Malaria control programme
NATIONAL INSECTICIDE-TREATED NETs (ITNs)
STRATEGY
2004-2008

REPUBLIC OF SUDAN

1. INTRODUCTION

Malaria, leishmaniasis and lymphatic filariasis are considered as an important public health problems in Sudan. Many efforts were carried out last years to control these diseases particularly malaria**.** There has been a renewed emphasis on preventive measures, both at community and at individual level. Insecticide treated nets (ITNs) are a promising preventive measure.

Randomized controlled trials in African settings of differing transmission intensities have shown that ITNs can reduce the number of under-five deaths by around a fifth, saving about 6 lives for every 1,000 children aged 1-59 months protected each year. The incidence of clinical episodes of *Plasmodium falciparum* infection is reduced by on average 50%. When used by pregnant women, ITNs are also efficacious in reducing maternal anaemia, placental infection, and low birth weight. Based on observed reductions in parasite prevalences, it has recently been estimated that in the long-term, widespread use of ITNs will massively reduce malaria transmission.

ITN programmes have subsequently demonstrated the effectiveness of ITNs under field conditions. In a large-scale social marketing programme in two rural districts of southern Tanzania with high perennial malaria transmission, ITN coverage of infants rose from less than 10% at baseline to more than 50% 3 years later. ITN use was associated with a 27% better survival of children aged 1 month to 4 years and a reduction of anaemia by 63% (evaluated by case-control design).

In The Gambia, the National Impregnated Bednet Programme achieved an 83% net treatment rate and 77% of under-fives and 78% of women of childbearing age reported sleeping under ITNs. Overall under-five mortality fell by 25%, and case-control studies suggested that episodes of uncomplicated malaria were up to 59% less frequent in ITN users.

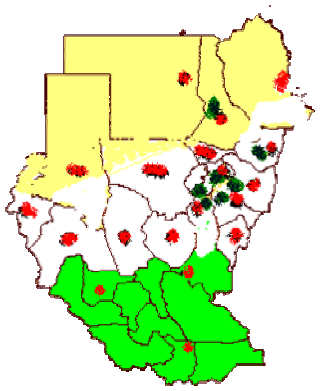
Therefore, ITNs are effective in reducing a) childhood mortality and morbidity, and b) morbidity and mortality in pregnant women from malaria. Increased access to ITNs will require major financial, technical and operational inputs.

Challenges to scaling-up ITNs include finding the most appropriate way to cover the costs of increasing coverage, while at the same time ensuring that the poorest and most vulnerable are protected and that the growth of the commercial market is not undermined.

Cost is a major limiting factor to scaling-up ITNs coverage. Most malaria-endemic countries in Africa spend only US$ 4 per capita a year on health, equivalent to the average cost of an untreated net in countries where nets are widely available. It would require US$ 200 million a year to provide 50 million nets and a further US$ 25 million a year to treat these nets with insecticide. This is too costly for donors (or governments) or users alone.

2. SITUATION ANALYSIS:

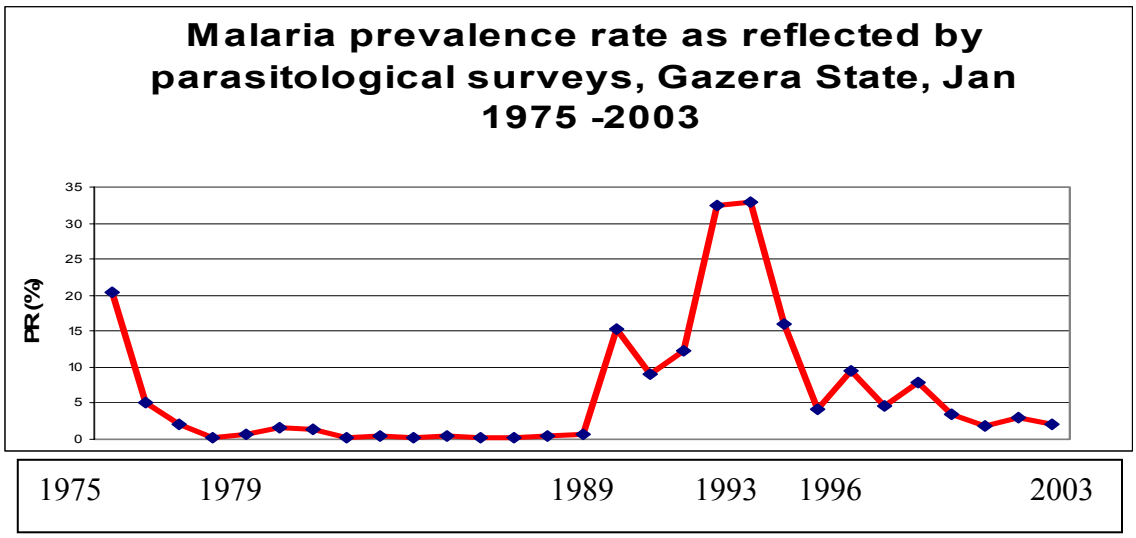
Diseases burden:
Malaria burden:



Malaria is a leading cause of morbidity and mortality in Sudan. The annual estimated numbers is 7.5 million cases and 35000 deaths. It accounts for 20-40% of the total outpatient attendance and amount of 40% of admission Plasmodium falciparum is the predominant species and dominating malaria vectors include A.arabiensis, A.gambiae and A.funestus. Five strata can be identified (see the map on the left): Riverine malaria (yellow), seasonal malaria (white), high perineal transmission malaria (light green), urban malaria (red spots) and irrigated areas malaria (dark green).

Efforts to control malaria in Sudan were the oldest in the tropic. Dr A. Baflour, is the first to be mentioned here. He had succeeded to eradicate malaria from Khartoum area in 1904 depending on larval control using retained oil. Many trials here and there then followed till the eradication era and then after. The famous one is the Blue Nile Health Project that launched in Gazera State and supported by many partners including Japan, Kuwait, USA and World Bank. The project one of the main strategies is residual spraying. The project succeeded to bring the prevalence to <1% and keep that for 10 years. Unfortunately a devastating epidemic was following the cessation of the project (see line below).

Many other attempts appeared with common two features: lack of sustainability and concentration of vector control.



Visceral leishmaniasis:
Visceral Leishmaniasis (VL) due to *L. donovani* is among the most important vector-borne disease problems in the Sudan. More than 24,660 VL cases and 1193 deaths have been reported in the country during 1996-2001. As a result of a poor reporting system, the numbers of cases and deaths are grossly underestimated. For example in population based studies, incidence rates of 38/1000 per year, and Case Fatality Rates as high as 20.5% have been observed. Other leishmaniases cutaneous leishmaniasis due to *L. major* is prevalent in parts of Sudan.

Sudan Map to reflect the leishmaniais affected areas (red)

Lymphatic filariasis:
Lymphatic filarisis have been known to be present in Sudan for at least half century. However as other diseases the information is generally anecdotal through the reported cases from the hospitals. There is no accurate data about the disease distribution in Sudan. A report from the Ministry of health stated that between 1948-1968, 7957 cases were recorded.

ITNs distributions programs:

Limited numbers of ITNs had been in use for some time in Sennar (Sennar pilot study, 1995) and El Dueim in central Sudan, but UNICEF first introduced the innovative tool in the Upper Nile area in 1996 as a small-scale pilot intervention project.

Initially 13,000 ITNs were used by 33,000 internally displaced persons (IDPs). In 1998, subsequent evaluation of the Upper Nile project came up with some informative indicators that were further corroborated with more or less matching results from KAP surveys conducted after about 3 years in the Sennar and El Dueim areas, known for their seasonal malaria endemicity.

The following findings were reported:
- 83.5% Households (HHs) slept under ITNs during July-December1996;

- 76.5% HHs always and consistently slept under ITNs for the same period;
- 80.9% of children were put under ITNs after sunset;
- 69.6% HHs never reported any fevers among members during the same period;
- 31.4% HHs reported fever during same period;
- 48.7% HHS with fever treated in same location;
- 2.6% fevers in HHs were referred to hospital;
- 71.3% of persons reported fever were U-5 year children;
- 0.9% mortality among children reported fever and referred cases;
- 11.3% reported so called "perceived" side effects in HHs due to use of ITNs such as allergy.
- 50.5% of HHs did not approve ITN fabrics because they were transparent, see-through and not warm enough during July – December1996;
- 47% HHs had washed ITNs during the first 6 months because of dirt;
- A high acceptability and compliance rate of 83.5 % + 76.5%.

For re-impregnation of ITNs, a number of health personnel and community volunteers were trained in the project sites and at a later stage in all the locations where implementation of the program took place such as in southern and northern Sudan (Source: UNICEF/FMOH abstract on UN ITN project, Apr.1997).

In 2000, UNICEF and FMOH undertook a Multi-indicator Cluster Survey (MICS2000). Indicators showed that Under-5 children sleeping under ITN, in the 2 weeks prior to the survey, in the North and the 3 major towns of southern Sudan were 7.2% and 15.75 respectively.

MSF did a large scale ITNs distribution program in 1999 in Gedaref state, this program has been very successful in coverage for villages endemic with VL, more than 260,000 fine mesh ITNs were distributed. The evaluation was done after 2 years and reported the following findings:

- 35% of ITNs were no longer available;
- 55% of ITNs were either missing or badly damaged/torn;
- The use of ITNs was most frequent during the rainy season > 50%;
- The village health volunteer program was considered unsustainable as it lacked motivation (lack of incentives, resources and follow-up).

Other trials in Sennar and Dueim, implemented by other partners (Plan Sudan), came up with the following findings:

- High knowledge on the value of ITNs in protecting against frequent attacks of malaria and from mosquito biting;
- A total of 93.8% were still having ITNs;
- Having treated nets was a priority among villagers, as 97.7 % thought that all the members of the family must have one;
- Those interviewed in Sennar and El Dueim thought that they could afford to buy a net and were willing to barter crop for a net;
- About 42.4% of those interviewed in Malakal were of the opinion that the nets were too expensive (recurrent recovery cost = US $ 2.30);
- Only 1.9% complained of minor side effects such as headache and nasal irritation;
- Sustained IEC campaign contributed to a favourable impact on KAP concerning ITN in selected project areas (Sennar, Malakal, El Dueim);
- 16% of pregnant women used mosquito nets during their last pregnancy.

A study undertaken in four northern States (Gezera, White Nile, Sennar and North Kordfan) showed that 68% did not have nets, 20% had untreated nets and only 2% had ITN. Most of them did not know the importance of re-treatment. Sixty percent (60%) of those without nets said they could not afford, 25% due to misconceptions about nets such as it resembled a coffin, and heat generation. For those who purchased the average cost was about US$ 6.0. Thirty six per cent (36%) reported that nets were available for sale. Most of those using nets (78%) mentioned prevention of mosquito bites as the main value of nets while only 20% said it prevents disease.

A single study carried out in South Sudan indicated treated Dumuria were more culturally accepted and thus used more regularly by certain tribes/ethnic groups in the South (The Nuers).

In Sudan, conventional "Information-Education-Communication" (IEC) programmes have been able to increase awareness and knowledge about malaria and ITN but have not been as successful at achieving behavioural results. It is clear that informing and educating people are not sufficient bases for behavioural responses. Behavioural impact will emerge only with systematic, comprehensive communication programmes, purposively directed at behavioural goals, and not directed just at awareness creation, or advocacy or public education.

Challenges of implementing ITNs in Sudan

The major challenges for going to scale up with ITNs in Sudan are:

- Insufficient awareness of particularly the rural population about the existence of ITNs and their potential benefit for health as well as economic burden to the families;
- Inadequate penetration of the commercial ITNs distribution networks in the rural areas resulting in poor availability and visibility of the products (nets as well as insecticides);
- Not enough promotion and opportunities for net re-treatment or treatment of previously untreated nets with insecticides through either individual treatment kits or net treatment services (commercial or otherwise);
- For all these challenges cost and affordability are not the only but key issues. This is true for the stocking of nets at rural shops and other outlets as well as for the ability to actually buy nets or insecticide re-treatment by the affected population and any strategy to increase the use of ITN in Sudan needs to take this into account;
- One other challenge for scaling up ITN coverage and use in Sudan is to convince and support individuals and families to sustain two key behaviours: to acquire and regularly sleep under insecticide-treated mosquito nets; and re-treat these nets with appropriate insecticide at the appropriate time.

Assumptions and conclusions on ITNs implementation in Sudan:

- The revolving fund system established at NMA and states apart from being an expensive system (not cost-effective), both the NMA and states do not have

experience in handling cash from sale of ITNs. Other methods of distributing ITNs need to be identified
- ITN culture is weak and depends largely on the public sector
- Poor perceptions on ITNs, especially in northern Sudan, accompanied with low re-treatment rates
- ITNs considered unaffordable and inaccessible by many households
- Currently there is only one private company involved in the selling of ITNs
- Capacity of FMoH, single-handedly, to undertake and sustain ITNs promotional campaigns is inadequate.
- Most of the projects evaluated involved heavily subsidized ITNs.

2. VISION

Over 80% of the target population in Sudan sleep under insecticide-treated nets. The majority of these people purchase their ITN from the unsubsidized commercial market. However, vulnerable groups can obtain subsidized ITNs.

Prices are kept low in the commercial market in both urban and rural areas due to economies of scale as well as competition among ITN suppliers and retailers. Government helps by providing an enabling environment, which includes generic promotion of ITN products, as well as a supportive fiscal and regulatory environment.

Government and NGOs provide a system of targeted subsidies that focus on vulnerable groups. These comprise the biologically vulnerable (pregnant women, under-fives) and the socio-economically vulnerable (e.g. the very poor, displaced populations). Subsidies will be targeted and implemented in such a way that the commercial sector is supported, wherever possible.

3. GOAL

Contribute to the reduction of malaria, leishmaniasis and lymphatic filariasis burden in Sudan

4. STRATEGIC OBJECTIVES

Increased the use of ITNs by vulnerable groups in high malaria transmission areas and by populations at risk of leishmaniasis and lymphatic filariasis.

5. OUTCOMES

Sudan is committed to both the Abuja Targets and the Millennium Development Goals and it is aiming to achieve the following outcomes:

6.1 80% of target population will be protected by ITNs through adoption and implementation of effective strategies by 2008.

6.2 By 2008, 80% of nets used by the target population are effectively treated and re-treated.

7. PRODUCTS

The National ITN strategy has the following products:

Outcome 1: 80% of target population will be protected by ITNs through adoption and implementation of effective strategies by 2008.

1.1 Mechanisms of identifying target population.
1.2 Public/private, private/private partnerships.
1.3 Distribution systems and mechanisms for ITNs.
1.4 ITN promotion plan using COMBI methodology.
1.5 Models and guidelines for targeting subsidies.
1.6 Procurement strategies.

Outcome 2: By 2008, 80% of nets used by target populations are effectively treated and re-treated

2.1 Accessible and functional treatment/retreatment centres.
2.2 Treatment and re-treatment promotion plan using COMBI methodology.
2.3 Nets packaged with insecticides.
2.4 Distribution mechanisms/systems for free insecticides.
2.5 Long lasting insecticidal nets.

8. IMPLEMENTATION STRATEGY

8.1 The Partnership Development Process

Collaboration is essential among a range of partners in order to increase access to ITNs, create and sustain demand, achieve affordability and encourage proper use. The Federal Ministry of Health will take the lead in developing and guiding the partnership. This will primarily be carried out through the ITN Working Group whose recommendations will be discussed by the Country Coordinating Committee on Malaria, TB and HIV/AIDS, and decisions taken.

The Federal Ministry of Health (FMoH) will present the National ITN Strategy Plan to partners with the aim of reaching consensus on scaling-up ITN coverage. The products to be promoted should meet the required specifications. Both geographical and socio-economic market segmentation will be needed to ensure civil society's efforts in scaling-up ITN coverage among the poor and vulnerable. This process should not undermine the nascent commercial sector.

A successful and sustainable partnership will be possible when it is recognized that while different partners have different priorities, all need to be working towards the same goal and vision.

8.2 Roles of the partners

Effective implementation of the Strategic Plan will require strong partnership and commitment from all partners to ensure that nets and insecticides are demanded for, available and affordable at the level of the target population. For the partnership to be sustained, the aims and roles of each partner must be clearly defined.

The partners can be categorized as:

- public sector
- private sector
- non-governmental organizations and civil society

Their respective roles are as follows:

8.2.1 Public sector

- create enabling environment for all partners
- mobilize resources
- promote generic demand through use of a variety of approaches and channels
- co-ordinate and chair the ITN Working Group and the involvement of partners in scaling-up ITN coverage
- undertake operational research
- set standards and norms for nets and insecticides, monitor and regulate their quality
- provide ITNs to vulnerable groups
- support systems for targeted subsidies to vulnerable groups
- with partners, monitor and evaluate efforts to scale-up ITN coverage

8.2.2 Private sector

- create awareness and demand for branded net and insecticide products
- improve product image and acceptability through consumer research
- carry out surveillance and monitoring of the commercial market
- supply, in a sustainable manner, ITNs and insecticides for net re-treatment
- with partners, monitor and evaluate efforts to scale-up ITN coverage

8.2.3 Non-governmental Organizations (NGOs) and civil society

- social marketing of subsidized ITNs and treatment kits
- co-ordinate and manage the card's system for subsidized ITNs targeted at vulnerable groups
- distribute subsidized ITNs to the very poor through existing initiatives
- provide ITNs to vulnerable groups during emergency situations
- with partners, monitor and evaluate efforts to scale-up ITN coverage

8.3 Use of subsidies to increase access by vulnerable groups

As cost is currently one of the most important obstacles to rapid scaling-up ITN coverage in Sudan, subsidies will be used to make ITNs and insecticides for net retreatment more affordable. In order not to interfere unnecessarily with the nascent commercial market for ITNs, subsidies for ITN will be targeted at the very poor, and the biologically vulnerable

(pregnant women and under-fives). In contrast, retreatment kits (single net insecticide dose) will be highly subsidized for the general population in order to improve net retreatment rates.

8.3.1 Improving access to ITNs for the very poor

Existing initiatives will be supported to provide subsidized nets to the very poor. Various mechanisms will be explored. For example Zakat Fund, Health Insurance etc.

83.2 Improving access to ITNs for pregnant women and under-fives

A card system that entitles money off ITN purchases for pregnant women and mothers of children under-five visiting antenatal and child health clinics will be used to improve access to ITNs for these groups. The cards will be redeemed in designated retail shops. Local ITN suppliers will be encouraged to ensure that products are available and accessible to consumers. The Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) resources will be used to support the scaling-up of such a system.

8.3.3 Improving access to net re-treatment

In order to increase net re-treatment rates, individual treatment kits will be subsidized across all sectors. In the public sector, limited distribution of kits will be carried out using existing community mechanisms. NGOs will support the distribution of kits to retail outlets in rural areas through social marketing. In addition, NGOs will provide limited numbers of subsidized kits through community-based projects. The private sector will distribute subsidized kits to retail outlets in rural and urban areas.

To increase treatment rates for nets, a new concept has been developed: long lasting insecticidal nets, treated once at factory level. The insecticide is incorporated into or bound to netting fibres in such a way that insecticidal activity is maintained for the entire life span of the nets.

This technology prevents the need for re-treatment, reduces human exposure (at any given time, most of the insecticide is hidden and not bio-available) as well as potential for environmental contamination (insecticide is not handled in the field by householders and resist to washing contrary to conventionally-treated nets).

One long lasting insecticidal net has already been evaluated and recommended by WHO. Several processes are under active development. With a current price around US $ 5 per net, LLINs are already more cost effective than conventionally treated nets. Efforts are currently being made to scale-up production capacity to meet demand which is already high. RBM partnership is facilitating technology transfer and stimulating local production of LLINs in Africa.

8.4 Communication for Behavioural Impact (COMBI)

Several agencies are implementing ITN programmes and even within the same State there are activities in different districts with different approaches to increasing access to

and use of ITNs. As Sudan begins to scale up its ITN programme, the need to integrate existing strategies and activities becomes essential. An innovative approach to social mobilization known as Communication for Behavioural Impact (COMBI) which incorporates the many lessons of the past 50 years of health education and communication in a behaviourally-focused, people-centred strategy. COMBI also draws substantially from the experience of the private sector in consumer communication.

8.5 Operational research, monitoring and evaluation

To ensure that primary goals of the programme are met, and given that the ITN market in Sudan is still in its infancy, it is imperative that the proposed strategy for market segmentation between public, private and NGO sectors be monitored. This will require both routine monitoring of ITN use and sales; quality of products and targeted operational research activity. Research results and their policy implications will be prepared and provided to the NMCP for implementation.

8.5.1 Monitoring market growth and structure

Consumer Surveys: This will be achieved using commercial consumer survey techniques. These surveys will track changes in household-level coverage in relation to socio-economic status, and geographical factors such as malaria risk, penetration into rural areas, proximity to ITN projects, etc.

Retail Surveys: Information is also needed on the size, extent and structure of the market. This can be done using surveys of places where nets and insecticides are sold. In this way, the flow of commodities can be tracked through the distribution chain, and measuring prices and volumes sold by brand, and in the case of nets, by size.

Analysis of market changes: Consumer and retail surveys can provide basic data on who sells what to whom, but careful analysis of these data, and probably some additional information, will be needed for an understanding of how public sector actions affect the private market. Inherent in these studies will be the measurement of true delivery costs by the various NGO sectors to form the basis of a cost-effectiveness analysis of different delivery strategies.

8.5.2 Measuring effective targeting of vulnerable groups

Sudan has the potential of identifying poor members of the community unable to access basic curative or preventative services (Zakat system). To monitor effective targeting mechanisms, formative research methodologies will be developed.

8.5.3 Monitoring insecticide resistance and safety of new net treatment practices

Vector population resistance to widely used synthetic insecticides will be monitored through the Regional network of experts in which national capacity to undertake routine bio-assays or genetic marker studies is being strengthened. The individual treatment kit approach – will require investigation as to whether the procedure is carried out safely and effectively, and whether insecticide concentrations are within

the target recommended dose. This can be investigated by chemical analysis of the insecticide residue on net samples, correlated with information on the treatment and washing history of the net.

8.5.4 Relationship between ITN coverage and epidemiological impact

In view of the limited evidence on what coverage level is required for transmission interruption, it would be important to determine this critical level.

8.5.5 COMBI plan monitoring and evaluation component

Progress towards achieving the strategic plan milestones will be measured using a set of standardized process and output indicators. Simple activity indicators such as the number of nets sold, the number of nets re-treated, the number of children and other individuals benefiting from some facilitated access scheme would be part of the routine data collection. Regular consumer surveys with both quantitative and qualitative methods will be carried out. These surveys will be complimented by outlet surveys, focus group discussions, interviews with different actors in the ITN supply chain, and other relevant approaches. The reports on these evaluation components will constitute the behavioural impact assessment of the COMBI plan.

8.6 Specifications of nets and insecticides

The WHOPES specifications for nets and insecticides will the basis for developing national standards.

9. BROAD KEY ACTIVITIES

Products	Broad activities	Implementers	
		FMoH	Partners
80% of target population will be protected by ITNs through adoption and implementation of effective strategies by 2008			
Mechanisms for identifying target population (biological – U5, Pregnant women; social – IDPs)	- Establish selection criteria - Undertake cross-sectional surveys - Quantify target population by area	5,000	15,000
Effective public / private, private / private partnerships	-Provide enabling environment (generic demand creation, rationalization of VAT (harmonized taxation system – essential health products), standards and norms), -Strengthen, expand and improve coordination of existing partnerships, structures/mechanisms	2,000	3,000
Distribution systems and mechanisms for ITNs	- Optimize the use of existing potential major distribution networks - Establish innovative networks of ITNs outlets (EPI, ANC, IMCI, CBI, private and commercial outlets)	3,000	7,000
ITN promotion plan using COMBI methodology	Organize planning exercise for COMBI methodology	10,000	20,000
Models and guidelines for targeting subsidies	Develop models for targeting subsidies (subsidized sales, vouchers/cards)	1,000	2,000
Procurement strategies	- Establish a forecasting system for ITNs - Negotiate for bulky purchase of ITNs - Establish quality assurance/specifications system	3,000	2,000
By 2008, 80% of nets used by target population are effectively treated and re-treated			
Effective re-treatment strategies	- Establish accessible and functional treatment / re-treatment centers - Develop ttreatment and re-treatment promotion plan using COMBI methodology - Provide nets packaged with insecticides - Establish distribution mechanisms/systems for delivery of free insecticides	15,000	35,000
Operational research	- ITNs coverage in relation to epidemiological impact. - Evaluation for the ITNs distribution mechanism and purchasing.	10,000	10,000
Sub-Total	-	49,000	94,000
Total	-		143,000