another 20 countries show that the incidence of malaria has *increased* since 2000. This is because 25–50% of “malaria cases” are now being reported compared to the 1–5% when programmes began in 2000. It now seems that the strategy of patient management, selective treatment and chemoprophylaxis during pregnancy, bednet distribution and epidemic containment will have little long-term impact on transmission. Every developed country continues to have importations of malaria; some have thousands of cases yearly. High profile politicians are urging citizens and organizations to be more actively involved in supporting malaria research, training and control in developing *and* developed countries for humanitarian and economic reasons. The most popular musical artists and other celebrities appear worldwide in support of malaria control and research. “Mash Malaria Marathons” are becoming widespread. No one is speaking of “a societal movement in health”.

Scenario 2. It is 2025. Over 90% of persons in rural malarious areas are sleeping under long-duration insecticide-impregnated bed nets and using insecticide-impregnated clothing, and soap with effective, non-toxic, insect repellents. Several new, low-cost, antimalarial drugs have replaced chloroquine and pyrimethamine-sulfadoxine as first-line therapy. Vector control methods (mix of residual house spraying, larviciding, environmental management) are being used in all cities and 90% of the rural areas in malarious countries: control of other vector-borne diseases occur concurrently with decreased malaria through Africa. Some countries are testing second and third generation malaria vaccines. Improved genetic understanding of mosquitoes, parasites, and human susceptibility to malaria have resulted in field trials of other new treatment and prevention interventions. Patients with fever and malaria, and malaria-associated deaths, have decreased by more than 40% in every malarious country as a result of well-administered programmes and the benefits of economic and educational progress. The number of imported malaria cases in Europe and North America has decreased by 90% since 2000, despite evidence that only one in 2–5 cases was reported at that time to national and international health authorities in developed countries. The newly licensed malaria vaccines are expensive, and coverage is less than 15%

but rising rapidly. The company with the vaccine patent cedes it to the UN Malaria programme, which has now become part of UNITEC, the UN Initiative to Eliminate Diseases. ■

1. **Bryce J et al.** Evaluation of national malaria control programmes in Africa. *Bulletin of the World Health Organization*, 1994, **72**: 371–381.
2. **Remme JHF, Binka F, Nabarro D.** A framework and indicators for monitoring Roll Back Malaria. *American Journal of Tropical Medicine and Hygiene*, 2001, in press.

Roll back malaria in sub-Saharan Africa?

Wenceslaus L. Kilama¹

The malaria situation in sub-Saharan Africa is grim, and the disease now constitutes a leading cause of poverty accounting for annual losses of up to US\$ 12 000 million.

Malaria control activities in Africa peaked during the 1960s, when, according to eradication trials, 60% of the African population could be protected, mainly by means of DDT. Efforts at malaria eradication were abandoned in 1969. Later, malaria surged. In 1992 Ministers of Health produced the Global Malaria Control Strategy which emphasized early diagnosis and prompt treatment; other measures were named but hardly implemented at all. The Roll Back Malaria (RBM) initiative is merely a redefinition of the 1992 strategy with partner involvement added on. A critical examination of the initiative is essential.

Malaria eradication trials relied on very powerful tools, namely DDT and chloroquine which are now both problematic. Countries with high resistance to chloroquine (such as Kenya, Malawi and the United Republic of Tanzania) have banned its use, and others will follow suit. Resistance to pyrimethamine/sulfadoxine, its logical successor, is already rampant in East Africa, and is likely to spread fast and widely across sub-Saharan Africa. The observed susceptibility to amodiaquine is probably transient and the drug is not so safe. The remaining antimalarials are costly and have limited safety for wide use.

DDT proved its prowess during the 1960s despite isolated reports of DDT resistance. Now DDT is threatened by an internationally binding ban advocated mainly by environmentalists. Pyrethroids, which are the mainstay of the RBM strategy, are already threatened by resistance in the two leading African malaria vectors, viz *Anopheles gambiae* and *An. funestus*. Resistance in *An. gambiae* is mainly promoted by use of pyrethroids in agriculture. In KwaZulu

Natal a switch from DDT to pyrethroids allowed a return of *An. funestus* which is now pyrethroid-resistant. Resumption of DDT spraying has effectively controlled *An. funestus*. The lesson to be learnt from this is that flexibility in the choice of insecticides would contain malaria. In neighbouring Mozambique pyrethroid-resistant *An. funestus* is delaying the commissioning of a billion dollar aluminium smelter. The genes which foster pyrethroid resistance are probably widespread; and resistant populations will result from wider use of these chemicals.

Malaria in sub-Saharan Africa is complex because the vectors, parasites, geography, ecology, human behaviour, infrastructures and resources available for disease control are all variable and problematical. Control strategies must therefore be place-specific. Some questions will illustrate the point. Will insecticide-treated nets (ITNs) work where the vectors are resistant to pyrethroids or are exophilic? Is there evidence to support ITN promotion in urban areas? To what extent will antimalarial drug resistance interfere with malaria control? Will imposed cost sharing deny treatment and prevention to the poor who in many countries of sub-Saharan Africa constitute over half of the population?

Several reports show scarcity of malaria research capacity in sub-Saharan Africa; malaria control personnel are even rarer. Many countries have some control personnel in national capitals, but have none at district and peripheral levels where control must actually be carried out. Who will lead the control activities? Who will undertake the applied operational and field research that is essential for guiding and steering the control programmes? Is there applied field research support from the RBM Secretariat?

Given the complexity of the malaria problem, is it rational to delegate its control to general health services, whose few personnel are poorly trained, underpaid, overworked and ill-equipped? Will they properly diagnose and promptly treat malaria which might soon be multidrug-resistant? Will they undertake field applied and operational research, decide on and undertake appropriate vector control, implement health education targeted at the particular needs of the local situation? Would vertical malaria control integrated within improved health care systems do better?

At the Amsterdam Conference in 1992, countries in which malaria is endemic, together with major donors and multilateral organizations, promised to reinvigorate malaria control. Almost a decade and over 10 million deaths later, the donors have not made sufficient input, and the malaria situation has deteriorated considerably. What is needed now, at the global and African leadership level, is to translate platitudes and promises into concrete and visible inputs into malaria control programmes. Promises have been made in the past but often not met. When met, donors however little they know about malaria control, often insist on specifying exactly what donations should be spent

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on. To make this concern effective rather than counterproductive, will donors agree to subject malaria control proposals to independent, external multidisciplinary review following scientific norms? Will African governments for a change invest substantially in their national malaria control programmes?

Malaria control in sub-Saharan Africa is "doable" IF there are effective tools, capacity strengthening, field applied research, adequate funding, better programming and management of malaria interventions. ■

Malaria – first, roll back expectations

Brian Greenwood¹

Rolling back malaria is a daunting task. The relatively easy part has been done and, with a few exceptions, malaria has been controlled effectively in areas close to the outer limits of its endemicity. Achieving similar success in the many parts of the world where the infection is still a major health problem, especially in Africa, is going to be much more difficult. The problem of malaria control in Africa lies in part in the efficacy of the major malaria vectors and in part in the lack of resources to support control programmes.

Controlling malaria in areas where residents are bitten nearly every night by at least one infected mosquito is a formidable challenge. Drugs, vaccines and insecticides will have to be enormously effective if they are to reduce transmission in such areas and reduction of the illness caused by infection may be the best that can be achieved for some time. Establishing a basic programme of control that might, for example, include effective treatment, prevention of malaria in pregnancy and provision of insecticide-treated materials cannot be achieved for a cost of less than US\$ 3–5 per person per year. Thus the cost of a modest malaria control programme for Africa alone is in the range of US\$ 1000–2000 million per year. Where is this enormous sum to come from? Some of it will be contributed directly or indirectly by the affected population, as is the case at present, but outside funds will be needed, especially for the poorest countries of Africa. Maintaining support from the international community for the long haul needed may not be easy but the Onchocerciasis Control Programme is an example of a situation in which this has been achieved. Because of the technical difficulties and cost of implementing malaria control it is important that expectations of what can be achieved in the next decade or so through the RBM initiative are not raised too high. The target of a reduction in mortality of 50% by the year 2010 is an ambitious one.

How much progress has the RBM initiative made towards achieving its objectives during its first two years? Staff of the programme must have been faced with some difficult decisions during the planning stage. Should they go for a few quick successes that would encourage the donors to maintain funding or should they concentrate on raising the profile of malaria internationally and building up a solid partnership? They have taken the latter course and the initiative has obtained substantial publicity for malaria through events such as the Abuja summit, and it has built up a broad-based partnership.

Taking this course has, however, led almost inevitably to complaints in some malaria-endemic countries that not much has changed on the ground since the initiative started. This situation must change during the next two to three years if the credibility of the initiative is to be sustained. Consequently, some objective measurement of its success will be needed. Documenting the impact of a successful malaria control programme is not easy and the RBM team has invested substantial resources in working out ways of measuring both performance and outcome indicators, an investment whose value will become apparent when specific programmes have been started. The implementation and evaluation of malaria control programmes require trained staff, and such staff are woefully few in many malaria-endemic areas. Rolling back malaria will not be achieved unless the capacity for research in malaria and for malaria control is increased substantially, especially in Africa.

Because of the difficulties in controlling malaria, it is unreasonable to expect immediate, dramatic successes in all areas where the infection is endemic. A sensible approach may be to concentrate activities in a few countries where malaria is a major problem but where there are some circumstances that favour a control programme, such as political commitment to malaria control, and political stability. Objective success in such situations would provide enormous encouragement to those involved on the ground in malaria control, to the donors and to those working in communities where control is more difficult. ■

Roll Back Malaria: technically feasible or just politically correct?

Pierre Druilhe¹

Who could be opposed to Rolling Back Malaria? The idea in itself is not new, however. The real question is: why should it succeed now where it has largely failed in the past? The outcome of attempts to eradicate malaria in the past through the widespread use of insecticides has been essentially to select out anophe-

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line mosquitoes that are resistant to the most affordable insecticides. Later attempts to reduce malaria illness and deaths by improved access to treatment have selected out parasites that are resistant to the most affordable drugs. The current attempt to employ the few remaining tools might complete the eradication of the armamentarium rather than the enemy.

The long-term vision is clearly deficient. The history of malaria control is characterized by underestimation of the problem and inability to grasp the fact that the situation is not static but constantly evolving. Host–parasite interactions lead to subtle equilibria (with distinct steady states in different regions of the world) which will unavoidably be modified as a consequence of any intervention. This in turn implies that without real-time monitoring in order to adapt control tools and without research to develop tools for the future years, there might be little hope.

A practicable control strategy against any infectious disease has to be based on knowledge. How much do we know about malaria? Mortality figures suffer from massive standard deviations: the estimate of 1 million deaths a year in the 1950s was re-evaluated to twice as many before the emergence of any drug resistance. The only well-documented study, on the impact of chloroquine resistance alone, concluded that it increased mortality by a factor of 8. Everyone hopes that it may not be as bad as that globally, but no one knows. Data about resistance to this and other antimalarials are obtained by a variety of hardly comparable methods; in addition they are very scarce and, for most of the time, out of date. Consequently, decisions about the next drug to use are somewhat erratic. Other issues have not been seriously faced. For instance, the medium-term effect of impregnated bednets on local epidemiology has been put in doubt by some studies. Likewise, it is merely “hoped” but not known that combined therapies would reduce the emergence of resistance. Disconcertingly, obtaining reliable information on these points does not seem to be amongst the current RBM priorities.

To revive interest in the control of malaria, RBM has chosen a high profile. The horizontal approach to strengthening health systems is innovative, modern and ambitious. It could make national decision-making the dominant force in a country rather than Northern-driven decision-making, and thus has political and health implications that go far beyond malaria. The federation of all public and private, national and international funding agencies is commendable, as the field is highly disorganized.

Provided that conflicts of national interest can be overcome for the sake of a great cause, the main bottleneck from the donors’ point of view remains confidence. They need confidence first that WHO can deliver (for once), second that the managers involved can form an efficient enough strategic team, and third that the undertaking is truly feasible, given the severe shortage of effective tools.

RBM’s claim that it can halve the malaria burden in the medium term is reminiscent of the claim made by the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR) in 1976 that it could develop a malaria vaccine within 5 years. Since malaria mortality is hardly measurable and no effort to measure the real impact of the tools is planned, the RBM initiative could inspire as much trust from donors as the proclamation of “Health for all by the year 2000” did in 1978. A better way to attract serious confidence and contributions would be to propose a realistic strategic plan based firmly on what is known about the means available.

What is obviously missing is prospective studies, which means research, but not the research that is currently being carried out. Here are some examples of the type of research and activities needed:

- to establish a link between existing research and control teams, which would enable both parties to work effectively;
- to monitor critical parameters in pilot areas from the outset;
- to find out how to rescue the efficacy of previous tools (chloroquine resistance is reversible) or at least preserve existing ones, which seems both pragmatic and affordable;
- to devise better tools for the future, which are indispensable for any real and sustainable impact.

An investment of 1% of the total RBM budget in “research for control” (a huge amount by normal research standards) would still leave 99% of the budget to spend on the uncertain operations currently planned.

To end on a note of optimism: the fact that WHO has sought sceptical views to publish in its own journal is in itself a promising step in the right direction. ■

Roll Back Malaria is unarguably both necessary and possible

David Nabarro¹ & Kamini Mendis²

The Roll Back Malaria movement arose from two basic realities. First, the large and growing burden of malaria in the world today is grossly inconsistent with modern health standards, and receives far too little attention. Second, malaria, despite all the scepticism expressed in this round table, is unarguably a disease that can still be both prevented and treated effectively. The vast majority of people who get infected with malaria and die of it — the poor of this

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world — do so because they do not have access to existing tools and interventions. These facts on their own would amply justify the RBM objectives, together with the logic that, provided we continue to develop a reserve of effective technologies for preventing and treating malaria, its incidence can be reduced.

This being said, the task of turning the possibility into reality presents daunting challenges, some of which have been clearly expounded in this round table. RBM's very foundations consist in understanding and responding to them. No one, surely, would argue against doing so, especially as we know that much can be achieved with the available technologies. We will briefly comment on the five main concerns expressed.

First, there is the overarching one of the *massive cost* entailed in rolling back malaria. Critics doubt that it can be met. Much of RBM's early efforts have been aimed at making people aware of malaria as a health and development problem and in doing so, enlisting the support of the world's major development partners and political leaders for the RBM effort. An RBM-commissioned study on the macro-economics of malaria provided a sound basis on which to make the case for a greatly increased level of global investment. Substantial pledges of financial resources for malaria control have been made by G8 countries, the European Commission, development banks and other organizations, and they approach the very large sums that will be needed. The task now is to develop mechanisms to ensure that these increased resources can be used effectively. This is the key to obtaining more.

Second, many technical impediments, especially *resistance to drugs and insecticides* can compromise the tools available for malaria control. Will RBM not destroy the weapons rather than the enemy? The answer, surely, is not to safeguard the tools at the cost of disease and death, but to tackle these impediments in a technically rigorous manner, with adequate research and development. Some strategies for delaying the development of resistance to anti-malarial therapies are known and are firmly backed by RBM partners. The development of new drugs is being fostered through the Medicines for Malaria Venture, an alliance between the public sector and the pharmaceutical industry. RBM supports a larger investment in research and development than has possibly ever been made before — certainly much more than the 1% of the global investment that has been suggested here. There have always been concerns about the complexity of tackling malaria; they point quite rightly to its need for a powerful technical foundation. WHO will work with other RBM partners to ensure that strategies pursued and programmes supported conform to the most up-to-date evidence and experience. Where they do not, WHO will call for changes.

Third, *local capacity* for malaria control is usually inadequate. In most countries RBM partners support activities that are carried out within poorly resourced health care systems. Extra investment is needed to build this capacity in ways that bring essential interventions to poor people. WHO, together with other RBM partners, has established regional networks of technical experts. They use the results of research and field experience in dealing with malaria alongside other health problems associated with poverty such as HIV/AIDS, tuberculosis, and maternal and child ill-health. The action will be taken forward through sector-wide approaches to health, intersectoral development, the work of nongovernmental organizations and assistance to communities affected by conflict and complex emergencies.

Fourth, critics say that *nothing new* appears to have been added by RBM to the global strategy for malaria control drawn up in 1992. In reality, though, what has been added are the elements that will make this strategy work: coordinated action by development agencies, hence the emphasis on partnership; concerted action by groups at community level, hence the emphasis on popular movements; and consistent application of the technical principles formulated in 1992, hence the emphasis on evidence-based action. Higher expectations will increase the availability of resources. A focus on action at country level will make it possible to apply the global strategy to regional and local epidemiological realities. Commitment to strengthening the health system will eventually lead to sustainable outcomes. As we have seen, greater investment in research and development is needed to back the effort up. Roll Back Malaria supports the application of well-accepted malaria control strategies within countries, between countries and internationally.

Fifth and lastly, what is the wisdom of the *horizontal approach* to disease control? At its inception, RBM set out to strengthen the extremely weak health systems that prevail in most situations where malaria occurs. Since malaria is one of the greatest health problems faced by communities, effective action to roll it back will strengthen frail health systems. Poor people will thus become better able to obtain essential medications, vital health care and preventive measures, and to benefit from effective surveillance systems. National and local roll back malaria movements will help health systems to focus on outcomes.

We would not be making the effort to help countries and communities roll back malaria if it were an easy task. The RBM partners know that many difficulties lie ahead. Experience tells us that these can be tackled by applying science, human and financial resources, and effective organization. Most important, though, is recognition of the need to oppose the suffering and deprivation caused by malaria. ■