

**SUDAN ROLL BACK MALARIA CONSULTATIVE MISSION:
ESSENTIAL ACTIONS TO SUPPORT THE ATTAINMENT OF THE
ABUJA TARGETS**

16th-20th November 2003

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1. EXECUTIVE SUMMARY

The Roll Back Malaria Board, representing the global RBM partners, requested the RBM Partnership Secretariat to conduct a series of country consultative missions to determine what additional inputs Category 1 countries would require to support the attainment of the Abuja Targets. The purpose of the country consultative missions is to re-invigorate co-operation between the RBM partnership and countries to support progress towards the Abuja Targets.

The country consultative mission to Sudan took place between 16th and 20th November 2003 and the mission team comprised Elfatih Mohd Malik (NMCP Manager), Mahmoud Weis (RBM focal person, WHO Sudan,) Hoda Youssef Atta (WHO EMRO) Alex Lang (RBM Partnership Secretariat), Chilunga Puta (Regional Centre for Quality Health Care, Kampala/EARN), Cheryl Lettenmaier (The Johns Hopkins University Health Communication Partnership/EARN and Alison Bell (Malaria Consortium East Africa/EARN).

Sudan is a low income country that has suffered from continuous civil strife in the south, leading to frequent population displacement. Sudan also suffers from drought, desertification, and periodic major floods. The health infrastructure in Sudan is extremely fractured and under-resourced. Implementation of RBM interventions is in its infancy in Sudan and further policy and strategy development is required, as are implementation plans and partnership mobilisation. Sudan is subject to a US trade embargo and has suffered from a lack of investment from bilateral and multilateral donors.

The following key essential actions were identified during the country consultative mission:

Partnership

- Expand RBM Partnership at state and local level

Case Management

- Technical Assistance Committees and State level taskforces to revise antimalarial drug policy, treatment protocol and diagnostic needs for implementation
- Review drug quantification, packing, procurement and distribution systems at all levels
- Procurement of antimalarials (ACTs) and supplies
- Review community access to anti-malarials and the links with public health care system.
- Maintain drug efficacy monitoring at sentinel sites and share results with HANMAT

ITN Coverage

- Develop ITN policy, strategy and implementation plan
- Procure long lasting insecticidal nets

IPT coverage

- Review and update situation analysis, develop MIP Policy
- Train health staff to deliver IPT; sensitise communities to MIP and IPT
- Procurement of SP

Epidemics / M&E

- Review and strengthen the epidemic surveillance system, including developing guidelines for 15 States and their sentinel sites.

Communication and behaviour change

- Integrate case management communication strategy into COMBI strategy

It should be emphasised that the gaps, resource requirements and essential actions identified are additional and complementary to those currently planned and budgeted for within existing resources in the country, including Global Fund monies.

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3. ABBREVIATIONS

ACT	-	Artemisinin-based Combination Therapy
AMD	-	Anti Malaria Drugs
ANC	-	Antenatal Care
CCM	-	Country Co-ordination Mechanism
CFR	-	Case-Fatality Rate
CIMCI	-	Community Integrated Management of Childhood Illness
COMBI	-	Communication for behavioural impactact
CQ	-	Chloroquine
EARN	-	Eastern Africa Roll Back Malaria Network
EMRO	-	Eastern Mediterranean Regional Office
FMOH	-	Federal Ministry of Health
GF/GFAM	-	Global Fund/Global Fund to fight AIDS, Tuberculosis and Malaria
GoS	-	Government of Sudan
HANMAT	-	Horn of Africa Network for Monitoring Antimalarial Therapy
IDP	-	Internally Displaced Persons
IMCI	-	Intergrated Management of Childhood Illness
IPT	-	Intermittent Preventive Treatment
IRS	-	Indoor Residual Spraying
ITN	-	Insecticide Treated Nets
LLINs	-	Long-lasting Insecticidal Nets
MICS	-	Multiple Indicator Cluster Survey
MIP	-	Malaria in Pregnancy
MSF-France	-	Medecins Sans Frontieres – France
NGO/CBO	-	Non Governmental Organizations/Community Based Organizations
NHSP	-	National Health Strategic Plan
NMCP	-	National Malaria Control Programme
PLAN	-	PLAN International
RBM	-	Roll Back Malaria
REAPING	-	Roll Back Malaria Essential Actions, Products, Investments, Gaps
RH	-	Reproductive Health
SMoH	-	State Ministry of Health
SP	-	Sulphadoxine pyrimethamine
SPLA	-	Sudanese People’s Liberation Army
TA	-	Technical Assistance
TAC	-	Technical Advisory Committee
UNICEF	-	United Nations Children’s Fund
US	-	United States
WHO	-	World Health Organization

4. INTRODUCTION

The Roll Back Malaria Board representing the global RBM partners requested the RBM Partnership Secretariat to conduct a series of country consultative missions to determine what additional inputs Category 1 countries¹ would require to support the attainment of the Abuja Targets. The RBM Partnership Secretariat requested the Eastern Africa RBM Network – which represents partners in the sub-region – to participate in these country consultative missions.

The purpose of the country consultative missions is to:

- Re-invigorate co-operation between the RBM partnership and countries to support progress towards achieving the Abuja Targets.

The expected outcomes of the missions are:

- Status of RBM implementation in relation to the Abuja plan and targets and the milestones set for the remaining two years of the Abuja plan period
- Identification of the essential actions (beyond those already planned) that need to be implemented during 2004 and 2005 to maximise country action to achieve the Abuja Targets
- A Country Support Package that details the additional investments required to carry out these essential actions

The mission team comprised: Elfatih Mohd Malik (NMCP Manager), Mahmoud Weis (RBM focal person, WHO Sudan,) Hoda Youssef Atta (WHO EMRO) Alex Lang (RBM Partnership Secretariat), Chilunga Puta (Regional Centre for Quality Health Care, Kampala/EARN), Cheryl Lettenmaier (The Johns Hopkins University Health Communication Partnership/EARN and Alison Bell (Malaria Consortium East Africa/EARN).

5. METHODOLOGY

The mission focused on the Northern States of Sudan currently under GoS control, reported to comprise between 18 and 23 States, however, most of the population data and target interventions refer to the whole population of Sudan, which results in inconsistencies in coverage reported. The peace deal between GoS and SPLA is about to be signed, and progress needs to be made in strengthening the north-south malaria control partnership. Further political advances are required before it is possible to assess malaria control needs across the whole of Sudan. For this reason a separate mission has been planned with malaria control partners currently operational in the southern states of Sudan and southern Sudan support needs will be documented in a separate report.

The methodology employed included a document review (see Annex 3), interviews with Ministry of Health personnel and partners at Federal and Gazera State level (see Annex 1) and culminated in a Consensus Meeting (see Annex 2).

Following the Consensus Meeting, the Essential Actions and Country Support Package were revised accordingly and next steps agreed on with the Undersecretary of Health and NMCP Programme manager, Federal Ministry of Health.

¹ The RBM Partnership Secretariat categorised African countries into 3 groups. Category One countries are those considered most ready to rapidly scale up the coverage of interventions. Sudan is classed as a Category One country.

6. SUMMARY SITUATION ANALYSIS

Sudan is classified as a low income country and has suffered from continuous civil strife in the south, leading to successive waves of population movements, coupled with drought and desertification, major floods in the north and a severe loss of human resources, especially in the health sector. This has resulted in an extremely fractured and under-resourced health infrastructure.

6.1. Malaria transmission and burden

Malaria is the leading cause of morbidity and mortality in Sudan, with an annual estimated 7.5 million clinical cases and 35,000 deaths.² *Plasmodium falciparum* is the dominant parasite and the principle mosquito vectors are *Anopheles arabiensis*, *An. gambiae* and *An. funestus*.

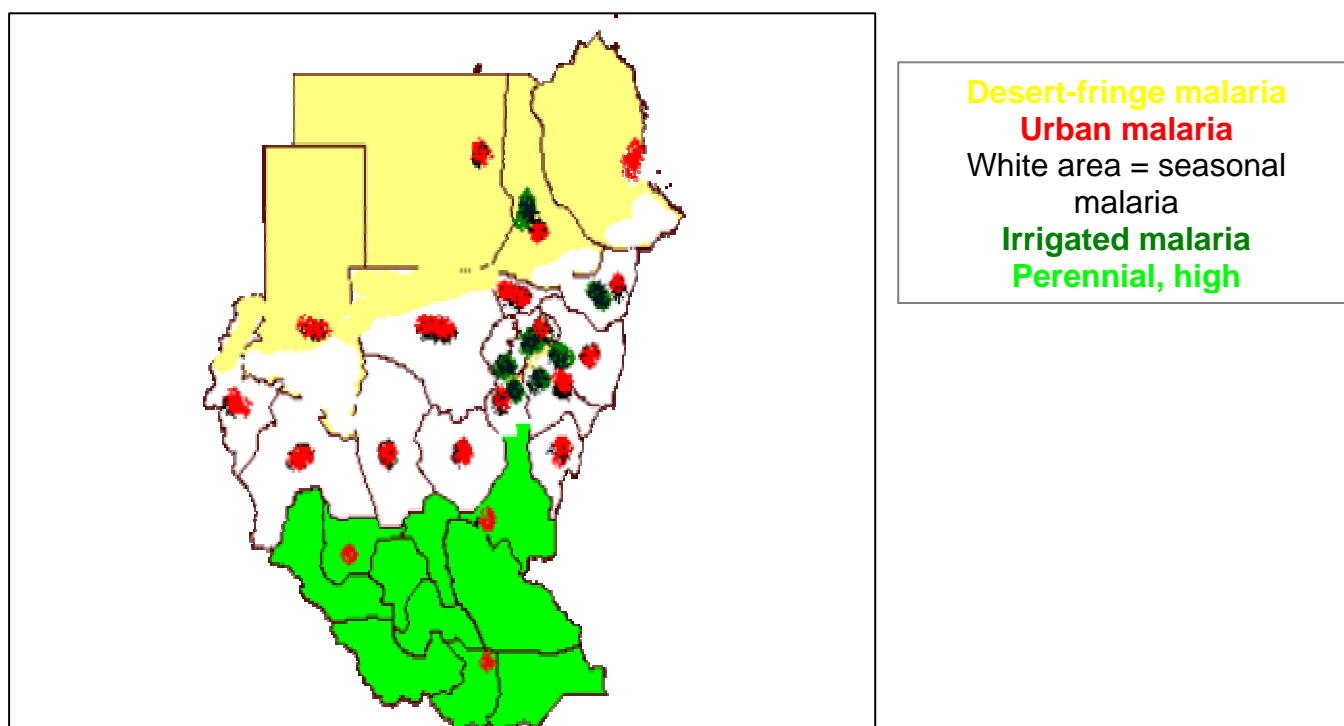


Figure 1: Transmission of malaria in Sudan. (NMCP data)

² RBM in Sudan: Achievements, Constraints, and Challenges. Progress Report 2002. NMCP, FMOH, Sudan

Table 1: Malaria endemicity in Sudan, with details of populations affected and interventions employed

Stratum	Endemicity	Population	States	Selected Interventions
Desert fringe	Hypoendemic	2,000,000	Northern, River Nile, Red Sea except Port Sudan and North Darfour except Elfashir	Case management, ITNs, source reduction where appropriate (with community involvement), IRS during emergency, epidemic preparedness
Poor savannah with seasonal malaria	Hypoendemic Mesoendemic	15,000,000	Rural areas in Greater Darfour, Kordofan, Blue Nil, White Nile, Sinna Gezira Gedarif, Kassala, Khartoum	Case management, ITNs, IRS during emergency, epidemic preparedness
Stable perennial transmission	Hyperendemic	4,000,000	Southern Sudan	Case management, ITNs and IPTs.
Urban malaria	Hypoendemic Mesoendemic	8,000,000	Khartoum and all large cities e.g. Port Sudan, Wad Medani	Case management, ITNs, source reduction where appropriate (with community involvement), larviciding, IRS during emergency
Irrigated Schemes	Usually in the mesoendemic zones	2,000,000	All large- scale irrigated schemes (Gezira, Elrahad, Kinana, Asalia, West Sinnar, New Halafa and Elzidab)	Case management, ITNs, targeted IRS, IPTs, source reduction where appropriate (with community involvement) during emergency

6.2. Policy and strategy environment and partnerships

The National Health Strategic Plan (NHSP) was developed in the political context of the federal system adopted early in the 1990s; “The system is founded upon a multi-tiered government; federal, state and local governments. The federal level is concerned with policy making, planning, supervision and co-ordination. The State governments are empowered for planning, policy making and implementation at state level”³

The *Country Strategy Notes* formed the framework for national health policy covering 1992-2002, and used as its basis the primary health care approach. A new strategic plan with a 25 years time frame is in the final stages of development. This document was not available during the mission.

The health sector operates in the context of a US trade embargo. This has led to a lack of engagement of bilateral partners. Funds that are allocated to Sudan are usually prioritised for emergency relief/humanitarian activities as opposed to longer term development activities. The NGO sector is a relatively new phenomenon in the North and there is a small underdeveloped private sector. RBM was launched in Sudan in 2001. Since then a RBM focal person has been recruited by WHO and RBM teams are present in 13 States. However, country partners consider that the partnership is effectively new and remains underdeveloped.

³ NMCP Sudan; RBM Progress Report on Abuja Targets as outlined in Abuja Declaration Plan of Action.

6.3. ITNs and other vector control measures

The NMCP is housed within the **national malaria, schistosomiasis and leishmaniasis control programme**, and consequently, integrated vector control programmes are implemented wherever possible. However, to date funding has not been forthcoming for the other two disease areas despite incidence rates as high as 38/1000 and CFR as high as 20.5% for visceral leishmaniasis, reported in population based surveys.⁴

ITN programmes have been limited to small scale NGO / CBO projects using a variety of different delivery mechanisms, often targeted at IDP populations or in insecure areas. Evaluations of these projects demonstrate that ITNs are an acceptable product that populations will use. Work by Oxfam and the manufacturer Vestergaard-Frandsen in Southern Sudan has led to the development of the Dumuria™ net, which is more acceptable to the Neur population as it is opaque and provides privacy for the users.

In 2000 a UNICEF / FMOH MICS survey found that 7.2% of children under five years of age had slept under an ITN in the previous two weeks. However, many question whether these data really refer to insecticide treated nets, given the relatively few efforts that have been targeted towards re-treatment.

The challenges remaining in the area of ITNs are:

- Affordability of, and poor access to, ITNs, particularly for rural communities
- Lack of Ministry of Health standards and specifications for nets and insecticides
- An underdeveloped ITN commercial market
- Lack of net re-treatment facilities and supplies of insecticides

The NMCP has drafted a strategy which aims to achieve over 80% of the target population sleeping under ITNs by 2008. Efforts towards this goal will be significantly assisted by the arrival of GFATM funds. However, there is ongoing debate as to how these nets should be delivered, with some disagreement about use of targeted subsidies versus free distribution of nets. There is also debate about the type of net to use and whether or not a long lasting net should be introduced. These questions need to be fully discussed and consensus among all stakeholders reached as a matter of urgency. The ITN taskforce which has been established is an excellent mechanism for this.

The NMCP in collaboration with WHO EMRO have drafted a Communication for Behavioural Impact (COMBI) Plan to scale up the use of ITNs in a phased way so that 12 states will be covered at the end of the first year and then 14 States by the end of the second year. However, this plan is only 20% funded.

The idea of local manufacture of nets was raised by the Under Secretary for Health as Sudan has a good textile industry. This opportunity could be explored in the future once the private sector becomes stronger.

During the REAPING mission visit the Ministry of Finance endorsed the Presidential Decree to remove taxes and tariffs on insecticides and nets imported into Sudan.

Other vector control measures employed include:

⁴ Draft National ITN Strategy, 2004-2008. Republic of Sudan

- Indoor residual spraying (IRS) in the epidemic prone areas. Insecticides used are deltamethrin and permethrin. IRS is deployed on the basis of feedback from the malaria early warning system
- The use of larviciding in urban centres such as Madani, Gazera and Khartoum
- Intermittent irrigation in private and Government irrigation schemes, although numerous leakages from irrigation channels are reported, with potential consequences in terms of increased mosquito breeding
- Limited use of *Gambusia* fish for biological control of mosquito larvae, which will be expanded with the arrival of GFATM monies.

In 2002 an insectary and entomology laboratory were established at Federal level with WHO support.

6.4. Access to effective treatment

Health care is provided at three different levels in Sudan: the primary care level constituting 95% of facilities (i.e. PHC unit, dressing stations, dispensary and health centre), the secondary referral level (i.e. general or rural hospitals), and the tertiary level (i.e. provincial or specialist hospitals). Primary health care facilities, excluding health centres, are administratively under the responsibility of the local administrative councils and “technically” under the State Ministry of Health (SMoH). Secondary care facilities and health centres are under the exclusive control of the State Ministry of Health. This complicated management system leads to difficulties with both human resources and supplies of essential drugs, as the lower level facilities do not receive federal support and so are dependent on State and community support. The poorer States less able to adequately fund these facilities are likely to be those in greatest need.

There is no culture of free health care provision in Sudan and patients must pay for both diagnosis and treatment. With over 50%⁵ of the population living below the poverty line, cost remains a major barrier to health care accessibility. There is also a sharp disparity between rural and urban health care provision, with West Darfur State reporting that 40% of its population live in a “red zone” meaning that these people have no access to any services for health, education, sanitation, etc. The Federal Ministry of Health Annual Statistics Report of 2002 states that only 15% of the total population have access to essential drugs.

Interestingly the TB programme has managed to provide drugs free of charge to patients via special clinics set up in existing facilities. In the past even when drugs have been donated free of charge at either Federal or State level, the patient was still required to pay in order to recoup administration charges for the delivery of the drugs down to facility level. This policy is currently being discussed as it will affect the delivery of GFATM drugs.

There appears to be little documented evidence of usual treatment seeking behaviours for malaria in Sudan. These are likely to vary across the different epidemiological settings.

The current antimalarial drug policy is chloroquine (CQ) for first-line, sulphadoxine-pyrimethamine (SP) for second-line and quinine for severe malaria. The antimalarial drug efficacy monitoring to date shows that CQ parasitological failure at 14 days is between 36-45%. The current antimalarial drug policy is not widely adhered to in the public health sector, with artemether, mefloquine and halofantrine all being used. This has been attributed to rather unclear clinical guidelines which do not give clear indications for 1st, 2nd and 3rd line

⁵ WHO Sudan Country Cooperation Strategy 2004-2007.

treatments. There is also widespread use by the community of different drugs provided by an unregulated private sector.

According to the limited data available Sudan appears to fall in the “change” phase of the WHO guidelines for the antimalarial drug policy change process. A technical working group has been formed (TAC) and at a workshop in October 2003 discussions began regarding a new treatment policy. The decision was taken to move to some form of combination therapy, however, the programme and partners are yet to agree on what this should be. MSF-France are strongly advocating for the introduction of ACTs as are WHO/RBM Geneva. However, both partners recognise the huge logistical and diagnostic challenges of introducing such a policy within the context of the existing health infrastructure. Supporting data on the efficacy of different combination therapy options are currently being collected to help inform the policy decision-making process.

In the majority of cases the diagnosis of malaria is still based on clinical signs. Facility based IMCI training has occurred in 15 of the 26 States, however, cIMCI is still only at the pilot phase in one District in each of six States. For hospitals and some health facilities that perform laboratory diagnosis there is a quality control system that regularly cross checks positive slides, but usually finds a high proportion of false positives.

A case fatality rate of up to 30% for severe malaria has been recorded at some hospitals and it was in response to this that WHO supported a malaria mortality reduction project in 3 sites. This project has demonstrated some success and the programme is eager to expand this to other areas of need.

There have also been some community projects that have explored the role of community health workers for the delivery of health education and selected interventions. The NMCP would like to investigate the possibility of developing a strategy that will improve access to appropriate treatment for malaria at the community level.

6.5. Malaria in Pregnancy

In a recent situation analysis undertaken by the NMCP it was reported that 52% of women attended antenatal care (ANC). It was not clear if these data applied to a single visit, or to the WHO-recommended four visits. Of those patients seen at ANC services, 85% go on to deliver at home. ANC is frequently provided externally to health facilities and the providers may not be formally trained. Moreover, providers are not authorised to dispense drugs, rather only to provide preventive and delivery services.

There is currently no policy on chemoprophylaxis/preventive treatment or case management of malaria in pregnancy in Sudan. A pilot of Intermittent Preventive Treatment (IPT) in two stable transmission areas is planned by PLAN / UNICEF. Sulphadoxine-pyremethamine will be the drug used. There are widespread community beliefs that antimalarials, as well as other drugs, cause foetal deaths when taken in pregnancy and there is generally little recognition of the risk of malaria in pregnancy.

6.6. Malaria Epidemics

Two thirds of the country is classified as epidemic prone, which equates to 16 States. A Malaria Early Warning System has been established in each of these States. Since 2001 no outbreaks have been detected. This may indicate a low sensitivity of the early warning system, particularly given that the system only compiles data at State level. Buffer stocks of drugs are held at State level to ensure a timely response should an epidemic be detected. A recent

experience with flooding in Kasaala State demonstrated that the system for mobilising resources works.

WHO HQ/EMRO are supporting an “intensified surveillance for forecasting and early detection for malaria epidemics” project in five States. The project will include the calculation of epidemic thresholds. It was stressed that this needed to be at the lowest level possible.

6.7. Communication and Community Mobilisation

There is an active IEC team within the NMCP that was involved in the development of the COMBI (Communication for Behavioural Impact) strategy for ITNs with technical assistance from WHO/Geneva; however, they lack physical resources and communication expertise to implement this ambitious plan, especially outside Khartoum. The WHO COMBI Team, based in Tunis, are committed to providing some technical assistance for implementation.

The IEC team has been actively involved in celebrations of Africa Malaria Day, developing radio, print and television messages at the national level and working with selected communities and schools for malaria control activities. In May 2002, various elements of the mass media, including the National radio station signed a commitment for free broadcasting of malaria messages. That agreement is still in force. The Radio Station broadcasts ten different messages scripted by the National Malaria Control Program in Arabic and Juba Arabic. These messages cover home management of malaria, use of ITNs and health seeking behaviour. The messages are linked to seasons and are intensified in the autumn.

NGOs and CBOs remain a developing concept in Sudan and are most active in cities, internally displaced persons camps, or in the areas of insecurity. They report that there is little donor funding available for them to undertake malaria communication activities, and most communication about malaria is integrated with other primary health care messages. Consequently, community based malaria communication efforts are limited in scope and reach.

However, there are good examples of community-based malaria control initiatives. For example, D'TaSi assisted 54 villages to form health committees, and recruited health volunteers from among the youth. In collaboration with the State and Federal Ministries of Health, D'TaSi trained the health volunteers to conduct malaria education, IRS, larviciding, and to report fevers to the health committees. D'TaSi also organised an ITN distribution and re-treatment using health volunteers and cluster representatives. Awareness and demand was so high that they could not procure nets quickly enough.

Plan International is also implementing a community based malaria behavioural development project funded by GlaxoSmithKlein in White Nile State with interventions very similar to D'TaSi.

6.8. Supportive Strategies: monitoring and evaluation, and partnerships

The programme has made considerable progress in ensuring that surveillance data are received at Federal level and since July 2001 there has been a weekly reporting system from 294 sentinel sites, however, this is not incorporated into the Integrated Disease Surveillance System, as this does not function very efficiently (personal communication, NMCP manager.)

There are limited baseline data available regarding malaria control interventions and no means of tracking progress towards Abuja. The monitoring of progress of malaria control interventions and progress in coverage are not only important to determine the progress of

programme interventions, but also can be used for advocacy with donors and or communities to demonstrate the impact of interventions.

In addition, it is a pre-requisite for the release of GFATM funds that adequate reports are submitted in a timely manner. All eight objectives contained in the GFATM proposal are measured using only process indicators, however, a baseline survey has been budgeted for under the Global Fund proposal, to establish the starting point. A system to enable routine collection of data on indicators to enable monitoring of the outcomes of interventions and, in the longer term, the impact of such interventions needs to be developed and implemented.

A regional initiative that will assist the NMCP Sudan with the collection of drug efficacy data is the launch of the Horn of Africa Network for Monitoring Antimalarial Therapy (HANMAT). Their inaugural meeting will be in Khartoum in January 2004.

An essential feature of the Roll Back Malaria movement is the concept of partnerships. A RBM co-ordination mechanism for malaria was established in 2000. This has now evolved into the Country Co-ordinating Mechanism (CCM) for the management and oversight of GFATM funds. There is also an NGO forum. Examples of existing in-country partnerships are:

- The malaria-free initiatives, in Gazera and Khartoum States
- GSK/Plan Sudan/NMCP in White Nile.
- The Gambia Project, between GoS and Government of Egypt
- Shell Sudan and NMCP,
- Talisman/ Detasi community project,

6.9. Malaria Control and Health systems

There is extremely high level political support for malaria control in Sudan. There is a Higher Committee for malaria and other communicable disease control headed by his Excellency the Vice President. Malaria continues to be an agenda item on cabinet meetings both at Federal and State levels. The high political profile of malaria needs to be capitalised on.

Organisation of malaria control

The NMCP is housed within the vector control unit of the Federal Ministry of Health and is headed by the Director-General of the Malaria, Schistosomiasis and Leishmaniasis control programme. This programme has a professional staff of 42 in eight departments: namely, vector biology and control, control of epidemics/surveillance, quality assurance of treatment and drugs, IEC, training and research, multiple prevention, state affairs, and administration and finance. In addition, there are 19 State Malaria control programmes, with vector control, case management and IEC persons present at each State level. With the arrival of Global Funds the programme is advocating for an expansion to 26 State RBM Co-ordinating Committees and 134 RBM District Co-ordinating Committees.

There is some inter-departmental collaboration within the MoH. For example, some joint planning with IMCI regarding training of health workers in diagnosis and case management. There have been linkages formed with the Directorate of Reproductive Health (FMoH), School Health, EPI and TB. These programmes currently place differing priorities on malaria control. For example, Reproductive Health do not see that malaria contributes to their burden of maternal mortality and considerable advocacy is required to raise awareness among other programmes and sectors.

Health systems development

Health care is delivered through a decentralised health care system, comprising 26 states, each with a Minister for Health. Whilst this State Ministry is politically powerful, it frequently does not have sufficient control over resources to enable translation of policy into implementation.

The health system is currently fragmented, with inequitable distribution of resources and accessibility, which is exacerbated by poor health infrastructure due to sustained under investment and in some case destruction due to the ongoing civil conflict.

With the advent of peace there will be greater opportunity for investment and development of the health system to ensure improved access to better quality of care.

Human resources

At Federal level in 2002 there was a large investment in training of NMCP staff with three gaining Higher National Diplomas and four completing a course on planning malaria control within Sudan. There are no vacant posts within the NMCP. However, an ongoing issue is the redeployment of specialist staff after a short time with the programme. Such “key staff” should be retained for a minimum time period to enable returns on the investments in training made by donors to be realised. The Under Secretary of Health has said that he will attempt to follow up on this issue and explore the possibility of civil servants, such as NMCP staff, being rewarded non-fiscally for their commitment, through free housing, schooling etc.

The NMCP and Under Secretary for Health reported a very high staff turnover at local level and low staff motivation, especially at State Level

There is a national malaria control training centre in Sennar, but it is in a very poor state. The seven medical schools of Sudan use vastly different malaria curricula and these require standardisation.

Logistics

At the central level, the NMCP cites logistics as a problem despite the donation of a four-wheel drive vehicle by UNICEF in 2002. Logistical constraints limit supervision visits by the NMCP. In addition, the need for security clearance and the shifting security situation makes providing support and supervision across the country extremely difficult.

In 2002 the Federal Ministry of Health donated twelve new 4WD vehicles and WHO donated three 4WD to the States to assist with supervision. However, given the overall size of the country and the constituent States, provision of sufficiently frequent support and supervision to lower levels remains a major challenge.

Financial resources

The average per capita spend on health is US\$3.00, 60% of which originates from the government. There are marked differences in the allocation of resources between States as well as between urban and rural areas.

There is an agreement between the States and Federal level that the Federal Ministry of Health will provide 35% of supplies and equipment and the States will provide the remainder. However, many States are not providing the shortfall in funding. In addition, some States receive no Federal contribution (NMCP 2002 report).

The NMCP budget for 2002-2003 is US\$6,700,000 of which US\$4,800,000 has been met by the Government of Sudan. A need remains for greater engagement in Poverty Reduction Strategy discussions at Federal level, to ensure that malaria control activities are prioritised within this strategy.

7. ABUJA TARGETS – WILL THEY BE MET?

The Abuja Targets are:

- 60% of under-fives and pregnant women sleeping under ITNs by 2005.
- 60% of pregnant women receiving IPT1 and IPT2 by 2005.
- 60% of under-fives with fever receiving effective treatment within 24 hours by 2005.
- 60% of epidemics are detected and responded to within 2 weeks of onset

It should be emphasised that given the current health system and low level of malaria control activities in Sudan, the NMCP and RBM partners will have made enormous progress controlling malaria if they attain the 2005 coverage levels given below despite these being lower than the Abuja Targets.

Due to the lack of empirical data and models that would allow us to make firm estimates, the estimates given below should be interpreted as broad indications.

7.1. ITN coverage among under-fives

Currently, Sudan has very low ITN coverage. Existing nets are often of poor quality and few are treated with insecticide. There is generally poor availability of quality ITNs in the country and very little private sector interest. The large size of the country presents additional constraints to providing geographical access. Therefore a phased approach to ITN distribution has been advocated by in-country partners. Twelve States will be targeted for implementation during 2004 and this will be expanded to 14 States by 2005.

It is estimated that by the end of 2005, 25% of pregnant women and under-fives will be sleeping under an insecticide-treated mosquito net if the following occurs:

Year	Assumptions and actions
2003	<ul style="list-style-type: none"> • Coverage was estimated based on available data from MICS (2000) • Coverage is 7.6% (North) • The ITN taskforce is reactivated to strengthen co-ordination and gain broader partnership involvement • There is endorsement of the presidential decree on the removal of taxes and tariffs by MoF
2004	<ul style="list-style-type: none"> • The ITN strategic plan is finalised and consensus is built around this document, which results in a draft implementation plan including the targeting mechanism, M&E system and quality standards for netting materials and insecticides to be used • The private sector is lobbied to begin importing good quality ITNs and expanding their distribution network within Sudan • Targeted subsidy scheme in place in 12 states • The COMBI strategy is implemented for community sensitisation on ITNs to create demand • Coverage increases to 15%
2005	<ul style="list-style-type: none"> • There is expansion of the COMBI strategy, including a community net retreatment programme • The partnership continues to expand and there is continued development of the private sector, so that prices of ITNs begin to fall • Targeted subsidy scheme expands to 14 states • Community based NGO projects continue

- Coverage increases to 25%..

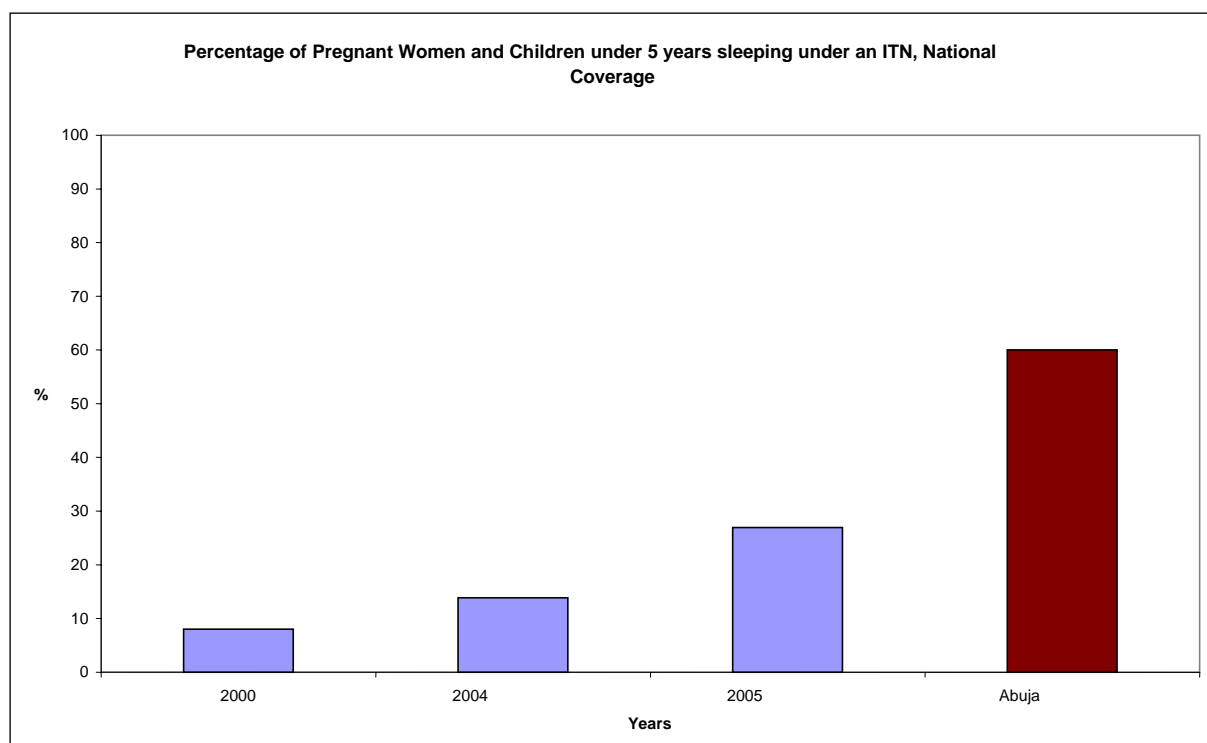


Figure 2: Percentage of Pregnant Women and Children Under 5 years, Sleeping Under an ITN

NB. An important assumption for this target is that Global Funds are released and additional funds are found to implement the COMBI plan for ITN sensitisation. In addition, a decision must be taken regarding the use of long-lasting insecticidal nets (LLINs). If LLINs are used the community re-treatment programme activities and money can be re-programmed for LLIN procurement to offset the higher cost of LLINs.

7.2. IPT Coverage Among Pregnant Women

Intermittent Preventive Treatment (IPT) is only recommended as a malaria prevention strategy in areas of stable, high transmission and therefore the 12 States that represent this epidemiological situation have been selected for this intervention. Currently not all of the 12 States selected for implementation are under the control of the Government of Sudan.

It is estimated that by the end of 2005, 20% of pregnant women living in hyper-endemic transmission areas will be receiving 2 doses of IPT (both doses) if the following occurs:

Year	Assumptions and actions
2003	<ul style="list-style-type: none"> • Coverage was estimated based on available data from RH, FMoH • Coverage is 0% (both doses).
2004	<ul style="list-style-type: none"> • Review existing MIP situation analysis • Pilot of IPT will be undertaken by Plan / Unicef • MIP policy will be developed and consensus built around this with key stakeholders e.g. obstetricians, women and other health care workers • An implementation plan for MIP interventions will be developed including a mechanism for SP delivery through ANC providers • IEC materials and guidelines for ANC providers and communities will be produced • Additional SP will be procured with GFATM funds • Coverage increases to 10%.
2005	<ul style="list-style-type: none"> • There will be an IEC campaign for pregnant women and decision makers in households on MIP interventions • ANC providers will be sensitised to MIP / IPT interventions

- In parallel, pregnant women may be targeted for ITN distribution (mechanism yet unknown) and this may increase ANC uptake and quality
- Coverage increases to 20%.

It is noted that these targets for coverage set by the NMCP in November 2003 are different to those given in the Global Fund proposal.

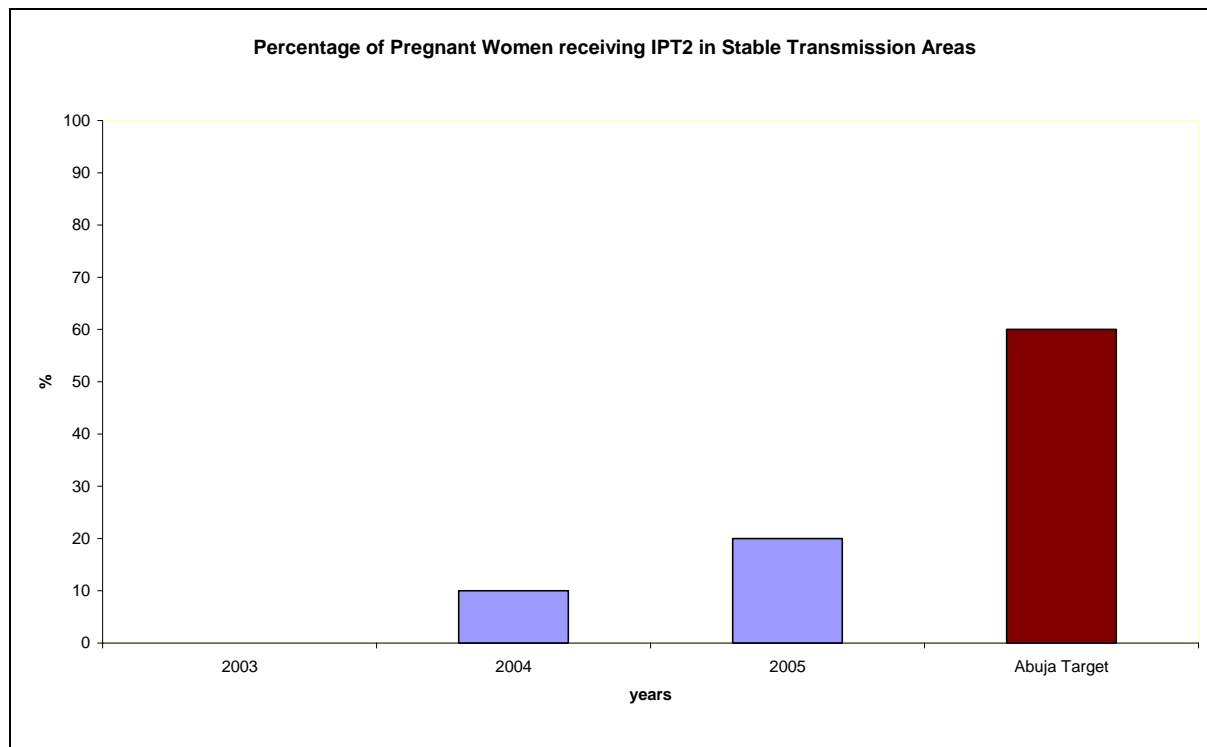


Figure 3: Percentage of Pregnant Women Receiving IPT2 in Stable Transmission Areas of Sudan

NB. An important assumption for this target is that Global Funds are released, health workers and communities accept IPT as a strategy and that the drug delivery system enables access to this intervention as part of a complete Antenatal Care Package.

7.3. Access to Effective Treatment for Children Under-five Years

It is estimated that by the end of 2005, 30% of under-fives with fever will be receiving effective treatment within 24 hours if the following occurs:

Year	Assumptions and actions
2003	<ul style="list-style-type: none"> • Coverage was estimated based on available data from anecdotal evidence from programme • Coverage is 5-10%
2004	<ul style="list-style-type: none"> • Consensus built on choice of drugs for new policy and policy finalised • Quantification and procurement of drugs in an appropriate formulation to support implementation of new AMD policy • There is a review of diagnostic capacity and needs with specific regard to quality assurance (QA) and implications of the new AMD policy • A situation analysis of current home-based management of fever is undertaken and options for incorporating this into the new AMD policy is explored. • There is dissemination of the new policy via updated treatment guidelines to health workers in private, NGO and public facilities, through linkages with other FMOH programmes • Work with CMS to improve drug delivery system & lobby politicians to provide free antimalarial treatment • Ongoing drug efficacy studies at sentinel sites and attendance at HANMAT

	<ul style="list-style-type: none"> Operational Research is undertaken on the barriers to accessing effective case management (GFATM funded) Communities are sensitised to malaria treatment and the new policy using COMBI methodology There is reinforcement of existing RBM state teams for strengthening case management There is provision of basic equipment to primary health care facilities Coverage increases to 15%.
2005	<ul style="list-style-type: none"> Scale up of training of health workers in new AMD policy Ongoing use of COMBI strategy to sensitise communities to new drug policy Ongoing QA monitoring of diagnostic capabilities Ongoing drug efficacy monitoring Improved regulation of the pharmaceutical private sector Improved essential drug distribution Coverage increases to 30%.

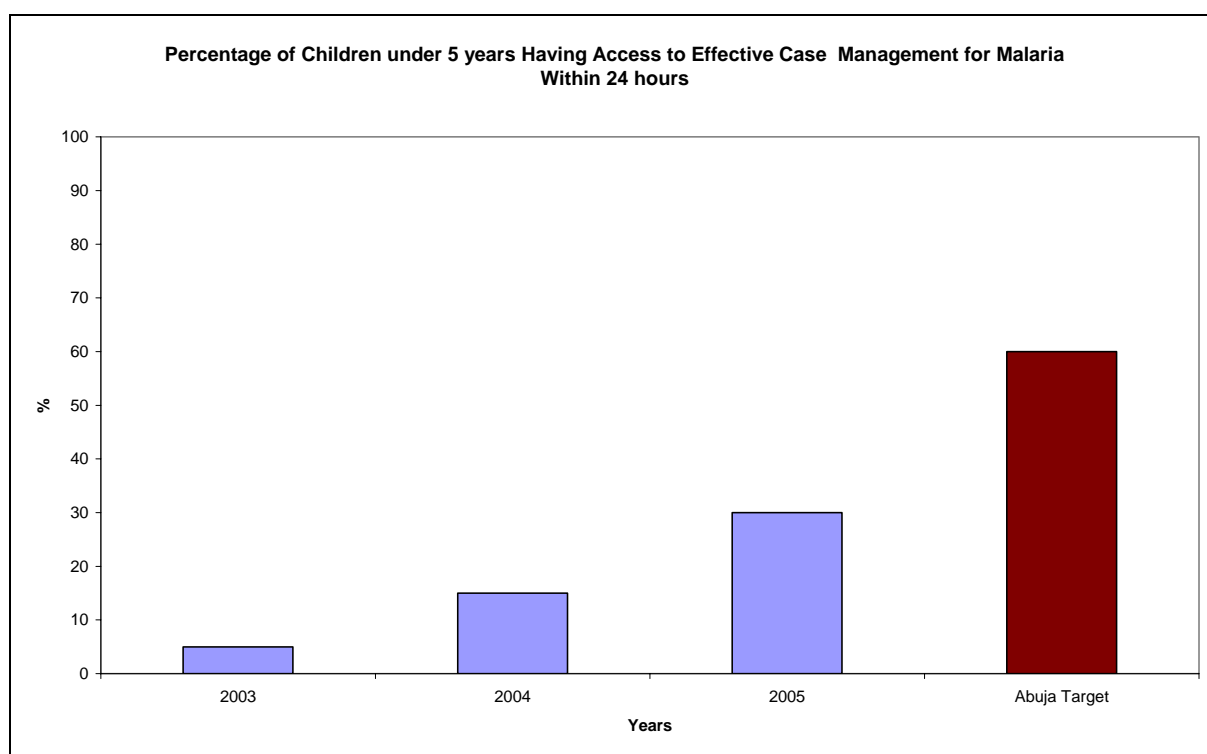


Figure 4: Percentage of children under 5 years who have access to effective treatment for malaria within 24 hours.

NB. An important assumption for this target is that Global Funds arrive, consensus can be reached on the new AMD, and a source of pre-packaged drugs that are pre-qualified can be identified promptly and delivered.

7.4. Epidemics

It is estimated that by the end of 2005, in the 16 States that are epidemic prone 20% of epidemics will be detected and responded to within two weeks of onset if the following occurs:

Year	Assumptions and actions
2003	<ul style="list-style-type: none"> It is reported that there have been no outbreaks or epidemics in the last 2 years. However, due to the low sensitivity of the malaria early warning system, the current detection and response rate is unknown.
2004	<ul style="list-style-type: none"> The 294 sentinel sites have epidemic thresholds determined on the basis of available data and these are communicated to State level to ensure identification before data compiled for

	<p>the whole state</p> <ul style="list-style-type: none"> • Sentinel sites have wall charts of epidemic thresholds for their own geographical area • Sentinel sites continue to function and communicate with both the State and then indirectly the national level • Guidelines are developed for the functioning of sentinel sites • State and Federal levels continue to hold buffer stocks of supplies to enable rapid mobilisation and response • There is training of rapid assessment & response teams at State level (with GFATM) • There is capacity building of MEWS teams, with annual refresher training • Coverage increases to 10%
2005	<ul style="list-style-type: none"> • Ongoing functioning of sentinel sites • Improved capacity of sentinel sites to detect and respond to epidemics • Coverage increases to 20%

NB. An important assumption for this target is that Global Funds are released; health workers continue to compile reports and the existing work with WHO achieves its goals, to set epidemic thresholds. In addition, security needs to remain stable to enable access to populations suspected to be at risk of epidemics.

Summary

Many of the interventions whose coverage were targets of the Abuja declaration are in their infancy in Sudan and require policy and strategy development, implementation plans and partnership mobilisation. Sudan has suffered from a lack of investment from bilateral and multilateral donors and so Sudan will be making the first steps towards Abuja.

8. THE ESSENTIAL ACTIONS

The essential actions given below are those deemed necessary by the RBM Country partnership, EARN and RBM Secretariat to accelerate implementation and reach the coverage rates given in the previous section.

It should be emphasised that these essential actions only include those that are *not* currently planned and budgeted for within existing resources in the country, including Global Fund monies.

8.1. ITNs

There is currently only a draft strategy for ITNs and no consensus exists as to which mechanism should be used for the distribution of these nets, how they will be targeted and which nets should be used. Therefore essential actions to achieve 25% coverage with ITNs of children under 5 years and pregnant women by 2005 are as follows:

Proposed Actions:

- Provide international TA to support the ITN taskforce to build consensus and prepare an ITN policy and strategic plan as well as an implementation plan detailing the targeted subsidy mechanisms that will be used. In addition, support is needed on deciding on the national strategy for re-treatment, or if only LLINs are to be used.
- Identify funding for an additional 300,000 ITNs for the first year and 703,000 for the second year.

8.2. Malaria in Pregnancy

Currently, Sudan does not have a MIP policy. There is little awareness amongst health workers, the Reproductive Health department or communities regarding the contribution made

by malaria in pregnancy to maternal mortality and low birth weight babies. These are major barriers to scaling up MIP interventions, therefore the following essential actions are proposed:

Proposed Actions:

- Review and update existing MIP situation analysis
- International TA to assist the NMCP and RH programmes to design sustainable mechanisms for the delivery of MIP interventions, specifically IPT in hyperendemic transmission areas of Sudan, and the development of training manuals and IEC materials to support the implementation of the policy
- Additional procurement of 132,000 doses of SP to cover the target population.

8.3. Case Management

There is currently very poor health infrastructure and subsequently very poor access to primary health care, especially in rural areas. The private and informal sectors are widely consulted for treatment of fever and community-based care is the norm for malaria. Without key health systems issues being adequately addressed to ensure access to acceptable, affordable treatment there will be no improvement in case management of febrile illness. Therefore the following actions are proposed:

Proposed Actions:

- Provide technical assistance to enable revision of the AMD Policy, treatment protocol and diagnostic needs for implementation
- Quantify drugs and relevant supplies required to implement the new policy. This process will include addressing regulatory and licensing issues, exploring packaging alternatives, and reviewing drug financing, procurement and distribution systems.
- Secure additional funding for procurement of drugs for the implementation of the new AMD policy to supplement the GFATM monies
- Develop and communicate new treatment guidelines and develop a strategy for improving compliance with guidelines for health staff at all levels of the health system, possibly to include private sector
- Review community access to antimalarials and the links with the public health care system. Undertake a needs assessment of community / home based management of fever initiatives or strategies that could be utilised and synchronised with the new antimalarial drug policy.
- Recruitment and equipping of six zonal / regional facilitators to reinforce existing State RBM teams for case management strengthening and regulating use of private sector
- Provision of basic equipment and supplies to peripheral health facilities to enable appropriate case management
- Continuation of drug efficacy studies as well as attendance at HANMAT meetings and engagement with other regional partners on this issue

8.4. Epidemics

Given the unstable nature of malaria transmission in much of Sudan, it is vital that a sensitive Malaria Early Warning and Response System is in place. To achieve this the following actions are proposed:

Proposed Actions:

- Establish guidelines for the functioning of sentinel sites
- Develop wall charts for each sentinel site to indicate epidemic thresholds for their catchment populations

- Capacity building for MEWS team including annual refresher training of four persons at the Federal level and three people per State on the calculation of epidemic thresholds

8.5. Supportive Strategies:

To enable progress towards the Abuja targets it is necessary for the appropriate supportive strategies to be functioning to enable delivery of the interventions in the most effective manner possible. Communication/IEC activities will be targeted to areas where commodities / interventions will be available. For example, ITN messages will only be targeted to 12 states in 2004 and scaled up to 14 States in 2005.

Proposed Actions:

- Case management communication strategy integrated into the COMBI strategy currently designed for ITNs. This will require a four week external consultancy.
- Additional funds secured for expanded COMBI activities, in addition to those under GFATM.
- Short term consultancies to assist with implementation of the COMBI strategy (three 2 week visits 2004, four 2 week visits 2005) and capacity building for national and 12 State COMBI teams; (2 week training course in country for 20 people) and vehicle for Federal COMBI team
- Procurement of computers, printers and desktop publishing supplies for State level RBM teams in stable and epidemic-prone areas.

8.6. RBM Partnership and Management Strengthening

To rapidly scale up malaria control interventions in Sudan, the current RBM partnership will need to be strengthened as well as expanded to include new partners. Likewise, it will be important for there to be sufficient capacity at the Federal and State levels to mount a scaled up malaria response. To ensure this occurs, the following actions are proposed:

Proposed Actions:

- Recruitment of a RBM Country Partnership Advisor whose first aim will be to engage partners not currently represented in Sudan, in response to the evolving peace process, specifically bilaterals, the World Bank and ITN distributors.
- Support RBM co-ordination committees at Federal and State levels in order to broaden the partnership and foster greater ownership of malaria control at State level
- Explore alternatives for increasing the resource base of the NMCP. For example, lobbying the Ministry of Planning to dedicate a proportion of all development projects to malaria control / health activities; ensure malaria is visible in the nascent Poverty Reduction Strategy.
- Explore solutions to the problem of specialist staff retention. For example, lobby the Ministry of Health to retain malaria trained staff within the NMCP and ensure civil service entitlements are received (e.g. free schooling, housing)

9. PROPOSED COUNTRY SUPPORT PACKAGE: ESSENTIAL ACTIONS AND INVESTMENTS REQUIRED SUDAN

#	Essential actions (in addition to ongoing activities)	Products	Additional Investments needed					Meeting the Gap	
			Human resources	Commodities	Equipment	Cost 2003	Cost 2004		Cost 2005
1	Expand RBM Partnership at state and local level & advocate for expansion of malaria control activities.	Broader representation amongst country RBM partnership & greater intersectoral collaboration to ensure more rapid scale up of malaria control interventions	Country Partnership Advisor	Activities such as meetings funded			200,000	200,000	RBM secretariat
2	Technical assistance to support the absorption of increased resources delivered through NMCP	Management support to NMCP manager to ensure efficient absorption of funds & retention of specialist staff at all levels							
Case Management									
3	TAC & State level taskforces to revise antimalarial drug policy, treatment protocol and diagnostic needs for implementation	Updated AMD policy to ensure access to effective treatment for malaria	Approx 3 month TA	Meetings, transport and other activities			125,000		
4	Review drug quantification, packing, procurement and distribution systems at all levels of the health system	Requirements to successfully implement new policy identified	Approx 1 month TA	Meetings, transport & other activities			75,000		
5	Procurement of antimalarials and supplies (ACTs)	Adequate supply of drugs to implement new AMD policy		Drugs			2,200,000	2,200,000	
6	Review community access to anti-malarials and the links with public health care system. Undertake needs assessment & design pilot for home based management of fever.	Pilot project designed to help address community access to treatment for fever	TA & study tour to Uganda	Drugs, materials			150,000		
	Essential actions (in addition to	Products	Additional Investments Required					Meeting	

	ongoing activities)		Human resources	Commodities	Equipment	Cost 2003	Cost 2004	Cost 2005	the Gap
7	Reinforce existing RBM state teams through recruitment of, and equipment for, six zonal facilitators for strengthening case management	Improved support/supervision and successful implementation of the new antimalarial drug policy at health facility level; enforcement of drug legislation at State level	6 zonal facilitators		6 cars		160,000	51,600	
8	Provision of equipment and supplies to peripheral health facilities	Health facilities appropriately equipped to enable improved diagnosis (\$40/facility)			Diagnostic equipment		450,000	450,000	
9	Maintain drug efficacy monitoring at sentinel sites and share results with HANMAT	Functioning sentinel sites and sharing of data with HANMAT	Flight, visa, per diem				5,000	5,000	
ITN Coverage									
10	Develop ITN policy, strategy and implementation plan	National plan of action for delivering ITNs to the target groups in place	Technical assistance			20,000			
11	Procure long lasting nets	Increased ITN coverage among vulnerable groups					\$1,500,000	\$3,515,000	
IPT coverage									
12	Review and update situation analysis, develop a MIP Policy in cooperation with RH, HIV, IMCI and others	A plan of action , training & advocacy materials developed for implementation of IPT in malaria hyperendemic areas	Technical assistance	Meetings & advocacy materials			40,000		
13	Train health staff who provide ANC in stable transmission areas (10 States) to deliver IPT; sensitise communities to MIP and IPT	Health workers in stable transmission areas trained in the administration and recording of the administration of IPT		Training materials and trainings			60,000 (6 states)	40,000 (4 states)	
14	Procurement of SP	Adequate SP supplies to implement IPT in stable transmission areas		SP			11,000	11,000	

	Essential actions (in addition to ongoing activities)	Products	Additional Investments Required					Meeting the Gap	
			Human resources	Commodities	Equipment	Cost 2003	Cost 2004		Cost 2005
Epidemics / M&E									
15	Review and strengthen the epidemic surveillance system, including developing guidelines for 15 States and their sentinel sites .	Guidelines in place at State level and at sentinel sites	TA		Wall charts for facility & state level		32,500 (TA & 5 states)	25,000 (10 states)	
16	Capacity building for Federal and State MEWS department	Capacity in MEWS maintained at Federal and State levels					10,000	10,000	
Communication and behaviour change									
17	Integrate case management communication strategy into COMBI strategy	Integrated COMBI malaria strategy	TA				21,000		
18	Secure funds to implement case management and ITN COMBI strategy	COMBI plan implemented, and communities informed of malaria and how to prevent and treat it					620,000		
Data Management									
19	Build capacity of 12 State RBM teams in stable transmission areas and 15 State RBM teams in epidemic prone areas in malaria communication	Sufficient capacity at State level to implement large-scale malaria communication efforts			Computers & printers		81,000	13,500	

10. FOLLOW UP ACTIONS;

- The Federal Ministry of Health and National Malaria Control Programme will distribute the Country Support Package document to country partners and use it as an advocacy tool with the forthcoming World Bank / UN mission to Sudan, following the signing of the peace agreement.
- The Country Support Package will be shared with the RBM Board by the Secretariat
- Country Support Package to be shared with members of EARN
- Country level partners and RBM Secretariat to give feedback to the NMCP/MoH regarding areas of need that can be met with funding
- EARN to respond to requests for technical assistance

11. ANNEX 1. LIST OF PERSONS AND ORGANISATIONS CONSULTED

Monday 17th November

Dr Salam Han Hani Officer in Charge, WHO Sudan. Acting for Dr Guido Sabatinelli. WR Sudan

Abdallah Si Akmad; Under Secretary for Health FMOH, Chairman of CCM

Dr Rashidi Abdul Rakim, Director of the National Malaria, Schistosomiasis & Leishmaniasis Control Programme

Dr Abdul Halim, Health & nutrition. UNICEF

Dr Roberto Ebernado, waiting to be appointed Health representative UNICEF

Dr Akbal, IMCI, MoH

Dr Rogaia Abuelgasim Abedirahim, Director National Reproductive Health Programme, MoH

Dr Faudos, focal person MiP

Tuesday 18th November

Ahmed Mahmoud, Programme Support Manager, Plan Sudan

Gasim Awad, Grant Officer, Plan Sudan

Mr Mustaque Ahmed, Assistant Country Director Care

Dr Malik, Medical Co-ordinator, Care

Francoise Delfosse, Head of Mission, MSF France / Dr Jerome Artieres, Medical Co-ordinator MSF-F Sudan

Dr Adel Tadros, Deputy Medical Co-ordinator, MSF-F, Sudan

Omer Osman Mahmoud, Secretary General, Dr. Khalifa Ahmed Babikar, Dr Abdel-Rahman Hamid, Health Director, Youssif Ali Elobied, Field Coordinator Khartoum Branch, Sudan Red Crescent Society

Wednesday 19th November

Yahir Yacoub Abdel Sayed; Deputy Under Secretary Ministry of Finance and National Economy

Director of training institute at Sennar

State Representatives in Gazera District

Thursday 20th November

Mr Mutasin Fadel, Director General of National Radio

Mr Shazali Algader, Director of Afnan Audiovisual Company

Mrs Israa Zein Elabdeen, Programme presenter and radio announcer

Mohamed O. Suliman, and Dr. Omer Sulieman D'tasi

12. ANNEX 2. AGENDA CONSENSUS MEETING**RBM CONSULTATIVE MISSION; 17TH-21ST November 2003****AGENDA
STAKEHOLDERS MEETING TO GAIN CONSENSUS ON THE
ESSENTIAL ACTIONS NEEDED TO SCALE UP MALARIA CONTROL
IN SUDAN**

10:00	Welcome & self introductions (NMCP & chairperson)
10:15	Presentation of mission objectives (A.Lang)
10:30	Review NMCP strategic plan and implementation status (Tarig Abdulgader)
11:00	Priority Actions towards Abuja: draft country support package (Fatih Malik)
11:30	Discussion & recommendations (A. Bell)
12:30	Way Forward (A.Lang)

Participants at Consensus Meeting; 21st November 2003

NAME	JOB TITLE
Dr Elfatih Mohd Malik	NMCP Programme Manager
Manal Awad Hussein	Researcher, Vector Biology and Control
Abdelhamid Adberr	SAC Department
Dr. Tarig Algader	Deputy Coordinator, NMCP
Ali Abdallah	Heathossicen
Mr. Abdalla Jassi	IEC
Mohammed Abed	Physician
Mohammed Ahmed Abass	Head of Vector Control Department
Dr. Khalid A. Muttalab	Department of Assurance of Diagnosis &
EtMardi	Treatment
Sabah Mohammed Nour	Medical Officer, Diagnosis & Treatment
Nuha Hamid	Department
Cheryl Lettenmaier	Leishmaniasis Coordinator
Alex Lang	Regional Communication Advisor
Dr. Abdelkarim Elfaki	RBM Partnership Secretariat
Dr Igbal Ahmad Beshir	DG NMCP
El Rashid Abdel Rahim	Consultanta Mal
Wasailat Zanoug	EWS Coordinator
Chilunga Puta	RCQHC
Alison Bell	Malaria Consortium East Africa

13. ANNEX 3. DOCUMENTS REVIEWED DURING COUNTRY CONSULTATIVE MISSION

1. WORLD HEALTH ORGANIZATION (2003). Communication-for-behavioral-impact (COMBI) Plan to scale up the use of Insecticide-Treated Nets (ITNs) The Republic of Sudan 2004-2005. National Malaria, Leishmaniasis and Schistosomiasis Control Programme (NPMLSC), Federal Ministry of Health (FMOH)/Sudan. World Health Organization (WHO) Country Office/ Sudan, WHO Eastern Mediterranean regional Office (EMRO), Cairo, Egypt and WHO Mediterranean Centre (WMC), Tunis, Tunisia. [Geneva WHO]
2. WORLD HEALTH ORGANIZATION (2003). WHO Sudan Country Cooperation Strategy 2004 – 2007.
3. WERNSDORFER WH (2002). Assignment Report: WHO-EMRO STC to the Sudan, 12 – 22 November 2002.
4. REPUBLIC OF SUDAN (2003) Draft National Insecticide-Treated Net (ITN) Strategy 2004 – 2008
5. FEDERAL MINISTRY OF HEALTH, SUDAN (2003). Implementation plan for The Global fund proposal to reduce malaria in Sudan: Year One. National Malaria, schistosomiasis and leishmaniasis Administration, National Malaria Control Programme. Khartoum, Federal Ministry of Health.
6. REPUBLIC OF SUDAN (2003). Map showing Health Facilities within regions and Counties of Southern Sudan Categorized by Facility Type.
7. FEDERAL MINISTRY OF HEALTH, SUDAN (2002). GlaxoSmithKline African Malaria Partnership Detailed Programme Proposal Narrative: Behavioral Promotion for Malaria Prevention and Treatment Programme. Khartoum, Federal Ministry of Health.
8. FEDERAL MINISTRY OF HEALTH, SUDAN (2000). The National Strategic Plan for RBM 2001- 2010, Sudan. Khartoum, Federal Ministry of Health.
9. FEDERAL MINISTRY OF HEALTH, SUDAN (2003). Treatment Options Against Malaria in Sudan: Conference Report 14 – 15 October 2003 Khartoum, Sudan. Khartoum, Federal Ministry of Health.