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## A Call for Integrated Approaches to Controlling Malaria

Jean-François Trape is to be congratulated on yet another outstanding large-scale population-based study on malaria epidemiology<sup>1</sup>. Such information helps to rationalize data from numerous studies and helps focus on real issues concerning malaria control. His analysis of the situation in Senegal, comparing the prevalence of illness and severe disease under differing conditions of entomological inoculation rates, draws attention to two facts. First, the epidemiology of severe malaria along with incidence of clinical conditions is complex, and is dependent upon intrinsic and extrinsic mechanisms affecting humans and mosquitoes. Second, although there is implication of a single approach to malaria control, effective control of malaria cannot depend on a monotypic strategy. It is this second point I would like to emphasize.

There is a danger in focusing on a monotypic approach. Clearly, reducing transmission in certain situations, as a result of sporadic and short-term interventions using insecticide-impregnated bednets (IBNs), has caused reduction in many indicators of malaria disease, but he queries whether long-term effects would be

sustainable, bearing in mind the changing immunological patterns in the human population that may result from reducing transmission. An important conclusion from his work is that control of this disease should now pass from the experimental to the functional; instead of being in the hands of agencies and organizations with numerous scientific agendas, it should move to a stage of national planning in those endemic countries where malaria control is a high priority. The process should become a national concern.

Those of us who have run national programmes know that there must be a plan of operations based on demographic, epidemiological and economic conditions, and the components of the intervention must combine effective case detection and treatment with vector control and reduction of transmission.

To find evidence of programmes that involved vector control and effective treatment, and data on their successes one should look into the past to see the long-term effects of such integrated activities. Apart from many other parts of the world, malaria has been effectively

controlled in numerous African countries, for example (among others) Swaziland, Eastern Transvaal, Zimbabwe, Zambia and Zanzibar. The programmes utilized both arms of the intervention and were considerably successful. Thus, as transmission patterns declined and when clinical cases became evident, adequate drug supplies were available in rural clinics, and chemotherapy prevented an upsurge in severe malaria. Many such programmes are still in force, others were disbanded because of cost; however, they demonstrate that the concerns raised by Trape<sup>1</sup> can be surmounted in a nationally planned, integrated strategy. We should be careful to consider his excellent presentation of data as it should be seen, a call for integrated approaches to controlling malaria, and not as one may fear, ammunition for those who consider diagnosis and treatment as the main vehicle for malaria control and may propose, heaven forbid, a decline back to tactical variant no. 1 of the WHO (1974).

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## Which Strategy for Malaria Control in Africa?

Can malaria mortality be decreased in tropical Africa by vector control? The answer is 'yes' if we consider the short-term impact on mortality of direct interventions, such as house spraying or impregnated bednets, which have decreased malaria transmission. However, the answer is 'no' if we consider the results of epidemiological studies which have compared malaria mortality rates between populations exposed to significantly different intensities of transmission. My belief is that the contradiction is only apparent, each approach revealing different but complementary aspects of the complex host/vector/parasite relationship in malaria, and that intervention trials principally measure a short-term effect, whereas epidemiological studies better reflect the

development of premunition<sup>1</sup>. Since fluctuations of transmission remain associated with fluctuations of morbidity and mortality whatever the epidemiological context, the short-term follow-up of interventions that decrease transmission does not permit the prediction of the future evolution of mortality, whereas epidemiological analysis does permit prediction of the strong trends of this evolution. In most epidemiological contexts observed in tropical Africa, even a substantial reduction in transmission cannot significantly reduce the burden of malaria for the whole community<sup>1</sup>.

Nevertheless, can impregnated bednets contribute to malaria control in Africa? Brian Greenwood (this issue) presents a series of arguments in favour of continuing

Likewise, Christian Lengeler *et al.* (above), and Umberto D'Alessandro and Marc Coosemans (above) believe that the evidence accumulated so far is not sufficient to warrant abandoning these programmes. Their arguments have weight: the immediate benefit is indisputable, some medium- or long-term benefits remain possible. Who could refuse to try to save the lives of 500000 African children each year<sup>2</sup>? Ideally, any strategy of malaria control must aim at optimizing a series of actions concerning: (1) patient care (health education at the community level for a suitable attitude toward disease; network of health structures; availability of personnel, equipment and drugs; adequate decision making and therapeutic schemes); and (2) disease prevention, of which vector control is one of the major components. Theoretically, these two categories of measures are complementary, and they synergize in areas of instable malaria.

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## Letters

where malaria is stable and resources are limited, we believe that a choice has to be made, because the potential benefits of these two categories of measures are too different to justify the dissipation of effort.

In tropical Africa, child mortality has decreased considerably over the past 30 years. At the beginning of the 1960s, nearly four children out of ten died before their fifth birthday. Nowadays, in most of Africa, eight or nine children out of ten reach the age of five years. The building of dispensaries, and the availability of vaccination, health education and schooling are the main reasons for this rapid progress in the space of only one generation. Thus, in the 1980s malaria mortality was almost totally suppressed in entire regions of the Congo<sup>3-5</sup>, Kenya<sup>6</sup>, Senegal<sup>7</sup> and probably of numerous other countries of tropical Africa. This was almost entirely due to the widespread use of chloroquine for treatment of fever cases, in particular by self-treatment. There was no reduction of malaria transmission levels. Even if, at present, malaria mortality is greatly increasing because of drug resistance (J-F. Trape *et al.*, unpublished), in my view this clearly shows that in areas of stable malaria, action against human-vector contact could have only a minor effect compared to that of patient health care. In a recent vaccine trial in The Gambia<sup>8</sup>, biweekly home visits for clinical monitoring have probably reduced child mortality by >90% despite the lack of efficacy of the

tested vaccine. No particular medical follow-up was planned for most bednet trials, but the occasional presence of mobile research teams may have saved many children.

Since Ross and Grassi, it has been demonstrated many times that using a bednet could protect people against malaria infection. Yet, except in China, this effective tool of individual protection has never been able to constitute an efficient tool of malaria control at the community level, even in areas of instable malaria where the use of bednets would have rapidly reduced the human-vector contact to a level lower than the crucial threshold of malaria transmission. As stressed by Clive Shiff (above), in areas of instable malaria of Europe, Asia, America and southern and northern Africa, it is integrated control that has permitted the suppression or significant reduction in the burden of malaria<sup>9</sup>. Vector control was only one component, and not always an essential one. It was mainly based on house spraying (and initially on a variety of measures such as larviciding, elimination of breeding places, and improvement of housing), and not on bednets. In these regions, improving conditions of direct treatment of clinical cases has permitted the continuing reduction in malaria mortality, despite the rapid development of high levels of drug resistance. Unfortunately, the extreme stability of malaria in most parts of tropical Africa means that the concept of integrated control will be

inapplicable until new control tools and economic development converge. For the present, we must make the best of the limited resources that can be obtained for malaria control. To promote the use of impregnated bednets would require, without any clear expectation for long-term efficacy, a considerable effort aimed at radically and durably changing the behaviour and daily practices of African people in a domain where no major or immediate stake is generally felt by these populations. We believe that the search for efficacy requires us to give up this dubious combat, and instead concentrate all our efforts on improving medical care for patients.

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## The IDRC/TDR 1997 Award on Gender and Tropical Diseases Call for Entries on 'Gender Issues in the Operationalization of Bednet Use'

This C\$5000 award is jointly sponsored by Canada's International Development Research Centre (IDRC) and the WHO's TDR.

Gender, as distinct from 'sex', refers to the sociocultural aspects of the male-female dichotomy, whereas sex denotes its biological basis. Gender refers to qualities, behaviours and roles ascribed by different societies to women and to men.

Pyrethroid-impregnated bednets prevent sleeping children from being bitten by mosquitoes, resulting in a dramatic reduction in deaths from malaria in children under five years old (by one-third in Kenya and by one-sixth in Ghana). There is a need now to explore the best methods for implementing widespread and effective use of bednets under different socioeconomic conditions, and guaranteeing long-term maintenance. Gender issues will be an important factor in this, including:

- Household information sharing about the positive aspects of bednet use.
- Power relations influencing decision-making on purchase, dipping and net maintenance.
- Positive effects of bednet use for pregnant women.
- Influence of gender differences in the control of household income and in the utilization of bednets within the household.

(NB Exciting new contributions on issues of sex that relate to the topic are also acceptable, providing these have clear implications that can be further developed.)

Papers should offer a critical review of current knowledge on the chosen topic, and should focus on practical disease-control issues. They must be original (ie. not published elsewhere), may be based on secondary sources or original research, and will provide a basis for future research that could be supported by the IDRC or the TDR.

Papers may have more than one author, and previous winners of an IDRC/TDR Award are not eligible. Entries (in English, Spanish or French, of not more than 30 pages of A4, double-spaced type) should be submitted by **30 September 1997** to: Dr Carol Vlassoff, Manager, Gender and Tropical Diseases Task Force, TDR/WHO, 1211 Geneva 27, Switzerland. (It would be helpful if authors planning to submit a paper would inform Dr Vlassoff well in advance of the deadline.)

The winners will be announced in November 1997.