WORLD HEALTH ORGANIZATION

FIFTY-FIFTH WORLD HEALTH ASSEMBLY A55/INF.DOC./6
Provisional agenda item 13.4 10 May 2002

Global Fund to Fight AIDS, Tuberculosis and Malaria

The global malaria situation: current tools for prevention and control

1. In response to the deteriorating global malaria situation, WHO called in May 1998 for a renewed attack on malaria. This rapidly evolved into the Roll Back Malaria global initiative based on intersectoral partnerships, evidence-based interventions, political mobilization and participation of civil society. The WHO cabinet project to roll back malaria was established in July 1998 to support the initiative, which was officially launched in New York in October 1998 with WHO, the World Bank, UNICEF and UNDP as founding partners. Roll Back Malaria was conceived as a strategy to reduce the malaria burden by building and sustaining partnerships at global and country levels, providing technical and operational support to endemic countries, stimulating research and development, and monitoring progress and outcomes.

2. The African Summit on Roll Back Malaria (Abuja, 25 April 2000) resulted in the Abuja Declaration on Roll Back Malaria in Africa endorsed by 44 African Heads of State and governmental delegations. The Declaration restates the commitment of African nations, articulated in OAU's Harare Declaration of 4 June 1997 on Malaria Prevention and Control in the Context of African Economic Recovery and Development, to reversing the malaria situation in Africa, and sets specific time-limited targets to achieve its goals.

3. The global strategy for rolling back malaria concentrates on three pressing needs: (i) to use existing interventions to the fullest extent possible; (ii) to use operational research to improve their implementation; and (iii) to support research to develop new and even more effective interventions. At the country level, the strategy calls for a judicious mix of existing interventions, as described below, to meet the dual objectives of improved prevention and reduced mortality and morbidity through better treatment.

GLOBAL SITUATION

4. Malaria exerts its heaviest toll in Africa, where around 90% of the more than one million deaths from malaria worldwide occur each year. Most malaria infections in Africa are caused by *Plasmodium falciparum*, the species of malaria parasite that causes the most severe and life-threatening form of the disease.

5. Malaria causes at least 300 million and possibly as many as 500 million cases of acute illness each year, which result in over 3000 deaths per day, mostly among young children in sub-Saharan Africa. Malaria is the leading cause of mortality in the under-five year age group in Africa (accounting for about 20% of all-cause mortality in this age group) and constitutes 10% of the continent's overall disease burden. Pregnant women are the main adult risk group.

6. Malaria, together with HIV/AIDS and tuberculosis, is one of the major public health challenges eroding development in the poorest countries in the world. There is a strong association between malaria and poverty. The disease strikes the most vulnerable and impoverished communities; therefore, those most in need of treatment are those least able to afford it. Malaria thus maintains people in poverty. In addition to immense human suffering, malaria costs Africa more than US$ 12 000 million annually, slowing economic growth by 1.3% per year.[1]

7. One of the most pressing issues facing Africa is the increase in drug resistance. The least expensive and most widely used antimalarial drug (chloroquine) is rapidly losing its effectiveness in almost all endemic countries, yet remains the first-line drug in many national malaria control programmes. Resistance to sulfadoxine-pyrimethamine, often considered the first and least expensive alternative to chloroquine, is also increasing in parts of Africa.

8. The greatest challenges remain in reducing the toll of malaria in young children and pregnant women in sub-Saharan Africa, and in low-cost or no-charge antimalarial drugs to which there is as yet no resistance. In other regions of the world, however, the increasing burden of malaria, associated with poverty, civil unrest and drug resistance, makes the disease a priority concern in other nations as well as for the international community.

THREE BASIC APPROACHES TO PREVENTION AND CONTROL

9. Malaria is preventable, treatable and curable. Its epidemiology, however, is highly variable, and control strategies must therefore be adapted according to local biological, social and health system factors. Despite this complexity, in most countries, especially those in Africa with the highest burden, **three approaches to reduce mortality and morbidity based on effective and low-cost interventions can and should be applied to give full coverage of all populations at risk**. These are: (i) prompt access to treatment, especially for young children; (ii) prevention and control in pregnant women; and (iii) use of insecticide-treated nets and other methods of vector control.

Prompt access to treatment

10. A large proportion of deaths from malaria results from delayed administration of effective antimalarial treatment, as death can supervene within days or even hours of onset of the disease. It is essential that all people who develop the disease, especially young children and pregnant women, have prompt access to effective treatment. In many African countries, more than three-quarters of all people with malaria are first treated at home with over-the-counter drugs, often of dubious quality, purchased in small local shops or from travelling vendors, and provided without treatment advice.

[1] The Harvard/London School of Hygiene and Tropical Medicine Report. In "The African Summit on Roll Back Malaria: Abuja, 25 April 2000", document WHO/CDS/RBM/2000.17.

11. Recently, several studies and pilot projects have shown that home-based management can be improved so as to ensure prompt access to safe and effective treatment. This approach relies on community volunteers, shopkeepers and vendors trained to recognize symptoms, distribute appropriate drugs, and provide accurate advice on drug doses. To support the approach, the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases has conducted research on appropriate formulations for home treatment, unit-dose blister packages and labelling.

12. Following good initial results, this home-based approach to management of malaria is being extended from small-scale projects to district-wide operations in several countries. Another promising tool is the use of artesunate suppositories as effective emergency treatment, at home or in rural health centres, of patients, particularly young children, with severe malaria.

13. The problem of prompt access to treatment is also being addressed in the WHO Integrated Management of Childhood Illness initiative, which includes malaria as one of five conditions targeted for action.

Prevention and control in pregnant women

14. In areas endemic for malaria, *P. falciparum* infection during pregnancy increases the likelihood of maternal anaemia, abortion, stillbirth, prematurity, intrauterine growth retardation and low birth weight. One of the most important recent developments for preventing these complications is intermittent treatment with sulfadoxine-pyrimethamine administered at least twice during pregnancy. This simple intervention has proven safe, highly effective and cost-effective in reducing the incidence of low birth weight and anaemia. Use of intermittent preventive treatment is now incorporated in the WHO Making Pregnancy Safer initiative.

Insecticide-treated nets and other measures for vector control

15. Studies covering the spectrum of transmission intensities in Africa have shown that use of insecticide-treated nets reduces overall child mortality by about 20% (range 14% to 29%) and that, for every 1000 children aged 1-59 months protected by such nets, about six lives are saved each year. Their use also reduces the incidence of severe disease and anaemia in young children and anaemia and low birth weight in pregnancy.

16. Local production and distribution of insecticide-treated nets in Africa is being promoted through public-private partnerships. In an effort to make them more affordable, African governments have been encouraged to reduce taxes and tariffs on nets, netting materials and insecticides. To date, altogether 17 countries in Africa have done so. Several African countries have increased the usage rates of such nets from almost zero to about 20% in the past three years.

17. Studies from around the world indicate that implementation of insecticide-treated nets is most efficient and sustainable when two simple general principles are followed: nets are bought by families as a commodity through commercial channels, and insecticide treatment is provided as a free public service. Increased demand has pushed down the price of nets on the international market in recent years to about US$ 3. The recent removal of taxes and tariffs has further helped to reduce the price to the consumer, and the increased demand has stimulated the initiation and expansion of manufacturing capacity for nets in Africa. For very poor populations, and to initiate wide demand for nets in situations where they are being introduced for the first time, nets may need to be provided at no-charge or be heavily subsidized.

18. Because yearly re-treatment operations are costly and difficult to maintain, nets treated with long-lasting insecticide are being developed in partnership with industry. The nets, produced at factory level with new bioactive fabric technologies, retain their insecticidal properties for at least four years (the lifespan of the net), thus making re-treatment unnecessary.

19. Numerous other vector-control methods are available. House spraying with residual insecticides is effective in some situations, especially for prevention and control of epidemics. As the development of vector resistance has rendered many inexpensive insecticides ineffective, WHO is engaged with industry in partnerships to develop new and affordable insecticides. Larval control, including environmental management, is relatively site-specific and has limited applicability in Africa, where use of insecticide-treated nets is now the standard method of malaria vector control.

NEW TOOLS

20. Chloroquine resistance in Africa has caused increased mortality due to malaria, and this drug should be replaced by more effective alternatives when a significant proportion of treated cases fail to respond. There is general consensus that it is unacceptable to use a first-line antimalarial treatment with a treatment failure rate higher than 25% (at which point a second-line treatment should be used), and that steps must be taken to make plans for replacement treatment well before treatment failure reaches this level.

21. Treatment of malaria with a combination of two or more drugs, each of which targets a different biochemical pathway, can delay the onset of resistance, although the associated higher costs can be prohibitive for national control programmes. Artemisinins combined with other antimalarial treatments offer distinct advantages: they produce rapid cure, there is as yet no documented resistance, and they are generally well tolerated. The ability of these combinations to delay the emergence of drug resistance is supported by evidence from Thailand since 1995 and more recently from Cambodia and Viet Nam. Their availability should make it possible to avoid the frequent changing of standard malaria treatment, which jeopardizes quality of care. An important body of research on combination antimalarial treatments in Africa has been generated under the leadership of the Special Programme for Research and Training in Tropical Diseases.

22. A technical consultation convened by WHO in 2001 strongly endorsed the potential of combination treatment for use in Africa and called for regional and national studies to assess the possibility of its incorporation into national policies. National programmes, scientific partners and WHO are giving high priority to this approach, and some African countries have already decided to include artemisinin-based combination treatment in their national policies.

23. In a separate initiative, WHO signed an agreement in 2001 with a pharmaceutical manufacturer to supply artemether/lumefantrine, an artemisinin-based drug combination, at a negotiated price to governments and nongovernmental organizations. The combination's high cure rate and shortened therapeutic schedule are expected to improve patient compliance and to result in the effective management of malaria in situations where levels of resistance to conventional drugs are high. In its most recent meeting (Geneva, 15-19 April 2002), the WHO Expert Committee on the Selection and Use of Essential Medicines recommended this combination for inclusion in the WHO Model List of Essential Medicines for use in areas with significant drug resistance.

24. Several public-private partnerships have recently been formed specifically to meet the need for better tools to control malaria. The Medicines for Malaria Venture is one such partnership set up to

foster and accelerate research on innovative and affordable antimalarial drugs. The Venture aims to produce one new antimalarial drug every five years.

25. The need for malaria vaccines is being tackled by, among others, the multilateral Malaria Vaccine Initiative, which aims significantly to accelerate the clinical development of promising candidate malaria vaccines. More than a dozen candidate vaccines are now in development, and the level of investment and intensity of effort committed to this objective are unprecedented.

MONITORING, EVALUATION AND SURVEILLANCE

26. The epidemiology of malaria poses special problems for monitoring. In highly endemic areas, children and other vulnerable groups are chronically parasitaemic, regardless of illness. Moreover, clinical manifestations of acute illness are non-specific. These features make monitoring of malaria prevalence and incidence especially difficult. Furthermore, as most of the morbidity and mortality attributed to malaria happens in or near the home, the incidence of cases in health facilities generally underestimates the disease burden.

27. Consensus is emerging that population-based surveys are indispensable to measuring the malaria burden and monitoring progress towards control. Beginning in 1999, household surveys have been conducted in 35 countries, mainly in Africa. The resulting data provide a baseline for monitoring progress in the implementation of global and country control strategies.[1] Data indicate that the average coverage, across countries, of children under the age of five years with nets is typically below 1% for insecticide-treated nets and 15% for any net. Access to antimalarial treatment for febrile children is higher, median 48%. However, most treatments are with chloroquine, the delay before treatment is unknown, and coverage with life-saving treatment is thus likely to be much lower.

28. To improve data on mortality, including those for malaria, demographic surveillance systems have been initiated or expanded in several African countries. Such systems rely on "verbal autopsies" whereby health workers enquire about the symptoms preceding recent deaths. Although lacking in precision, use of estimates based on verbal autopsy may represent the best approach at present for estimating malaria mortality on a population level.

29. While monitoring and evaluation are increasingly relying on special surveys, there is still an important role for surveillance. In parts of the world where epidemics are prone to occur, for example as a result of meteorological factors, immigration or a breakdown in health services, warning systems monitoring epidemiological or contextual indicators may help by providing timely information for decision-making. Malaria epidemics can be devastating, and WHO and other Roll Back Malaria partners support the development of warning systems and preparedness at country and intercountry levels.

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[1] UNICEF, UNAIDS, WHO. *Coordinates 2002*. Geneva, World Health Organization, 2002 (for unpublished prepublication issue see document WHO/CDS/2002.11; available at web site http://www.who.int/infectious-disease-news/IDdocs/Coordinates22.pdf).