



ISLAMIC DEVELOPMENT BANK

ERADICATING MALARIA IN IDB MEMBER COUNTRIES IN AFRICA





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FOREWORD

According to the World Health Organization (WHO), more than one million people die of malaria every year, mostly infants, young children and pregnant women and most of them in Africa. The WHO estimates also show that a child dies of malaria every 30 seconds. This is a disease that is both preventable and curable.

Most of the IDB member countries in Africa have high incidence of malaria. The economic costs of malaria are huge. It has been estimated that the annual cost of malaria in Africa is more than \$12 billion in terms of lost GDP. It is believed that malaria is responsible for a 'growth penalty' of up to 1.3% per year in some African countries. Malaria is also closely associated with poverty. The governments in Sub-Saharan countries spend up to 40 percent of their health budgets on medical care for malaria victims and malaria control.

Addressing the most severe and debilitating threats to health in the Muslim world is one of the key Strategic Thrusts of the IDB 1440H Vision. In line with this Vision and the Ten-Year Program of Action adopted by the Third Extraordinary Session of the Islamic Summit Conference held in Makkah Al-Mukarramah in December 2005, the IDB has launched its Quick-Win Roll-Back Malaria Programme in selected member countries which is being implemented in collaboration with the International Federation of World Health Organization (WHO) and the Red Cross and Red Crescent Societies (IFRCRCS).

In view of the importance of the subject of malaria for both the Islamic Development Bank and its member countries, the IDB decided to commission this paper which has been prepared by Dr. Ambrose Talisuna, a renowned expert on malaria. This paper discusses the problem of malaria in IDB member countries, especially the Least Developed Member Countries (LDMCs), and the challenges which they are facing in addressing this problem. It analyzes the relevance of malaria to the achievement of Health Millennium Development Goals (MDGs) in LDMCs; reviews the international and regional initiatives for malaria control, and gives an assessment of their implementation. The paper also suggests the actions that may be taken at national, regional, and international levels for the eradication of malaria in Africa in general and the IDB member countries in particular. It is hoped that the readers would find the information and analysis contained in this paper useful and that the policy makers, in particular, would benefit from the recommendations made in it for addressing the issue of malaria. While eradication of malaria is an ultimate objective, it would be an important achievement of this analytical work if it leads to saving some innocent and precious lives.

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LIST OF ACRONYMS

ACTs	Artemisinin Combination Therapy
ADB	Asian Development Bank
ADR	Adverse Drug Reaction
AfDB	African Development Bank
AFR	Africa Regional Office of the World Health Organisation
API	Annual Parasite Index
AQ	Amodiaquine
AsDB	Asian Development Bank
BMGP	Bill and Melinda Gates Programme
BNRTI	Blue Nile Research and Training Centre
CBMIS	Community Based Management Information Systems
CBOs	Community Based Organisations
CDC	Centres for Disease Control
CFR	Case Fatality Ratio
CHW	Community Health Workers
CIDA	Canadian International Development Agency
CORPs	Community Resource Persons
CQ	Chloroquine
CSO	Civil Society Organisation
DDT	Dichloro-Diphenyl-Trichloro-ethane
DFID	Department for International Development
DGF	Development Grant Facility
DS	Dressing Stations
DSS	Demographic Sentinel Surveillance
EANMAT	East African Network for Monitoring Antimalarial Treatment
EBRD	European Bank for Reconstruction and Development
EDS	Early Detection System
EMR	Mediterranean Regional Office of the World Health Organisation
ENSO	El Nino Southern Oscillation
EPI	Expanded Programme of Immunisation
EPR	Emergence Preparedness and Response
EURO	European Regional Office of the World Health Organisation
FMOH	Federal Ministry of Health
GAVI	Global Alliance for Vaccines and Immunisation

GEF	Global Environmental Facility
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GMP	Global Malaria Programme
HANMAT	Horn of Africa Network for Monitoring Antimalarial Treatment
HBMF	Home Based Management of Fever
HH	Household
HIPC	Highly Indebted Poor Countries
HIV/AIDs	Human Immune Deficiency Virus/Acquired Immune Deficiency Syndrome
HMIS	Health Management Information System
HQs	Headquarters
HRD	Human Resource Development
HNP	Health Nutrition and Population
IADB	Inter American Development Bank
ICCMs	Inter Country Coordinating Mechanisms
IDA	International Development Agency
IDB	Islamic Development Bank
IDP	Internally Displace People
IMCI	Integrated Management of Childhood Illness
IMR	Infant Mortality Ratio
IPT	Intermittent Preventive Treatment
IRS	Indoor Residual Spraying
ITN	Insecticide Treated Nets
IVM	Integrated Vector Management
LDMCS	Least Developed Member Countries
LLINs	Long Lasting Insecticide Treated Nets
M&E	Monitoring and Evaluation
MDB	Multilateral Development Banks
MDGs	Millennium Development Goals
MDSC	Multi Disease Surveillance Centre
MEC	Malaria Endemic Countries
MFI	Malaria Free Initiative
MIM	Multilateral Initiative for Malaria
MIP	Malaria In Pregnancy
MMR	Maternal Mortality Ratio
MMV	Medicines for Malaria Venture

MoH	Ministry of Health
MRC	Medical Research Council
MRTC	Medical Research and Training Centre
MVI	Malaria Vaccine Initiative
NGOs	Non Governmental Organisations
NMCPs	National Malaria Control Programmes
NNRWs	National Net Re-treatment Weeks
OAU	Organisation of African Unity
OIC	Organisation of the Islamic Conference
PEAP	Poverty Eradication Action Plan
PHCU	Primary Health Care Units
PMI	President's Bush Malaria Initiative
PMS	Post Marketing Surveillance
PRSP	Poverty Reduction Strategy Paper
PV	Pharmacovigilance
QA	Quality Assurance
QC	Quality Control
RBM	Roll Back Malaria
RDTs	Rapid Diagnostic Tests
RH	Reproductive Health
RMC	Regional Member Countries
SP	Sulphadoxine- Pyrimethamine
SSA	Sub Saharan Africa
TDR	Special Programme for Research and Training in Tropical Diseases
U5MR	Under Five Mortality Ratio
UN	United Nations
UNDP	United Nations Development Program
UNESCO	United Nations Education, Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VDB	Vector Borne Diseases
WANMAT I	West Africa Network for Monitoring Antimalarial Treatment I
WANMAT II	West Africa Network for Monitoring Antimalarial Treatment II
WB	World Bank
WHO	World Health Organisation

GLOSSARY OF TECHNICAL TERMS

MALARIA TRANSMISSION AND ENDEMICITY

Stable malaria: Stable transmission areas are those where there is a steady prevalence which does not show great changes between transmission seasons from year to year. Malaria epidemics are unlikely to occur in these areas because the population often readily acquires immunity after childhood.

Unstable malaria: These are areas where transmission can vary dramatically from year to year. Malaria epidemics are very likely because the population (children and adults) does not readily acquire immunity

Seasonal transmission: Transmission occurs during only some months of the year and is interrupted or very low during other months

Perennial transmission: Transmission occurs in all months of the year, although there could be some seasonal fluctuations

Endemic: The continuous occurrence of a disease or infectious agent within a given community or population.

Malaria endemicity: A measure of malaria transmission based on the parasite prevalence rate (PR) usually in children less than 10 years old.

Hypo-endemic: Parasite prevalence is less than 10%.

Meso-endemic: The parasite prevalence is between 11-50%.

Hyper or Holo-endemic: The parasite prevalence is greater than 50%.

Epidemic: A dramatic increase in a disease incidence in a given population at a specific time. Epidemic thresholds have been established for several infectious diseases. However, for endemic diseases that have seasonal variations such as malaria, the determination of an epidemic threshold is not obvious. Recognition of a large malaria epidemic does not pose any problem, but small epidemics could easily be confused for seasonal fluctuations and vice versa.

MALARIA DIAGNOSIS

Presumptive diagnosis: The diagnosis is based on clinical grounds without laboratory confirmation

Parasite based diagnosis: The diagnosis is based on confirmation of the presence of malaria parasites, either by microscopy or rapid diagnostic tests (RDTs)

CLASSIFICATION OF MALARIA CASES BY ORIGIN OF INFECTION: TERMINOLOGY FROM THE ERADICATION ERA (WHO, 1964)

Indigenous Case: the origin of which from local transmission can not be disproved

Imported Case: the origin of which can be traced to a known malarious area (or country) outside the area (or country) in which it was found.

Introduced Case: in which it can not be proved that the infection is a first step (first generation) of local transmission subsequent to a proved imported case i.e. in which the mosquito was infected from an imported case.

Relapsing Case: shown by the history of the patient to be a probable relapse if careful epidemiological investigation shows that the infection was contracted before interruption of transmission was claimed in the locality and if there are no epidemiologically related malaria cases in the neighborhood.

Induced: Infection properly attributable to the effect of a blood transfusion or other form of parenteral inoculation, but not to normal transmission by a mosquito.

Autochthonous: More broadly, locally acquired malaria cases (indigenous and introduced) were called autochthonous in contrast to imported cases.

Another term sometimes applied was cryptic malaria, indicating an isolated case usually in a non endemic country, for which the origin of infection could not be readily explained and which was not associated with secondary cases, as determined through appropriate epidemiological investigation. This is a category of last resort.

Malaria eradication vs. elimination: It is important to differentiate the concept of malaria eradication from elimination. Eradication has been defined as the permanent reduction to zero of the world wide incidence of infection caused by a specific agent as a result of **time bound deliberate efforts**. Intervention measures are no longer needed once eradication has been achieved. While elimination of infection is defined as reduction to zero of the incidence of infection caused by a specific agent in a defined geographical area as a result of deliberate efforts. Continued measures to prevent re-establishment of transmission are required.

VERTICAL VS HORIZONTAL APPROACHES

Vertical programmes are so called because they are directed, supervised and executed, either wholly or to a great extent by a specialized service using dedicated health workers (Mills, 2005). Prime examples include the small pox eradication project and the yaws campaigns of the 1950s, and more recently the polio and onchocerciasis eradication projects and measles elimination campaigns. These traditional disease specific programmes may have limitations because they could skew priorities towards a few diseases, and could divert resources from general health services and generate duplication between programmes. Horizontal approaches on the other hand cut across diseases, and there is likely to be health systems benefits from this approach.



EXECUTIVE SUMMARY

Malaria is among the leading, most widespread and serious communicable diseases in the world. It is a major public health problem, and is endemic in approximately 130 countries and territories including those that have not reported malaria recently, but reported cases in the period 1990-2003. In 2000, the African Summit on Roll Back Malaria (RBM) was held in Abuja, Nigeria. It reflected a real convergence of political momentum, institutional synergy and technical consensus on malaria and, to some extent, on issues related to other infectious diseases. The African leaders rededicated themselves to the principles and targets of the Harare Declaration of 1997 and committed themselves to an intensive effort to halve the malaria mortality for people in Africa by 2010. The Leaders also resolved to initiate appropriate and sustainable actions to strengthen the health systems to ensure that by the year 2005:

- at least 60% of those suffering from malaria have prompt access to, and are able to correctly use, affordable and appropriate treatment within 24 hours of the onset of symptoms;
- at least 60% of those at risk of malaria, particularly children under five years and pregnant women, benefit from the most suitable combination of personal and community protective measures such as insecticide treated mosquito nets and other interventions which are accessible and affordable to prevent infection and suffering; and
- at least 60% of all pregnant women who are at risk of malaria, especially those in their first pregnancies, have access to chemoprophylaxis or preventive intermittent treatment.

In addition, development partners were called upon to cancel in full the debt of heavily indebted poor countries within Africa in order to release resources for poverty alleviation programmes, including Roll Back Malaria and to allocate substantial new resources of at least US\$1 billion per year to Roll Back Malaria. At the time of writing it is now over two years after 2005 and most of the Abuja targets have not been achieved. Some of the targets have been revised upwards, implying that renewed efforts are needed for the revised targets to be achieved.

Despite these clear strategies and initiatives, malaria has remained a leading cause of morbidity and mortality in Africa, especially among pregnant women and children of 5 years of age and under. Although effective medicines and preventive measures exist, they reach only a small proportion of the population at risk. Indeed, during the last decade, new medicines and preventive approaches have been developed for malaria case management and for selective vector control as well as epidemic prevention and control. Malaria has also become integrated into national health systems of most countries and partnerships have been increased both locally and internationally. It is now over seven years into the global commitment to fight malaria

and half way through the announcement of the Millennium Development Goals (MDGs). Countless caregivers still give their sick children medicines that no longer work, because too often, ineffective options are their only choice. The consequences of which are unacceptable because a child is likely to die of malaria, while the disease is preventable and curable.

The extent of the malaria problem in the resource constrained countries requires a paradigm shift from demand creation to the identification and quantification of needs. The population at risk of malaria is also the poorest in the world with most of them living on less than one US dollar per day. Consequently, strategies based on demand creation, though good, will take many decades to achieve the Abuja targets and the MDGs. The paradigm shift should take into consideration the lessons learnt so far in efforts to control malaria, re-started globally since 1996 and the lessons from the Roll Back Malaria initiative, which commenced in 1998.

In line with the IDB Vision 1440H, resolutions of the 15th IDB annual symposium held in Teheran 29 Rajab 1425 H (14 September 2004G), and the Ten-Year Program of Action of OIC, the IDB has embarked on a Quick Win (QW) Program aiming at combating malaria in 10 highly malaria endemic member countries. This Program was launched with an approval of US\$50 million for the initial phase (intended to last two years), and it is estimated that the total cost for the program could amount to US\$150 million. The QW program is a cost-effective operation targeting a key developmental impediment. The first two approvals under the QW program are for Senegal and Sudan. The total project cost in Senegal is €6.9 million, with the IDB being the lead financier, providing €5.8 million, and the government of Senegal providing the remaining €1.1 million. In Sudan, the total project cost is estimated at US\$13.4 million. The IDB is the lead financier of the project, with total funding of US\$7.2 million, with the remaining finance to be provided by the Export Development Bank of Iran, Ministry of Health, Global Fund to Fight AIDS, Tuberculosis and Malaria, World Health Organization, United Nations Childrens Fund, Non-Governmental Organisations and local commercial banks.

This paper demonstrates that the burden of malaria is still high and generally unacceptable in most of the IDB member countries and that the prevention, control or elimination of malaria will be critical to the achievement of the health MDGs in the Least Developed Member Countries (LDMCs). There are several major challenges that have to be addressed, including inadequate health infrastructure, monitoring and evaluation, information and surveillance systems; weak human resource capacity; shortage of essential commodities; inadequate integration of the different sectors and programmes; and inadequate capacity for communicating knowledge to the public. Further, a challenge for the countries that aim at elimination of malaria is ensuring a robust and timely early warning and surveillance system for both autochthonous and imported malaria cases. This requires the estimation of national and sub-national annual parasite infection (API) rates as well as *Plasmodium falciparum* ratios. Such countries also need to establish an early detection system (EDS) and to have ready adequate resources for prompt response to any new cases of malaria after the certification of a malaria free status.

In malaria prevention and control, “one size does not fit all” and malaria control plans have to be tailored to the local epidemiological context. Consequently, it is proposed that the IDB member countries should be categorised into high and low malaria burden countries. In this paper, the high burden countries include: Benin, Burkina Faso, Cameroon, Chad, Comoros, Cote d’Ivoire, Djibouti, Gabon, Gambia, Guinea, Guinea-Bissau, Mali, Mauritania, Mozambique, Niger, Nigeria, Senegal, Sierra-Leone, Somalia, Sudan, Togo and Uganda. In these countries, the goal should be to quickly scale up malaria prevention and control so as to reduce malaria prevalence and contribute to the reduction of infant and under five mortality. However, clear targets need to be set for the next five years to enable annual monitoring of progress. The generic guide proposed below should be adapted by the high burden countries:

- To increase the proportion of the population at risk of malaria who receive effective treatment for malaria within 24 hours of onset of symptoms to 85%;
- To increase the proportion of pregnant women receiving intermittent preventive treatment (IPTp2) to 85%;
- To increase the proportion of households owning at least 2 insecticide treated nets to over 90%;
- To increase the proportion of children aged less than five years regularly sleeping under insecticide treated nets to 85%;
- To increase the proportion of pregnant women regularly sleeping under insecticide treated nets to 85%;
- To increase the coverage of households receiving targeted Indoor Residual Spraying at least once a year to 85%;
- To reduce the malaria case fatality ratios at hospital level to less than 2%; and
- To contribute to the improvement of overall health systems.

The low burden countries include: Algeria, Egypt, Libya, Morocco and Tunisia. The aims and objectives for this category of countries should be incremental, initially aiming at reducing the incidence of malaria to a level where it is of limited public health importance, and subsequently aiming at interrupting local transmission and finally to maintain a malaria free status. The strategies should combine intensive efforts to control the disease locally through case management and targeted vector control with extensive screening and follow up of imported cases. In order to succeed, there is a need for all stakeholders to be committed to their roles. The countries need to be supported to:

- Ensure that the implementation of the malaria programme is successfully conducted;
- Revise the malaria situation analysis so as to refine and re-quantify the commodity needs (anti-malarial drugs, Insecticide Treated Nets, diagnostics etc.);
- Establish the delivery mechanism for scaling up malaria prevention and control/ elimination interventions and to ensure that relevant commodities are procured and delivered to the appropriate site timely;

- Ameliorate the human resource constraints through capacity building and improved incentive schemes for health workers and task shifting where applicable;
- Maintain a functional surveillance system, design appropriate community based surveys for tracking population based malaria indicators and establish a mechanism for monitoring to track progress and achievement of targets; and
- Build and maintain partnerships with different stakeholders.

There is also a need to work closely with numerous stakeholders (endemic country partners, Non-Governmental Organizations (NGOs), Civil Society Organizations (CSOs), The World Health Organization Global Malaria Programme (WHO/GMP), the pharmaceutical industry, academia and research institutions and other partners, to be able to leverage resources. Continuous innovation is critical to stay a step ahead and to create new and better solutions. For many years, efforts to control malaria have been under-funded, under-researched and poorly coordinated. However, there is now hope on the horizon. IDB member countries should put emphasis on partnerships; utilize the current political momentum and allocate sufficient new resources to combat malaria. The private sector should work with countries to ensure that the supply of good quality commodities is available, ensuring quality delivery within national guidelines. Further, there will be a need to utilize the private sector to deliver some of the interventions such as Artemisinin Combination Therapy (ACTs) in the non-premium private sector, and ITNs by the CSOs.

At the sub-regional and regional levels, the existing bodies such as the Roll Back Malaria (RBM) regional networks need to be supported to play their role and are used for sharing best practices. In addition, the IDB can bring together countries that fall in same classification of burden and help in sharing experiences and best practices. Good examples of regional bodies that are presently on the brink of collapse (as a result of inadequate financial resources) that the IDB can support, are the networks for monitoring anti-malarial treatment. These networks are non-governmental, non-profit-making organisations which are politically and religiously neutral. Their main purpose is to assist in the development of evidence-based anti-malarial treatment drug policies in member countries so as to provide effective malaria treatment and to reduce malaria morbidity and mortality. To accomplish this goal, the East African Network for Monitoring Antimalarial Treatment (EANMAT) in Eastern Africa, the West African Network for Monitoring Antimalarial Treatment (WANMATI and II) in West Africa and Horn of Africa Network for Monitoring Anti-malarial Treatment (HANMAT) in the horn of Africa set out to work in partnership with member countries and associate members. These networks should be instrumental in providing the evidence base for the new anti-malarial drug policies in member countries. The IDB should support these networks to increase their scope to cover monitoring of the safety of new tools such as ACT. Further, ongoing research initiatives on vaccine candidates and new drugs and insecticides in some of the IDB member countries such as at the Malaria Research and Training Centre (MRTC) in Bamako, Mali and in Manhica, Mozambique; the Medical Research Centre (MRC) in Banjul, Gambia; The Centre Muraz in Bobo Dioulasso, in Burkina Faso; and the Multi Disease Surveillance Centre (MDSC) in

Ouagadougou, Burkina Faso need to be supported within the framework of creating centres of excellence in IDB member countries.

At the international level, agencies such as WHO and UNICEF, can play a key role in the provision of technical support to the countries, in advocacy for additional resource mobilization, and in the maintenance of a data base for potential technical assistance to the National Malaria Control Programmes (NMCPs).

Finally, in order to achieve these goals, the IDB and other development partners need to commit substantial resources to address the short-, medium- and long-term objectives. Some of the resource gaps have been articulated in the major challenges. However, specifically with respect to financial resources, the IDB member countries as a group require approximately US\$150-200 million annually to implement holistic malaria prevention and control plans. Although most IDB member countries have gone through the lengthy process of developing their five year strategic plans as part of their comprehensive national health strategic plans or as part of their Global Fund applications, it is proposed that the IDB in collaboration with endemic countries and international agencies such as the WHO conduct quick technical appraisal missions for these member countries. These missions can help the IDB to define the Bank's contribution to the RBM, aiming at a sustainable response to malaria, and acquiring an overview of the country-specific and cross-country needs and opportunities for achieving a sustainable reduction in malaria. Further, the missions can facilitate gap analysis so that the IDB can consider the financial requirements for each country. Moreover, the appraisal missions will identify the countries that have the biggest need. It is proposed that contiguous member countries are grouped to enable the assessment of cross-country needs and opportunities. The mission appraisal teams should be comprised of experts in malaria control, health systems development, public health, and IDB Operations Complex. These joint missions will meet key informants including government officials, health sector staff, researchers, NGOs, academia and manufacturers. Through these missions, countries can be identified on a need basis. It is also proposed that the Quick Win initiative be carried out in phases so that the countries with the biggest need (in both the high and low burden category) are included in the first phase.



1. INTRODUCTION

1.1 THE GLOBAL BURDEN OF MALARIA

Malaria is a major public health problem, and is endemic in approximately 130 countries and territories including those countries that have not reported malaria recently, but they reported cases in the period 1990-2003 (WHO, 2005). The global burden of malaria is only imprecisely known, because only a minority of cases are recorded in health facilities, yet vital registration of death causes is incomplete and unreliable in countries with highest malaria burden, and available community-based studies often over sample areas of relatively intense malaria transmission, and are usually conducted during peak transmission season. Two recent sets of estimations concluded that the annual number of clinical episodes in 2002-04 was between 300-600 million, of which around 270-400 million cases were due to falciparum infection (Snow et al, 2005 and Korenromp 2005). An estimated 57-72% of falciparum cases occurred in the Africa region. These estimates are at least 6-fold higher than cases globally recorded by national health information systems in 2004, and around 17-fold higher for non-African countries. The estimates reflect the consensus that cases recorded and reported in national health information systems capture far less than the full burden of malaria in most parts of the world. For malaria mortality, the World Health Organisation (WHO) estimates that over one million people die of malaria as the direct cause of death each year, of which around 800,000 are children under-5 years old in Africa. In addition, malaria contributes to additional deaths, mainly in young children and pregnant women in areas of intense transmission, through synergy with other infections and illnesses.

1.2 OBJECTIVES

The objectives of this review paper were to examine the problem of malaria in the IDB member countries, specifically those in Africa, identify major challenges facing the African member countries in coping with malaria, analyse the relationships between malaria and the MDGs, review international and regional initiatives on malaria, provide the experience of three IDB member countries in Africa with high incidence of malaria; and suggest practical solutions for the prevention and control/eradication of malaria in these countries.

1.3 ORGANIZATION OF THE POSITION PAPER

The paper is organized into six sections. Section 1 presents the global burden of malaria, the epidemiology and burden of malaria in IDB member countries in general and the member countries in Africa in particular. In Section 2, the international and regional initiatives for malaria prevention and control/elimination are reviewed as well as the role and contribution of multilateral development banks (MDBs) towards the control of

malaria in Africa. Section 3 provides the analysis of the relationship between malaria, socio-economic development and poverty, and reviews the relevance of malaria to the achievement of the health related Millennium Development Goals (MDGs) in the least developed member countries (LDMCs). It also assesses the progress towards the achievement of the relevant MDGs and targets of the RBM programme in light of the resource gaps. In Section 4, major challenges in dealing with malaria for the high and low burden countries are presented. In Section 5, the experience of three case studies in Africa (Uganda, Sudan and Senegal) in combating malaria is presented and the efforts made as well as the major challenges and lessons learnt by these countries are highlighted. In addition one success story, the MFI project in Sudan is highlighted. In Section 6, the way forward is presented and priority actions that may be taken at national, regional and or international levels as well as at the level of the IDB for the prevention and control/elimination of malaria in Africa are identified.

1.4 MALARIA EPIDEMIOLOGY AND BURDEN IN AFRICA

1.4.1 Malaria parasites and principal vectors

Plasmodium falciparum, the cause of the most severe form of malaria is responsible for about 93-98% of the infections and clinical cases in Africa and *Plasmodium vivax* or mixed *Plasmodium falciparum* and *vivax* account for 2-7% (Korenromp, 2005, WHO, 2005). *Anopheles gambiae*, a highly efficient vector, and *Anopheles funestus* are the most widespread vectors in Africa (Africa Malaria report, 2003, World malaria report, 2005). Malaria prevention and control in Africa, unlike other continents, has been difficult to achieve, because the climate in Africa is very suitable for both the vectors and the parasite. Almost 66% of the people who live in the Southern fringes of the Sahara desert in the North, and at latitude of about 28° in the South of the continent are at risk of malaria, but the magnitude of the risk varies (Hay et al, 2004). The favourable climate for malaria is compounded by the high efficiency in malaria transmission of the main malaria vectors found in Africa. Consequently, even small vector populations can maintain malaria transmission leading to substantial morbidity all year round. The latter has implications for the coverage of interventions that interrupt malaria transmission such as insecticide treated nets (threshold coverage in populations at risk of 60 -80%) and indoor residual spraying (IRS) (threshold coverage in populations at risk of over 80%). Below the threshold coverage, there will be sufficient malaria transmission leading to high morbidity and mortality.

1.4.2 The burden of malaria in Africa

In Sub-Saharan Africa (SSA), malaria is among the most infectious diseases, affecting all age groups, but children less than five years old and pregnant women are the most vulnerable in areas of intense transmission. In recent years, malariologists have tended to classify malaria transmission intensity into stable (perennial and seasonal) and unstable (epidemic prone) transmission areas. However, in the past, malaria infection prevalence has been traditionally used to describe malaria endemicity (Metselaar, 1956). According to this classification, the population at risk of malaria in Africa is

estimated to be around 521 million, of which 39.3 million lives in hypo endemic areas, 67.4 million in meso endemic areas, and 414.3 million in the combined hyper and holo endemic areas and 13.6 million in areas that are not classified due to absence of parasite prevalence data (Snow et al, 2005). However, it is pertinent to note that the estimates of the morbidity and mortality attributable to malaria in Africa vary depending on the completeness of reporting, self treatment and non use of formal health facilities and the inherent assumptions in their derivation. For example, one group has estimated the number of Plasmodium falciparum cases in 2002 at 365 million (1.7 million in hypo-endemic areas, 11.5 million in meso-endemic areas and 351.8 million in hyper- and holoendemic areas combined, (Snow et al, 2005). Another group estimated between 205-293 million total malaria cases of which 200-289 million were falciparum cases for the year 2004 (Korenromp 2004). Both sets of estimates are much higher (4- to 7-fold) than the cases reported through national health information systems in African countries. It is estimated that in the year 2000, around 18% of all childhood deaths per year were directly attributable to malaria (Rowe et al., 2004, 2005). Africa contributes approximately 59% of the total global burden of clinical malaria and about 74% of the clinical falciparum burden (Korenromp, 2004). In terms of mortality, Africa contributes an estimated 89% of the global mortality burden (WHO, 2003).

1.4.3 The burden of malaria epidemics in Africa

Historically, malaria epidemics have tended to recur in prone areas (areas of unstable transmission), whether the limiting factors are temperature (altitude) or relative humidity (deserts). In the past 10 years, malaria epidemics have occurred in the highlands of East Africa and in the horn of Africa. Several factors could be responsible for the epidemics such as climatic changes, increasing parasite resistance to drugs and land use for agriculture and swamp reclamation. Indeed, malaria epidemics may be categorised on the basis of their main causal factors (Najera, 1999). For example, there are malaria epidemics due to climatic anomalies such as prolonged rainfall or unusual increases in the mean temperature. A clear example is that due to meteorological phenomena such as the El Nino Southern Oscillation (ENSO) events that are commonly associated with drought or floods and an increase in the mean temperature. Epidemics may occur as a result of complex emergencies where malaria transmission is affected by sudden population movements, war or political instability or they could occur due to a break down in control activities leading to a rebound phenomenon (Najera, 1999). Although, the control of malaria epidemics has been a priority of the World Health Organisation (WHO, 1993), surprisingly, little is known about the public health burden of malaria epidemics. Over the period 1997-2002, malaria epidemics were detected in 41 African countries with an estimated yearly death rate of 155,000 to 300,000 (Worrall et al, 2004). The population at risk of climate dependent malaria epidemics varies according to the methods used for their estimation. However, in 1995 it was estimated that approximately 74 million people were exposed to malaria epidemics in Africa (Snow et al, 1999). In 1996, a WHO estimate based on country specific expert opinion projected the population at risk was 124.7 million (Kawano. 2003).

1.4.4 Effect of malaria on health systems

In sub Saharan Africa (SSA) excluding southern Africa, the malaria cases reported through the National Health Information Systems (HIS) represent only a minor fraction (approximately 30-40%) of the actual malaria burden (WHO, 2003). Access to clinical care is difficult especially in the rural settings that commonly have very intense malaria transmission. Presently, most of the malaria reported from health facilities is based on presumptive diagnosis (without laboratory confirmation). Notwithstanding these limitations, malaria overburdens the health care delivery systems because of the high number of clients' attendance and re-attendance for treatment. Routine facility based reports suggest that malaria is responsible for 25-40% of the out-patient clinic visits (both children under the age of five years and older) and about 20-50% of the in-patient facility admissions (WHO, 2003). Of the cases admitted, approximately 2-5% of the malaria cases die as a result of late presentation, inadequate case management and medicine stock outs. The proportion attributable to malaria among out-patients visits at health facilities for children under five years old ranges from 30 – 40% in West Africa, 25 – 35% in central Africa and East Africa and is slightly lower at 20 – 30% in Southern Africa. Similarly admissions at health facilities for children under the age of five years range from 25-35% in West Africa, 20 – 30% in Central Africa, 30 -40% in East Africa and again are slightly lower at 10 – 20% in Southern Africa (WHO, 2005). Therefore malaria is one of the health problems that increase the work load for health workers. The work load increases significantly with intense transmission where repeat episodes due to malaria are common. Further, there is increased health expenditure on medicines, which has been recently compounded by parasite resistance to the cheap treatment options such as chloroquine (CQ), sulphadoxine-pyrimethamine (SP) and amodiaquine (AQ).

1.5 GROUPINGS OF IDB MEMBER COUNTRIES IN AFRICA

Based on the data on the incidence of malaria the countries in Africa are divided into the following two groups.

1.5.1 High burden countries

The high burden include; Benin, Burkina Faso, Cameroon, Chad, Comoros, Cote d'Ivoire, Djibouti, Gabon, The Gambia, Guinea, Guinea Bissau, Mali, Mauritania, Mozambique, Niger, Nigeria, Senegal, Sierra Leone, Somalia, Sudan, Togo and Uganda. In addition, the high burden countries also include some from WHO/EMR region including the Sudan, Somalia and Djibouti. For example, Sudan accounts for an estimated 21% of the malaria cases in the EMR region (about 5.5 million annual cases resulting in 7000-10,000 deaths per year). However, the whole population of Sudan is virtually at risk, with 80% living in areas of unstable malaria transmission (epidemic prone areas). In the Southern Sudan, malaria is hyper or holo-endemic, with perennial transmission. Somalia also suffers high malaria incidence. In these countries the strategy should be to control malaria so that it is of limited public health importance (Table 1.1 and Figure 1.1 demonstrates the malaria burden and

its relationship to poverty, while Figure 1.2 is an endemicity map from Lysenko previously used in Snow et al. 2005, but has been recently modified to provide the limits of stable transmission in Africa as defined in a new paper in press in PLOS medicine (Snow RS personal communication).

1.5.2 Low burden countries

Many of the low burden countries belong to the WHO/EMR region and are malaria-free, while a few are in the process of eliminating malaria transmission. According to the status of malaria control, these countries can be categorised into two groups: (1) countries free from malaria transmission such as Libya and Tunisia; and (2) Countries with residual foci where elimination of malaria is feasible and sustainable if achieved such as Algeria (from WHO/AFR), Egypt and Morocco. Tunisia and Libya have interrupted malaria transmission and this status has been sustained and any resurgence is effectively controlled. Both countries have maintained their malaria-free status for many years, although Libya recorded some outbreaks in recent years whose origins are unknown as a result of insufficient investigations due mainly to a breakdown of the surveillance system and poor performance of laboratory services. The second group of countries have residual foci of malaria transmission. They include; Algeria, Egypt and Morocco, which have achieved a steady decline in morbidity over the past decade and have controlled malaria to levels where its public health importance is low. Indeed, no cases of malaria have been recorded in Egypt since 1998 and in Morocco since 2000 (WHO, 2003), although the latter does not necessarily imply that the reservoir of malaria has been exhausted. In this group of countries, both elimination and complete interruption of the transmission are feasible in the foreseeable future with intensified efforts.

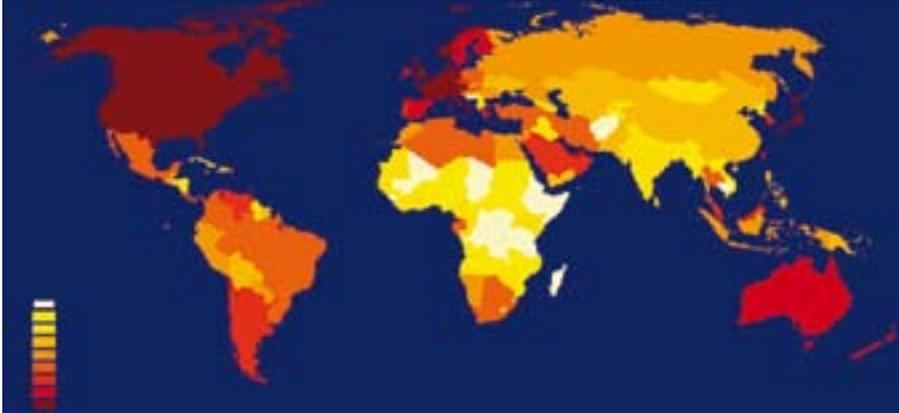
Table 1.1
Coverage of key interventions and reported malaria cases in the high burden countries in Africa

IDB Country	Population (Millions)	Population Growth rate per annum	Infant mortality per 1000 live births	Under-five mortality per 1000 live births	Population in Urban areas (%)	Population at low risk of malaria (%)	Population at high risk of malaria (%)	% of children under five sleeping under an ITN	IRS coverage in population at risk	Completeness of reporting	Cases of malaria reported
Algeria	30.841	2.0	39	49	58						
Benin	6.446	3.0	94	158	42	0	100	7.4	-	27	4,683,567
Burkina Faso	11.856	2.5	104	197	17	0	100	12.4	-	20	671,3298
Cameroon	15.203	2.4	96	155	49	24	74	1.4	-	17	557,7081
Chad	8.135	3.1	117	200	24	14	86	0.6	-	10	4,237,526
Comoros	0.727	3.0	59	79	33	50	50	9.3	-	4	229,872
Cote d'Ivoire	16.349	2.3	102	175	44	0	100	1.1	-	15	694,8136
Djibouti	817	2.6	102	124	84	14	32	-	-	8	60,636
Gabon	1.262	2.7	60	90	81	0	100	1.9	-	19	431,554
Gambia	1.337	3.3	91	126	31	0	100	14.7	-	52	567,334
Guinea	8.274	2.7	109	169	28	1	99	0.5	-	22	4,127,792
Guinea-Bissau	1.227	2.4	130	211	32	0	100	7.4	-	32	75,6670
Mali	11,677	2.6	141	231	30	10	90	8.6	-	2	617,6816
Mauritania	2,747	3.0	120	183	58	59	41	-	-	30	82,7983
Mozambique	18,644	2.9	125	197	32	4	96	3.5	13	39	754,6147
Niger	11,633	3.63	150	265	21	11	89	1.0	-	11	653,9322
Nigeria*	120,047	2.7	75	140	44	1	99	1.2	-	5	5,562,3433
Senegal	9,662	2.5	79	138	47	3	97	1.7	6.5	30	402,5657
Sierra Leone					37	0.1	99.9	2	-	17	241,4767
Somalia*	8,298	3.4	120	224	28	43	53	0.4	-	1	106,7966
Sudan*	34,512	2.5	62	91	36	37	51	0.5	2.4	85	508,8821
Togo	4,657	2.8	79	141	33	0	100	2	-	20	227,4346
Uganda	26.4	3.4	76	137	14	20	73	0.2	0.2	33	124,52346

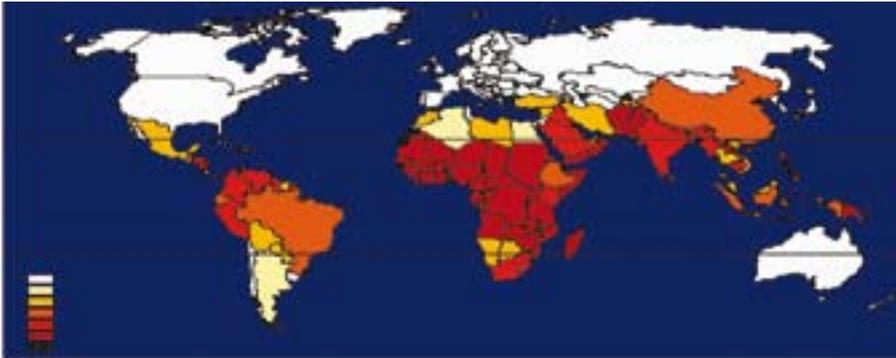
Source: Korenamp E for the RBM Monitoring and Evaluation reference group & MERG Task Force on malaria morbidity, WHO, RBM, Geneva, 2005
 *www.emro.who.int

Figure 1.1
Malaria Burden and Poverty

GNP per capita (1995)

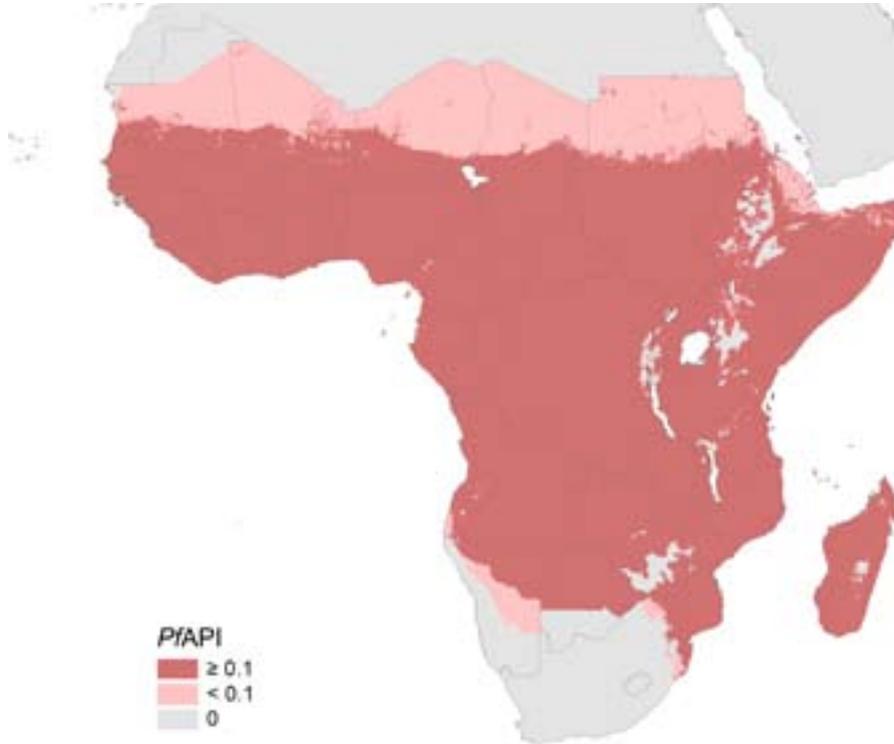


Malaria Index



Source: Gallup and Sachs, 2001

Figure 1.2
Malaria Endemicity Map for Africa



Source: Endemicity map from Lysenko previously used in Snow et al. 2005, but recently modified to provide the limits of stable transmission in Africa (As defined in a new paper in press in PLOS medicine (Snow RS personal communication))



2. ERADICATION/PREVENTION AND CONTROL OF MALARIA: A CRITICAL REVIEW OF INTERNATIONAL AND REGIONAL INITIATIVES

2.1 POLICIES AND STRATEGIES TO CONTROL MALARIA

2.1.1 Eradication Era (1950-1969)

The global programme of eradication was largely based on the successes of indoor residual spraying with DDT in parts of Latin America and Europe. Although many ill informed commentators always solely attribute malaria eradication in the temperate zones to indoor residual spraying (IRS) with DDT, the latter was coupled with improvements in environmental and living conditions as well as urbanization. Further, the climate facilitated a malaria free status in those regions of the world. For Africa, some major events shaped the debate on the strategy, namely: the Kampala Conference in 1950, the Global Malaria Eradication Program and the political independence of most African States in the 1960s.

The Kampala Conference in 1950, probably the first multilateral gathering on malaria in tropical Africa, resolved that malaria in sub-Saharan Africa should be “controlled—by modern methods as soon as feasible, whatever the original degree of endemicity (Dobson et al, 2000). However, at the launch of the 1955 global malaria eradication program five years after the Kampala Conference, Africa was not included because intra-domiciliary insecticide spraying was not considered feasible in much of Africa. Exclusion of the most intensely malarious area of the world from the global eradication program was paradoxical, because one would have expected such an ambitious undertaking to include areas where the burden was the highest (WHO, RBM, 2002, Alilio et al, 2004). As a result of the eradication programme, malaria was eliminated from most areas with relative socio-economic stability in temperate and sub tropical zones in the Americas, Asia, and Europe. In addition spectacular reductions were observed in countries such as India, Sri Lanka and many South American countries. However, in Africa, many national programmes lacked adequate epidemiological skills/knowledge and administrative organisation. These deficiencies were initially overlooked because of the humanitarian appeal of the programme, the sense of urgency, and the feeling that peer pressure could eventually shake the chronic apathy of the health services (Najera, 1999). Although it was possible to reduce or even interrupt malaria transmission by insecticide spraying in large areas, it was difficult to establish effective surveillance in the absence of a solid health infrastructure. Other factors responsible for the lower-than-expected impact of the eradication programme were (Curtis and Lines , 1985): (a) DDT resistance in vector mosquitoes; (b) Objection by local inhabitants to the entry of spray men into their households (McCormack, 1984); (c) Selection of exophilic mosquitoes which do not rest long enough indoors to pick up a lethal dose; and (d) Vertical organisation of vector control programmes, which required an efficient and stable organisational infrastructure. Furthermore, it

was realized that, in the great majority of countries, eradication was not a realistic goal (WHO, 1993) and that there was a need to change from highly prescriptive, centralised control programmes to flexible, cost-effective and sustainable programmes adapted to local conditions and responding to local needs (WHO, 1993). In addition, the emergence and spread of drug resistance further compromised the mass drug administration programs and the eradication strategy. In 1969, the WHO decided that due to various administrative, financial and technical reasons, global eradication of malaria could not be achieved (WHO, 1968) and instead recommended that national governments evaluate their potential to achieve eradication in the short term or otherwise to reconsider them as control programmes without a time limit.

2.1.2 Era of apathy and lack of resources for malaria control (1970-1990)

The failure of the WHO led malaria eradication program led to a general sense of disappointment and apathy globally and the latter was associated with a decline in resource allocation for malaria. Most country programmes collapsed due to lack of human and financial resources. The focus of WHO and partners shifted to searching for new tools or improving existing ones. Consequently, in 1975, the Special Programme for Research and Training in Tropical Diseases (TDR) was established by WHO, UNICEF, UNDP and the World Bank as an independent global partnership for scientific collaboration. The two main objectives of TDR are: (1) to promote research and generate critical new information, and (2) to strengthen the capacity of low-income endemic countries to undertake research required for developing and implementing these new and improved disease control approaches. The TDR now focuses on 10 infectious diseases: African Trypanosomiasis, Dengue, Leishmaniasis, Malaria, Schistosomiasis, Tuberculosis, Chagas disease (American Trypanosomiasis), Leprosy, Lymphatic Filariasis, and Onchocerciasis (Morel, 2000).

2.1.3 Era of renewed optimism (1990- current)

During the period 1970 to 1989 little effort was made at the international and national levels to control malaria, resulting in a resurgence of malaria in Africa. It was not until the early 1990s that renewed efforts to control malaria were started. In 1992, a global malaria control strategy aimed at preventing mortality and reducing morbidity was adopted by the ministerial conference held in Amsterdam (WHO, 1993). This strategy was based on four basic elements:

- To provide early diagnosis and prompt treatment of malaria;
- To plan and implement selective and sustainable preventive measures, including vector control;
- To detect early, contain or prevent epidemics; and
- To strengthen local capacities in basic and applied research to permit and promote the regular assessment of a country's malaria situation, in particular the ecological, social and economic determinants of disease.

This strategy was endorsed by the WHO in 1993 and by the economic and social council of the United Nations in 1994. The increased burden of malaria in Africa in this era also catalyzed the establishment of many multilateral initiatives (programmatic and research), underscoring the need for well-coordinated efforts to tackle funding, research coordination, and promotion of private and public sector cooperation (UN, 1994).

In 1997, the **Multilateral Initiative on Malaria (MIM)** was launched. MIM is an international effort aiming at training scientists, coordinating research funding and promoting greater research and control leadership in Africa (Siegel, et al, 2001, Sina, 2000, Nchinda, 1998). The MIM provides training and research grants through a peer-reviewed competitive process, with a budget of approximately \$2 million per year (MIM secretariat, 2002). Many of the research programs initiated in 1999 by MIM and managed/administered by WHO/TDR, have developed into regional scientific networks comprising several country teams and scientists and address multiple disciplines such as antimalaria drug resistance; epidemiology and information technology; pathogenesis and immunology; and vector biology and insecticide resistance. In the same year (1997), there was the Harare Declaration for Malaria Prevention by the member states of the organization of African Unity (OAU).

In 1998, the global Roll Back Malaria effort was announced by the heads of WHO, UNICEF, UNDP, and the World Bank. The proposed initiative responded to requests from the Organization of African Unity (OAU) for assistance from the international community to help address the malaria problem effectively in their countries, and requests from Heads of State directly to WHO and the World Bank. The Roll Back Malaria (RBM) partnership consists of malaria-affected countries, UN agencies, the private sector, industry, OECD countries, development banks, NGOs, research entities, and the media. The initiative aims to reduce global malaria mortality by 50% by 2010. There are six core elements to the strategy to achieve this goal: (i) early detection; (ii) rapid treatment; (iii) multiple means for prevention; (iv) well-coordinated action; (v) a dynamic global movement; and (vi) focused research. A key ingredient to an integrated and coordinated approach within RBM is the identification and recognition of the comparative advantages of each partner involved at the global, regional, and country level, and the development of mechanisms at the country level to translate strategies into action across sectors. The RBM Partnership serves as an example of how a global priority can more effectively and efficiently be addressed. This initiative has led to increased malaria awareness and in some scenarios has resulted in increased resource allocation for malaria.

In 1999, the **Medicines for Malaria Venture**, a novel public-private venture was initiated by the WHO, the World Bank, and several pharmaceutical companies (Ridley, 2002, Moerman, 2003). The goal is to develop at least one new anti-malarial drug or drug combination every five years and make them available to low-income countries. Several medicine discovery projects and five development projects are now in progress, making MMV the largest anti-malarial drug pipeline since World War II.

In 2000, the African Summit on Roll Back Malaria was held in Abuja, Nigeria, reflecting a real convergence of political momentum, institutional synergy and technical consensus on malaria and, to some extent, other infectious diseases. Forty four of the fifty malaria-affected countries in Africa attended the summit. In addition, the Summit was also attended by the senior officials from each of the four founding agencies -Director General of the WHO, Vice President of the World Bank, Executive Director of UNICEF, and Director of UNDP Africa, as well as other key partners including UNESCO, the African Development Bank, USAID, DFID, CIDA, and the French Co-operation. The Heads of State and other delegates ratified an action-oriented declaration with strong follow-up processes. The Summit concluded with the review and signing of the Declaration and the Plan of Action in which the African leaders rededicated themselves to the principles and targets of the Harare Declaration of 1997, and committed themselves to halve the malaria mortality for Africa's people by 2010. In addition, they agreed:

- to catalyze actions at the regional level to ensure implementation, monitoring and management of Roll Back Malaria;
- to initiate actions at the country level to provide resources to facilitate the realization of RBM objectives;
- to work with partners towards stated targets, ensuring the allocation of necessary resources from private and public sectors and from non-governmental organisations; and
- to create an enabling environment in their countries which will permit increased participation of international partners in malaria control actions. The Leaders resolved to initiate appropriate and sustainable action to strengthen the health systems to ensure that by the year 2005:
 - at least 60% of those suffering from malaria have prompt access to, and are able to correctly use, affordable and appropriate treatment within 24 hours of the onset of symptoms,;
 - at least 60% of those at risk of malaria, particularly children under five years of age and pregnant women, benefit from the most suitable combination of personal and community protective measures such as insecticide treated mosquito nets and other interventions which are accessible and affordable to prevent infection and suffering; and
 - at least 60% of all pregnant women who are at risk of malaria, especially those in their first pregnancies, have access to chemoprophylaxis or presumptive intermittent treatment.

Further, the Heads of State called upon all countries to undertake and continue health systems reforms so as to promote community participation and joint ownership of Roll Back Malaria actions to enhance their sustainability. They noted that health systems should make diagnosis and treatment of malaria available as peripherally as possible, including home treatment, and ensure accessibility to the poorest groups in the community. In addition, they called upon countries to maximize vigilance to

prevent the re-emergence of malaria. In addition, development partners were called upon to cancel in full the debt of heavily indebted poor countries within Africa in order to release resources for poverty alleviation, programmes such as Roll Back Malaria and to allocate substantial new resources of at least US\$ 1 billion per year to Roll Back Malaria and that additional resources would also be needed to stimulate the development of malaria vaccines appropriate for Africa, as well as to provide incentives for other anti-malaria technologies. The Leaders pledged to do the following:

- to implement the agreed Plan of Action within their own countries;
- to develop mechanisms to facilitate the provision of reliable information on malaria to decision-makers at the household, community, district and national levels, to enable them take appropriate actions;
- to reduce or waive taxes and tariffs for mosquito nets and materials, insecticides, anti-malarial drugs and other recommended goods and services that are needed for malaria control strategies;
- to allocate the resources required for sustained implementation of planned Roll Back Malaria actions;
- to increase support for research (including operational research) to develop a vaccine, other new tools and improve existing ones;
- to commemorate this summit by declaring April 25th each year as African Malaria Day;
- to call upon the United Nations to declare the coming decade 2001-2010, a Decade for Malaria; and
- to develop traditional medicine in the area of malaria control.

It is now almost two years past 2005 and most of the Abuja targets have not been achieved. Some of the targets have been revised upwards, implying that renewed efforts are needed for the revised targets to be achieved. By 2002, the resource allocation for malaria prevention and control was still inadequate and **the Global Fund to Fight AIDs, Tuberculosis and Malaria (GFATM)** was initiated to try and alleviate the funding gap. By 2004 the GFATM had allocated 2 billion US dollars for malaria control and prevention over a 5 year period, yet this still falls short of the global needs. Other recent initiatives include the **Malaria Vaccine Initiative (MVI)**, the president Bush malaria initiative (**PMI**), the Bill and Melinda Gates malaria program (BMGMP) and World Bank's Booster programme

Despite these clear strategies and initiatives, malaria has remained a leading cause of morbidity and mortality in Africa, especially among pregnant women and children 5 years and younger, yet the disease is curable and not an inevitable burden. Although effective medicines and preventive measure exist, they reach only a small proportion of the population at risk. Indeed, during the last decade, new medicines and preventive approaches have been developed for malaria case management and for selective vector control as well as epidemic prevention and control. Malaria has become integrated into national health systems of most countries and partnerships have been increased both locally and internationally.

2.2 THE ROLE AND CONTRIBUTION OF MULTILATERAL DEVELOPMENT BANKS TOWARDS THE CONTROL OF MALARIA IN AFRICA

As suggested by their name multilateral development banks (MDBs) provide finance for investment in both human and physical capital that promotes development. This in broad terms is the mandate of the IDB, World Bank and three of the four regional development banks namely: the African Development Bank (AfDB), the Asian Development Bank (AsDB) and the inter American Development Bank (IaDB). In their initial decades of operations, these MDBs primarily financed public sector infrastructure projects through provision of sovereign loans to developing countries. The European Bank for Reconstruction and development (EBRD)-the other regional bank (founded in 1991) following the fall of the Berlin wall was given the mandate to finance investments, mostly in the private sector, that foster the transition to a market economy in the post communist countries. Three characteristics distinguish the MDBs from private financial institutions and bilateral donors namely: 1) their multilateral shareholding structure; (2) a subsidized capital base and access to other subsidized sources of funding; and (3) preferred creditor status.

2.2.1 The Role of IDB

The IDB Vision 1440H identifies achieving healthy human development as one of the key challenges facing the IDB member countries. Although significant strides have been made, member countries still face serious challenges with regard to health conditions. On examining the Human Development Indicators (Annex 1), it is apparent that a significant percentage of IDB member countries are classified as low and medium categories of human development. Poor health is considered a serious problem in a number of IDB member countries. Although the figures for child mortality and maternal mortality are improving, the overall picture is nonetheless worse when compared to other developing countries, high income countries and the world as a whole. If one examines the health condition in LDMCs, the situation becomes even more dismal .

In light of the gravity of the problem, one of the key Strategic Thrusts identified the IDB Vision 1440H is to “Promote Health”. This Strategic Thrust focuses on addressing “the most severe and debilitating threats to health in the Muslim world. These are child mortality, maternal health, diseases including HIV/AIDS and malaria, and environmental sustainability (access to safe drinking water and sanitation)” (IDB, 2006). It must be recognized that these areas coincide with some of the goals of the UN MDGs, and therefore help align IDB’s targets with them. The Vision 1440H also acknowledges that highest priority and added resources need to be channelled to the containment of disease, especially in LDMCs.

The IDB has been active in improving health services in member countries in line with its vision. Its involvement in the social sector is predominantly on the education and health sectors. Specifically with regard to IDB assistance to the health sector,

the focus is predominantly for primary health care focusing on delivery of health services to the rural poor as well as for the establishment of hospitals. By the end of 1427H (January 2007), the IDB had financed projects for health sector amounting to \$1.2 billion. This led to the establishment of more than 2,700 primary healthcare units, over 100 district/regional hospitals, and a number of specialist hospitals in 40 member countries. During the period 1396H-1427H (1976- January 2007), the IDB financed 167 projects in the health sector. This is tantamount to 7.3 percent of its total project financing . The IDB's commitment to the health sector extends beyond the pure financing aspect of health infrastructure.

As malaria has been identified as a key challenge facing some of its member countries, the IDB organized a Symposium on Malaria in 2004, and embarked on a Quick Win Program on Malaria in 2007. These two initiatives are briefly discussed in the following sections.

2.2.1.1 Symposium on Malaria

The theme of the 15th IDB Annual Symposium held in Tehran on 14 September 2004 was "Health Millennium Development Goals : Reversing the Incidence of Malaria in IDB Member Countries". It was recognized that malaria is a complex problem, affecting the vulnerable groups in many IDB member countries and it requires concerted efforts at all levels to address the issue. The Symposium emphasized that:

- i There is an urgent need for effective control of malaria in member countries with a high incidence of the disease due to its negative impact on socioeconomic development;
- ii Achieving the malaria related MDGs in countries with intense transmission and where the disease predominantly affects vulnerable groups (women and young children) will prove to be difficult unless the health status of the vulnerable groups is significantly improved;
- iii Although it may not be realistic to achieve the health related MDGs within the envisaged time frame in complex emergency countries, particularly in Africa, the issue must still be addressed on humanitarian and developmental reasons;
- iv There is a dire need to maintain the efforts to prevent reestablishment of transmission in countries where the interruption of malaria transmission has been achieved, or almost achieved;
- v The international funding required in the medium-term to supplement current inputs for all the low-income IDB members is estimated at US\$500 million per annum; and
- vi The success of malaria control programs depends on the utilization of cross-sectoral approaches and sustained efforts at both national and regional levels.

The main determinants of success are:

- Sustained and sufficient financing;
- Effective human resource development;
- Practical integration with general health system planning;
- Partnership with the community, private sector, NGOs and all other agencies; and
- National government commitment and leadership.

The symposium resulted in several recommendations for action at the national, regional and IDB Group levels. The recommendations made to IDB were to:

- i. prioritise health-financing programs;
- ii. provide technical and financial support to member countries for effective malaria control;
- iii. support human resource development and management;
- iv. help increase awareness on the seriousness of malaria and its relationship to economic development, the environment, and health in member countries where malaria is prevalent;
- v. encourage and support innovative approaches to malaria prevention and control which are based on local resources and technology and supported by evidence.
- vi. consider developing innovative financing mechanisms to accelerate malaria control in member countries.
- vii. incorporate into project planning and implementation prevention and control measures for transmission of malaria where applicable;
- viii. support malaria research, the development of innovative strategies for effective malaria control, medical training, environmental education and public campaigns;
- ix. support regional initiatives to control malaria in member countries; and
- x. help demonstrate via successful malaria control programs in member countries that malaria is not an intractable problem in the endemic countries.

These recommendations raised several challenges to the IDB, and in order to practically implement these recommendations, the IDB recently embarked on a “Quick Win” on Malaria.

2.2.1.2 IDB Quick Win on Malaria

In line with the resolutions of the 15th IDB annual symposium held in Teheran in Rajab 1425H (September 2004), and the Ten-Year Program of Action of OIC, the IDB has embarked on a Quick-Win “QW” Program aiming at combating malaria in 10 highly malaria endemic member countries. These countries are Burkina Faso, Chad, the Gambia, Guinea-Bissau, Indonesia, Mali, Mauritania, Niger, Senegal and Sudan. The program was launched with an approval of US\$50 million for the initial phase (intended to last two years). It is estimated that the total cost for the program could amount to US\$150 million.

The QW Program provides an opportunity for the IDB to play a lead role among agencies spearheading the Roll Back Malaria Program “RBM” by supporting cost effective RBM and integrated disease surveillance and response in target member countries through project financing and technical assistance activities. The program adopts a holistic approach for malaria management encompassing integrated disease surveillance, training of manpower, provision of essential commodities, support for applied research, and monitoring and evaluation. It is anticipated that the QW program will result in:

- lowering the incidence of malaria in target member countries;
- creating a Malaria Coordination Body encompassing international and sister financial institutions/donor agencies to ensure synergy and complementarity of efforts;
- supporting production and distribution of essential commodities for RBM at country level;
- operationalising country-level research and dissemination of best practices for the improvement of the RBM partnership; and
- assisting target countries to build their capacities and to establish Reference Malaria Centers to adopt and exemplify standard management procedures and quality assurance measures in management of the RBM partnership.

The proposed QW program is a cost-effective operation targeting a key developmental impediment. The first two approvals under the QW program are in Senegal and Sudan.

A brief description of the projects is presented in Box 2.1.

Box 2.1

Financing Malaria Initiatives under the Quick Win Program

Objectives of the Program: The Program aims to support the efforts of the respective Governments in achieving the Millennium Development Goals through the reduction of Malaria morbidity and mortality rate. The Program consists of prevention; case detection and treatment, institutional support and Project Management. The Program will be implemented in 24 months in the target countries.

(1) Sudan Central Zone Malaria-Free Initiative Project: The total project cost is estimated at US\$ 13.4 million. The IDB is the lead financier of the project, with total funding of US\$ 7.2 million. The remaining amount will be provided by the EDBI, Ministry of Health, GFATM, WHO, UNICEF, NGOs and local commercial banks. The Executing Agency will be the Federal Ministry of Health represented by the National Malaria Control Program.

(2) Malaria-Prevention and Control in Senegal: The total project cost is estimated at Euro 6.9 million. The IDB is the lead financier of the project, with total funding of Euro 5.8 million with the Government of Senegal providing the remaining Euro 1.1 million. The Executing Agency will be the Federal Ministry of Health and Medical Prevention through the National Malaria Control Program.

(3) Support to Malaria Prevention and Control in Mali: The total project cost is estimated at Euro 3.902 million. The IDB contribution in the project will be Euro 3.36 million with the Government of Mali providing the remaining Euro 0.54 million. The Executing Agency will be the Ministry of Health Prevention through the National Malaria Control Program.

(4) IDB Malaria Control Project in Gambia: The total cost is estimated at US\$ 3.079 million. The IDB contribution in the project will be US\$ 3.0 million with the Government of Gambia providing the remaining US\$ 0.079 million. The Executing Agency will be the Federal Ministry of Health Prevention through the State Department of Health and Social Welfare.

(5) Support to Malaria Prevention and Control in Niger: The total project cost is estimated at Euro 3.410 million. The IDB contribution in the project will be Euro 3.335 million with the Government of Niger providing the remaining Euro 0.075 million. The Executive Agency will be the Federal Ministry of Health Prevention through the National Malaria Control Program.

(6) Malaria Initiatives Under The QW Program in Mauritania: The total project cost is estimated at US\$ 4.435 million. The IDB is the lead financier of the project, with total funding of US\$ 3.100 million. The remaining amount of US\$ 1.335 million will be provided by the Government of Mauritania, The Global Fund, WHO and UNICEF. The Executing Agency will be the Federal Ministry of Health and Social Affairs through the National Malaria Control Program.

2.2.2 The Role of World Bank in malaria control

In 1998, the World Bank launched the RBM campaign, promising to halve malaria deaths this decade. After studying the options the Bank made an un-precedented pledge before the Africa heads of state in 2000, that it would spend \$300-500 million to fight malaria in Africa (World Bank, 2000). In order to define the World Bank's contribution to the RBM aim of a sustainable response to malaria, and to acquire an overview of the country-specific and cross-country needs and opportunities for achieving a sustainable reduction in malaria, six Joint Consultation Missions were undertaken by the World Bank, WHO, and UNICEF from November 1998 to March 1999 in six countries in Eastern and Southern Africa: Kenya, Uganda, Tanzania, Ethiopia, Malawi, and Mozambique. The contiguous grouping was selected to enable the assessment of cross-country needs and opportunities. The mission teams comprised expertise in malaria control, health systems development, public health, and World Bank operations. The joint consultation team met with key stakeholders including government officials, health sector staff, researchers, NGOs, and manufacturers. Country counterparts were very positive about the joint approach of the agencies involved, and supported the effort to define the mechanisms of partnership within RBM. The missions highlighted the impact malaria has in each of these countries, as a leading cause of hospitalization, outpatient care-seeking, death and illness and concluded that malaria control activities can (and should) be integrated within more existing and upcoming World Bank operations. While more resources would ultimately be required, it also became clear that in many cases existing resources were being underutilized, as the public health sector did not have the capacity to absorb and effectively utilize the available resources. Potential World Bank contributions within the Global RBM Partnership were identified by the Missions as follows:

- Incorporating malaria more effectively into Health, Nutrition and Population (HNP) Sector Programs;
- Including tax, trade and regulation issues (e.g. for bed nets, insecticides and pharmaceuticals) in Bank and IMF operations (in Country Assistance Strategies, Policy and Budget Framework Papers);
- Supporting the involvement of the private sector in malaria control (fostering partnerships with the International Finance Corporation, supporting appropriate pharmaceutical policies and social marketing initiatives);
- Applying the Bank's ability to work across sectors, i.e. follow up of the opportunities to address malaria in non-health sectors (e.g. education, infrastructure, environment);
- Considering the role of Health Impact Assessments in avoiding increased malaria risk resulting from infrastructure investments in Africa; and
- Increasing disbursements for malaria as absorptive capacity is expanded, and obstacles to resource flows are addressed.

One of the objectives of the Joint Malaria consultations was the identification of cross-country needs and opportunities. Issues identified concerned common borders, as well as potential gains in economies of scale due to production, supply, research and training. Support to local networks and access to information was also identified. Most of these activities would not be very costly, and other partners (e.g. WHO, NGOs, research institutes) within the RBM partnership who have a greater comparative advantage would support these aspects of the response. The World Bank committed itself to contribute through strengthening and building upon existing regional institutions to support cross-country efforts. A Development Grant Facility (DGF) funding of \$1 million for 1998/99 helped establish a regional RBM Secretariat in Africa. The DGF grant for 1999/2000 was meant to support the RBM Technical Resource Networks in Africa. In addition, the Malaria Team within the Africa Region would work to ensure that Task Teams are aware of cross-country experiences, issues and opportunities.

As a follow-up to the missions, the Malaria Team collaborated with Country Teams to develop some concrete country examples of innovative approaches to address malaria, and employing the Bank's comparative advantages within the Partnership. Progress to date has been made in Ethiopia, Eritrea, Tanzania, and Mozambique within the health sector as well as non-health sector operations. While the missions were a first practical step towards working in partnership on the ground, it became very clear that partnership does not establish itself naturally. Producing some successful "partnership examples" and disseminating these experiences was very important. Similarly, cross-sectoral approaches were not well-institutionalized, and the Malaria Team sought to produce and disseminate enough examples to ensure that such approaches became the norm. Because of the country missions, malaria has been recognized as a corporate priority. Increased recognition of its impact on development efforts, combined with the appreciation that there are effective interventions to control malaria, resulted in additional efforts by all Country Teams in malaria-affected countries. In addition to the increased operational focus on malaria, the World Bank is involved within the private-public partnership to develop new medicines for malaria- The Medicines for Malaria Venture (MMV), MIM, WHO/TDR. Further, the World Bank's Strategy and Booster programme has earmarked additional resources for malaria prevention and control, although its design and formulation received criticism (Attaran et al, 2006). The 2005 Global Strategy and Booster programme commits US\$ 500 million to 1 billion over the next five years, including co-financing that the WB anticipates from partners (World Bank, 2005).

The current challenges for the WB include institutionalizing the mechanisms of partnership; integrating malaria effectively in health sector reform and sector-wide approaches; effectively working across sectors; and accommodating regional/cross-country approaches. To institutionalize working in partnership, the Malaria Team has agreed with the core RBM Partners to focus the spotlight on some evolving country examples and dissemination of the lessons learnt in the spot light countries.

2.2.3 The Role of African Development Bank

Several factors underline the African Development Bank's (AfDB) approach in the assistance given to regional member countries (RMCs) in malaria control. These include the need to be effective, selective and collaborate with other development partners given the enormity of the burden of malaria in RMCs. In this regard, the AfDB has stated in its operational policies that it perceives malaria control as an important and integral aspect of its overarching objective of poverty reduction, and a contributing factor to the achievement of the Millennium Development Goals (MDGs) among which are those specific to fight against communicable diseases. Effective malaria control in RMCs will no doubt contribute to the achievement of these targets. The global partnership, RBM has been established and is committed to making a difference by halving the malaria burden worldwide by the year 2010. This partnership has galvanised action by concerned governments of RMCs, development agencies, civil society, private sector, professional associations, research groups and the media. An important follow-up to the launching of RBM has involved the process of consensus building on an agreed malaria control strategy among African countries. As a result, strategic partnerships for malaria control and identified multi-sectoral linkages to advance the RBM agenda are being revitalized. International mechanisms to monitor RBM achievements and support related resource mobilization efforts will be undertaken through the complementary efforts of the *Global Fund to Fight AIDS, Tuberculosis and Malaria*.

In addition to endorsing the elements and principles adopted in the context of the RBM initiative, the AfDB is guided by the following principles:

- Selectivity and focus: Promoting a wide-range of interventions in malaria control that are proven to be efficacious in averting mortality and disability, and also cost-effective, given the complex interaction between malaria parasites, vector mosquitoes and human populations;
- Feasibility of approaches and affordability: Supporting the integration of malaria control measures across sectors of RMCs to maximize the use of available resources including co-financing mechanisms;
- Empowerment: Assisting individuals, families, communities, governments, institutions, private sector and media among others to contribute towards national efforts in malaria control, and at a sustainable level of effort; and
- Participatory approaches and strategic partnerships: Involving beneficiary communities and the sub-groups within them, and working through strategic partnerships with specialized lead agencies in implementing best practices to assist multi-sectoral malaria control actions in RMCs.

The AfDB's approach in providing assistance for malaria control consists of a combination of multi-sectoral and targeted interventions. Among these interventions are activities that raise awareness on malaria prevention and early treatment as well as impact assessment of development operations to reduce the risks of increased malaria

transmission as a result of the AfDB's assistance. The process of mainstreaming malaria control into Bank-financed operations across different sectors is guided by considerations given to this disease that are incorporated into its sectoral policies.

The AfDB's Malaria Strategy and operational guidelines were developed in 2002 and underscore the institutional priority accorded to fighting malaria. Over the past ten years, the Bank invested approximately US \$ 380 million to fight malaria directly. Most of its financed health projects were aimed at strengthening health infrastructure which is a main cornerstone to alleviating the burden of diseases including Malaria. Of these health projects approximately US \$ 46.5 million had gone to malaria related prevention and control activities within the health sector.

The AfDB is also increasingly including Malaria related components in its agricultural, water and sanitation, infrastructure and education sector projects. The value of its funding of Malaria related components in sectors other than the health sector over the past decade is approximately US\$ 30 million, thus emphasizing the importance of a multisectoral approach to address the complexities of Malaria and its impact. The AfDB is firmly committed to working with African Governments and development partners to address all pertinent issues related to Malaria control in a holistic and multisectoral approach.

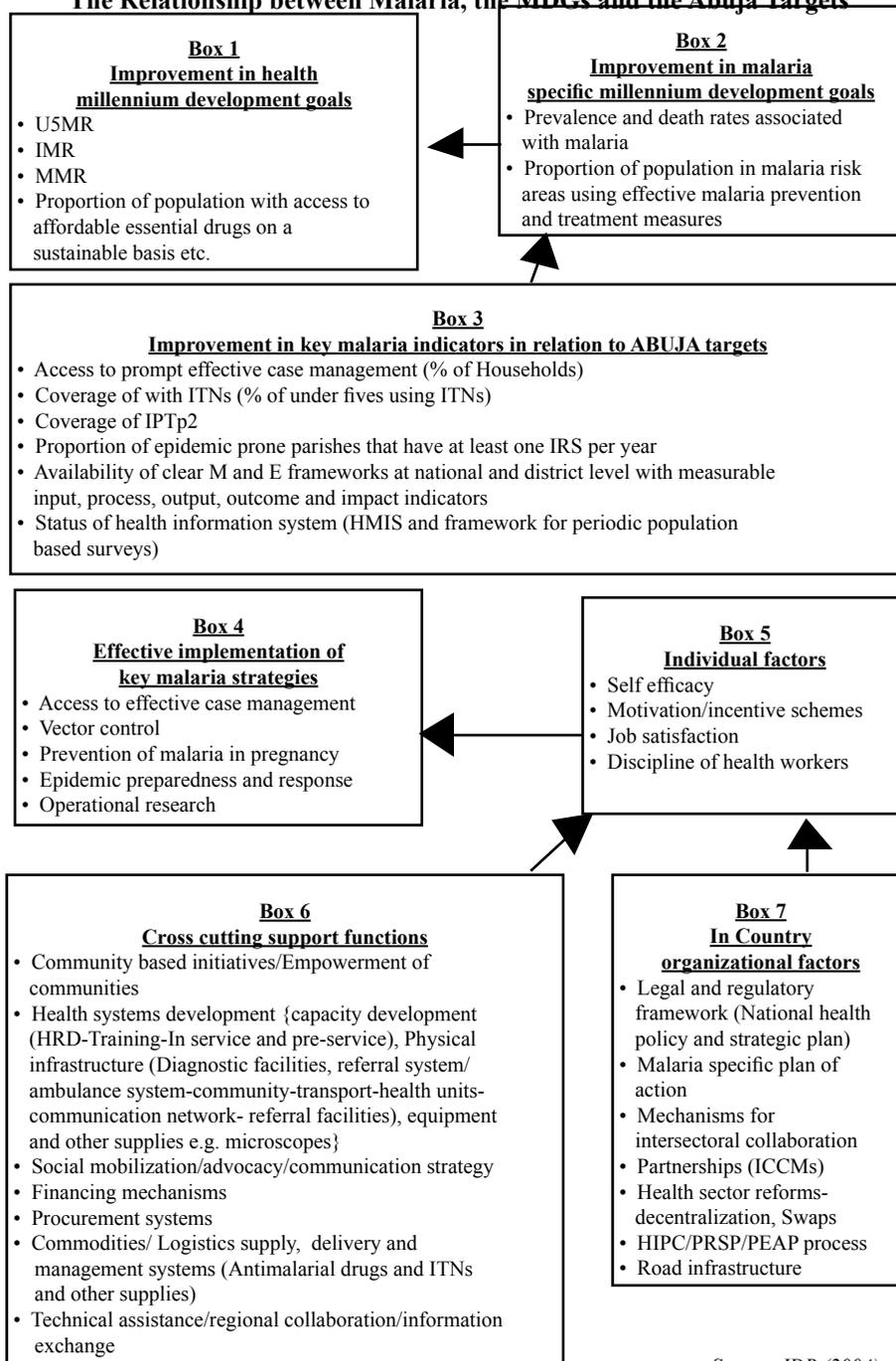


3. MALARIA, THE MILLENNIUM DEVELOPMENT GOALS AND THE ECONOMIC COSTS OF MALARIA IN THE LEAST DEVELOPED MEMBER COUNTRIES

In 2000, leaders from every country agreed on a common vision for the future as a world with less poverty, hunger and disease, greater survival prospects for mothers and their infants, better educated children and equal opportunities of women and a healthier environment. This vision took the shape of the UN Millennium Development Goals (MDGs) which provides countries with a framework for development and time bound targets by which progress can be measured. In addition, in 2000, African heads of state agreed at the Abuja summit to tackle the malaria problem in Africa. The relationship between malaria, the MDGs and the Abuja targets is best captured in the conceptual framework presented in Figure 3.1.

Health should be seriously considered as a priority development issue for every country's economic planning because without good health, individuals, families, communities and nations cannot achieve their social and economic goals. The economic costs of malaria to a given country are immense. WHO estimates that malaria causes a reduction of 1.3% in the annual per capita economic growth rate of malaria endemic countries (MECs) and the long term impact is a reduction of the Gross National Product (GNP) by more than a half percentage point per annum (Sachs and Malaney, 2002). The economic impact of malaria is most noticeable in the rural communities where the peak malaria transmission season coincides with the peak agricultural and crop planting season. Consequently, malaria is a threat to food security in the MECs. Further, malaria is a common cause of absenteeism from school, accounting for about 28% in some MECs. In Uganda, for example, a participatory poverty assessment survey identified ill health as the most frequent cause and reason for poverty (UPPAP Report, 2002) and malaria was a major cause of ill health. Moreover, those in the poorest quintile were the most affected by malaria. Similarly in Zambia, a higher prevalence of malaria infection was observed in the poorest populations (WHO, 2003), while in Ghana, the cost of malaria was found to be about 1% of the income of the rich, yet it was about 34% of the income for the poorer households (Binka et al., 1996). Child mortality rates have also been documented to be higher among poorer households and malaria is responsible for a big proportion of child mortality rates. Indeed, the impact of malaria on child mortality has been well demonstrated in insecticide treated nets (ITNs) intervention studies where it has been demonstrated that prevention of malaria through high ITNs coverage can reduce all cause under-five mortality by approximately 20% (Lengeler, 2004). Therefore malaria prevention and control has a critical role to play in the eradication of poverty and the achievement of the MDGs.

Figure 3.1
The Relationship between Malaria, the MDGs and the Abuja Targets



Source: IDB (2004)

3.1 PROGRESS TOWARDS THE ACHIEVEMENT OF THE RELEVANT MDGS AND RBM TARGETS

3.1.1 Progress towards the relevant MDGs

In 2000 leaders from every country agreed on a vision for the future to take the shape of eight MDGs. A report compiled in 2006 (UN, 2006) demonstrated where the world stands in achieving the set targets. The MDGs that are related to malaria prevention and control are:

- **Goal 4:** Reduce child mortality-Reduce by two thirds, between 1990 and 2015 the under-five mortality rate;
- **Goal 5:** Improve maternal health-Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio; and
- **Goal 6:** Combat HIV/AIDs, malaria and other diseases-Halt and begin to reverse the incidence of malaria and other major diseases by 2015.

Goal 4: To reduce child mortality-Reduce by two thirds, between 1990 and 2015 the under- five mortality rate

Though child survival prospects improved in every region, still 10.5 million children died before their fifth birthday in 2004, most of them from preventable causes. The vast majority of these children (94%) lived in 60 countries. Moreover, sub-Saharan Africa with only 20% of the world's young children accounted for a half of the total deaths, a situation that has shown only modest improvement. Further there are disparities in child deaths both within and among countries. Survival rates for children of mothers with at least secondary education are twice as high as those for children with less educated mothers. Similarly, children living in the wealthiest 20% percent of households are twice as likely to survive as those in the poorest 20% of the households. Addressing these disparities and reaching the most disadvantaged groups is the greatest challenge to achieving the child mortality target by 2015.

Goal 5: Improve maternal health-Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio.

Maternal mortality remains high where most deaths occur. The issue of maternal mortality has been on the international agenda for two decades, yet maternal mortality ratios (MMRs) seem to have changed little in the regions where most deaths occur (sub-Saharan Africa and Southern Asia). Within countries, the presence of skilled attendants at delivery is the most inequitably distributed among child and maternal health indicators. Impoverished rural women are far less likely to receive skilled care during child birth. Inequality between rural and urban areas is particularly significant in sub Saharan Africa. For 33 countries with data, urban women are over three times more likely to deliver with health personnel than women in rural areas. Further, women in the wealthiest fifth of the population are six times more likely to deliver with a health professional than those in the poorest fifth.

Goal 6: Combat HIV/AIDS, malaria and other diseases-Halt and begin to reverse the incidence of malaria and other major diseases by 2015

A growing awareness of malaria's heavy toll has been matched with greater commitment to curtail it. Increased financial flows from the Global Fund to Fight AIDS, Tuberculosis, and Malaria, the World Bank's Strategy and Booster programme, President Bush's Malaria Initiative and the Bill and Melinda Gates Foundation, among others are expected to spur key malaria control interventions, particularly ITNs use and access to effective antimalarial drugs. In just four years (1999-2003), the distribution of ITNs increased 10 fold in sub-Saharan Africa. Despite this progress, urban dwellers are six times more likely to use nets than their rural counterparts, according to data available from a number of countries in the region. Similarly the richest fifth of the population are 11 times more likely to use them than the poorest fifth.

3.2 PROGRESS TOWARDS THE RBM TARGETS

Recognizing that there are proven and effective interventions against malaria, the Roll Back Malaria (RBM) Partnership was launched in 1998 by the World Health Organization (WHO), the World Bank, the United Nations Children's Fund (UNICEF) and the United Nations Development Programme (UNDP), with the overall goal of halving the burden of malaria by 2010 (WHO, 1998). The partnership includes MECs, their bilateral and multilateral development partners, the private sector, academia and international organizations. The following core technical strategies for the sustainable control of malaria have been identified:

- improved and prompt access to effective treatment;
- increased use of ITNs and other locally appropriate means of vector control;
- early detection of and response to malaria epidemics; and
- Improved prevention and treatment of malaria in pregnant women in highly endemic areas.

The data presented below were extracted from the World Malaria Report 2005 (WHO, 2005). For many countries, the primary information source is the annual reporting to WHO by regional and country offices and national malaria control programmes (NMCPs).

3.2.1 Key RBM malaria control goals and targets

Goal: *To halve malaria-associated mortality by 2010 and again by 2015.*

Millennium Development Goals: *Target 8- to have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.*

Indicator 21. *Prevalence and death rates associated with malaria (WHO).*

Indicator 22. *Proportion of population in malaria-risk areas using effective malaria prevention and treatment measures (UNICEF/WHO).*

Abuja coverage targets, from the African Summit on Roll Back Malaria, 2000

By 2005, At least 60% of those suffering from malaria should be able to access and use correct, affordable and appropriate treatment within 24 hours of the onset of symptoms.

At least 60% of those at risk of malaria, particularly pregnant women and children under-5 years of age, should benefit from suitable personal and community protective measures such ITNs.

At least 60% of all pregnant women who are at risk of malaria, especially those in their first pregnancies, should receive IPT.

3.2.2 Progress in all-cause under-5 mortality

In Africa south of the Sahara, all-cause under-5 mortality is an important indicator of the burden of malaria. Children in this age group are those most likely to develop severe disease and are at risk of dying from malaria. Throughout Africa south of the Sahara, the decrease in all-cause under-5 mortality that was apparent during the 1970s and 1980s leveled off in the 1990s (UNICEF, 2004). Besides HIV/AIDS, increased mortality caused by malaria in the 1990s compared with earlier decades is probably among the explanations for this trend (Korenromp et al., 2003)

3.2.3 Coverage of mosquito nets and insecticide-treated nets

Increased national and international funds have boosted the deployment of ITNs. About half of the African countries have waived taxes and tariffs on nets, netting materials and insecticides. Since 2002, several countries started scaling up free of cost or highly subsidized provision of ITNs for children under 5 years of age and pregnant women (Table 3.1). As a result, there has been a substantial increase in ITN coverage in several of these countries, measured by either ITN usage by children under 5 years of age or household ownership of ITNs.

Togo and Zambia	Free distribution to children under 5 years of age during broader health campaigns including measles
Malawi	Social Marketing and distribution of highly subsidized ITNs through mother and child health clinics
Tanzania	Subsidies in the form of discount vouchers delivered to pregnant women through antenatal clinics, in collaboration with the commercial sector
Benin, Eritrea, Ghana, Mali, Nigeria, Senegal	Distribution of free and highly subsidized ITNs through routine antenatal clinics and routine child immunization (EPI) clinics free mass re-treatment campaigns Eritrea
Ghana, Malawi, Uganda, Zambia	National Child health days for distribution of ITNs and re-treatment along with Vitamin A and or de-worming medication
Benin, Kenya, Madagascar, Mali, Nigeria, Tanzania	Social marketing

Source: WHO, Malaria Report, 2005

On an Africa-wide scale, it is more difficult to precisely describe the current level of ITN coverage or the progress in increasing ITN coverage. Of the 45 African countries where ITNs form part of the national malaria control strategy, 36 had a representative household survey that measured child usage of nets and/or ITNs at some point between 1999 and 2004, but most of these surveys were conducted in 2000–2001. According to available surveys, only Eritrea, in 2003, reached the Abuja target of 60% ITN usage. There is a need for additional high-quality household surveys to measure time trends in ITN coverage. Available surveys do indicate that coverage with any net is generally much higher (up to 10-fold) than coverage with ITNs: across all countries with data. Taking the most recent survey point in each country, a median of only 11% of nets used by children under 5 years of age (range: 0–93%, 34 surveys) and a median of just 18% of nets owned by households (range: 1–79%, 10 surveys) were ITNs. Countries where ITN distribution was recently successfully scaled up include Eritrea, Malawi and Rwanda, where over half of nets used by young children were ITNs. A much larger number of untreated nets, compared to ITNs, are already available for at risk populations, especially in West and Central Africa. This indicates that the provision of (re-)treatment of nets as a free public service is an important complement to the distribution of ITNs.

The cost of an ITN is a major barrier to ownership and usage for a large proportion of Africans who are among the poorest of the poor and also the most highly affected by malaria. Although the malaria burden is highest in rural areas and among the

poorest people, ITN coverage tends to be generally higher in urban areas and in wealthier households. This is evident from the data from national surveys. Net and ITN possession and usage by children under- 5 years of age are 2-3 fold lower in rural areas compared with urban areas. Net and ITN possession and usage are between two fold and eight fold lower in the poorest households compared with the least poor households. Social marketing and subsidized or free of cost distribution of ITNs for target groups can effectively reduce this inequity, as was recently illustrated in Ghana, Nigeria and Togo. Since 2002, in deprived areas of Ghana and Nigeria, UNICEF-supported programmes have supplied highly subsidized ITNs to pregnant women and children less than 5 years of age through routine public health services. A year after the programmes began usage of ITNs by children under 5 years of age and pregnant women in rural areas was similar to or higher than that in urban areas. Net possession in Nigeria and net possession as well as usage in Ghana were equally high or higher in the poorest households compared with the least poor households. Although no ITN coverage data from earlier years are available for Ghana and Nigeria, the contrast with less favorable coverage distribution patterns in neighboring countries that lacked subsidized distribution programmes is clear. In contrast to these inequities between urban and rural areas and between poorest and least poor households, no gender inequities are evident: in available survey data, net and ITN usage were generally similar for boys and for girls.

3.2.4 Coverage of antimalarial treatment

About two-thirds of African MECs have changed their antimalarial treatment policy since 1998 in response to the emergence of drug resistant falciparum malaria; of these, 65% have done so since the Abuja Declaration of 2000. By the end of 2004, 23 countries had adopted ACTs in their antimalarial treatment policies, while 22 countries had adopted home management of malaria in their national malaria control strategies, of which 11 are scaling up home management and 11 are piloting the strategy (Table 3.2).

Table 3.2
Countries that adopted and implemented the strategy of home management of malaria in Africa, by the end of 2004

Policy being implemented and scaled up	Benin, Eritrea, Ethiopia, Gambia, Ghana, Madagascar, Nigeria, Senegal, Uganda, Zambia, Zimbabwe
Policy being implemented in pilot areas	Burkina Faso, Cameroon, Guinea Bissau, Kenya, Mali, Niger, Togo, Rwanda, Malawi, Sao Tome and Principe, Sudan

Source: WHO, Malaria Report, 2005

In Africa, where the vast majority of malaria cases and deaths occur in young children, WHO recommends that all acute childhood fevers in areas of high malaria endemicity be treated presumptively with an antimalarial (Nicoll, 2000). Therefore, the proportion

of young children with fever who received an antimalarial drug represents a relevant survey-based indicator of the coverage of antimalarial treatment among all malaria patients with prompt and effective treatment. Between 1998 and 2004, across 35 national surveys, the median proportion of children under 5 years of age that were treated with an antimalarial drug was 49.6% (range 3.0–68.8%). However, most of these antimalarial treatments could not be considered effective since: (i) 95% were with chloroquine, against which there is a high rate of falciparum malaria resistance; (ii) a significant proportion were not started within 24 hours of the onset of fever, so not all treatments were necessarily given in sufficient time to prevent a possible progression into severe life-threatening malaria; and (iii) the dosages typically taken might not always have been adequate for full parasitological cure, although dosing was not measured in national surveys. For these reasons, the coverage with prompt and effective antimalarial treatment was probably much lower than survey data indicate. However, it is likely that the proportion of fevers treated with effective antimalarial regimens is now increasing in those countries that have recently implemented a change in drug policy to combination treatment.

3.2.5 Malaria prevention and treatment in pregnant women

In all sub-regions of Africa, well-timed antenatal clinic attendance is key for delivering the malaria prevention package to pregnant women, since surveys have consistently shown that at least two thirds of pregnant women in MECs use antenatal care, and most of them attend antenatal clinics at least twice. Since approximately 40% of these women present for the first time to an antenatal clinic in the second trimester of pregnancy, the first dose of IPT could be given in time to most pregnant women. While initially few countries were using antenatal care services for IPT, the integration of IPT into these services became part of the national malaria control strategy in 21 countries by the end of 2004. However, only 11 of these countries are at some stage of actually implementing IPT. In Kenya, Malawi, Uganda, United Republic of Tanzania and Zambia, implementation covers the whole country or scaling up towards countrywide coverage is on track. Coverage of pregnant women with IPT using sulphadoxine–pyrimethamine, according to national surveys in Ghana, Kenya and Zambia, generally remains below 10%. An exception is the 47% coverage in Malawi, the first country to adopt IPT in its national malaria control policy. The interpretation of these data is complicated because some surveys measured the receipt of sulphadoxine–pyrimethamine specifically during antenatal clinic visits, while other surveys measured any usage during pregnancy regardless of the occasion or source; the latter would include both preventive and curative treatments and thus overestimate IPT programme coverage. Moreover, for both outcomes some surveys reported use of sulphadoxine–pyrimethamine regardless of the number of doses, while others reported coverage only for those women who received at least 2 doses during the pregnancy, which is the WHO-recommended frequency for IPT policy. Standardizing assessment of IPT coverage in household surveys will address these inconsistencies.

IPT coverage was fairly equally distributed between urban and rural areas and between less poor and poorer women, reflecting that antenatal clinic services are widely used

among all socioeconomic levels of African populations and thus providing a major opportunity for delivery of IPT. National-level surveys indicate that use of mosquito nets among pregnant women in malaria-endemic countries remains unacceptably low. The proportion of pregnant women sleeping under a net (irrespective of the net's treatment status) was a median of 15% (range 5.4–34.1%) across 10 surveyed countries. Coverage with ITNs was a median of 2.8% (range 0.5–31.4%) across 8 national surveys.

3.2.6 Coverage of indoor residual spraying

About half of the MECs, mainly in Southern and East Africa, include targeted IRS in their NMCP strategy. An increasing number of African countries use IRS for mosquito control, and the reported number of households or units sprayed rose from around 2.7 million in 1999 to over 4 million in 2003.

3.2.7 Coverage of epidemic detection and control

Of 17 countries that reported at least one malaria epidemic between 1999 and 2004 (totaling 119 epidemics), 9 reported using a weekly surveillance system that allowed them to detect ongoing epidemics and, subsequently, to respond within 2 weeks (WHO, 2004).

3.2.8 Drug efficacy

Chloroquine failure rates were between 50% and 60% in East and Central Africa in recent years, respectively. In West and Southern Africa, typically between 10% and 30% of treatments with chloroquine fail. These failure rates are similar to those in the 1990s, confirming that chloroquine resistance had already spread widely throughout Africa more than a decade ago. The fluctuation in median failure rates from 1994 to 2004 reflects that sites sampled for efficacy testing varied over the years: not every site was repeatedly sampled to track the actual local time trend. Resistance of *P. falciparum* against the most affordable alternative drug, sulphadoxine–pyrimethamine, is typically 10–20% in East and Southern Africa and around 10% in Central and West Africa. The few available studies of chloroquine combined with sulphadoxine–pyrimethamine from just 6 countries show failure rates ranging from 3% in Comoros to 13% in Rwanda. Amodiaquine resistance has of recent increased in East and Central Africa.

3.3 Resource gaps for effective implementation of RBM

The WHO has estimated that the cost to support the minimum set of malaria interventions required to achieve the 2010 Abuja targets and the MDGs for malaria by 2015 for 82 countries with the highest burden of malaria is around US\$ 3.2 billion per year (US\$ 1.9 billion for African countries and US\$ 1.2 billion for the others (Kiszewski A et al., 2005). Earlier estimates for scaling up malaria interventions suggested that US\$ 2.5–4.0 billion was needed for 50–70% coverage (WHO, 2001, *Macroeconomics for Health*). Of this total cost, LLINs would account for about 10%, ACTs (which as of 2004 cost over 10 times as much as conventional monotherapies) would account for

around 36% and rapid diagnostic tests for around 17%. Programme costs involving improvement of health infrastructure, human resources and monitoring and evaluation would cover about 19% of costs. The remaining 17% would be directed towards specialized interventions such as malaria in pregnant women in Africa, epidemic control and the treatment of severe and complicated episodes.

In most of the countries with a high malaria burden, the financial gap between what funds are needed and what are available remains large. Understanding the financial resources available for control activities is an important part of monitoring efforts. In general, government expenditures on health are lowest in those countries and regions with the highest burden of malaria, both for absolute per capita expenditures and for health expenditures as a proportion of all government expenditures. The Maputo Declaration in July 2003 (Africa, Union, 2003) reaffirmed the commitment of African governments to increase financial support for the health sector to a target level of 15% of all government expenditures. In most African countries, private and out-of-pocket expenditures on malaria prevention and treatment are high relative to government expenditure (Ettling, 1994). In addition, among African households, out-of-pocket expenditures on malaria prevention and treatment as a proportion of annual income are greatest in the poorest households (WHO, 2004).

From available data, governments are the main source of funding for malaria control programmes, accounting for 71% of financial contributions in Africa, 80% in Asia and 96% in the Americas. The remaining contributions represent a mix of bilateral donations, foundations, multilateral lending agencies and international donations. The precise breakdown of nongovernmental contributions is not specified by all of the programmes.

3.4 The Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM)

The GFATM, which started disbursements of grants for malaria control in 2003, has become an important international source of additional funding for scaling up malaria control. In accordance with the RBM recommendation, the GFATM endorses the use of ACTs as the choice of antimalarial treatment for countries affected by drug-resistant falciparum malaria, in particular in Africa. By the end of its first four funding rounds up to the end of 2004, the GFATM had US\$ 3.1 billion dollars of committed funds, of which 31% has been targeted to support proposals for control of malaria. In 2003–2004, US\$ 200 million was disbursed to 28 countries in Africa, 15 countries in Asia and 4 countries in the Americas. Malaria allocations on a five-year basis now total about US\$ 1.8 billion, with the approved commitments for 2005–2006 totaling US\$ 881 million. Up to this point there has been a longer than anticipated time lag in the implementation of GFATM grants; by September 2004 a total of US\$ 130 million had been disbursed, but only eight malaria grants totaling US\$ 33 million had already concluded one year in operation.



4. CHALLENGES TO EFFECTIVE MALARIA PREVENTION AND CONTROL IN IDB MEMBER COUNTRIES

4.1 HIGH BURDEN COUNTRIES

4.1.1 Weak health systems

The national health system for most of the member countries still needs strengthening, yet most development partners consider health systems development a domain for the countries and therefore do not channel enough development assistance in this critical area. Consequently, important health system aspects such as the referral mechanism (community-communication-ambulance-referral health facilities); the health information system and the diagnostic capacity are inadequate for successful malaria control and needs to be strengthened. Of particular focus in the area of ACTs is the infrastructure for improved diagnosis of malaria

4.1.2 Inadequate human resource capacity

Inadequate human resources, high staff turnover as a result of changes in key staff, ill health and ‘internal and external brain drain’ are major risks to the successful implementation of malaria prevention and control. Development partners, ministries of finance and human resource planners need to be sensitized about the human resource implications for malaria prevention and control. The latter will facilitate the justification for adequate financial resources to support human resources capacity building. The human resource gap is even more critical at the community level. Consequently, innovative approaches such as work-based capacity building activities to reduce the amount of time away from work and strengthening core staff to take up leadership positions within clear existing career structures could help to ameliorate the risks of inadequate human resource capacity. Further, stop gap measures such as task shifting may be needed in some scenarios. The latter has ameliorated human resource constraints in HIV/AIDs control and could be extrapolated to malaria prevention and control/elimination.

4.1.3 Inadequate integration of different sectors and programmes

The terms vertical and horizontal are familiar to most people working in public health and health systems. Gonzalez (1965) notes a number of points that remain relevant today viz:

- The two approaches should not be seen as mutually exclusive; general health services and mass campaigns should be coordinated and combined in various ways with a long term goal being a unified scheme of general health services;
- General health services have the advantage of being comprehensive, flexible in adjusting to changing disease pattern; permanent and embedded in community life;

- Mass campaigns can deal effectively with scourges that are widespread and affect such a large proportion of the population as to be a dominant factor in hindering the social and economic development of a country; and
- The decision of whether a mass campaign is a suitable method of dealing with a disease depends on such issues such as the intrinsic importance of the disease; whether the disease is a major constraint on economic development; population attitudes and preferences; availability of technical tools; and operational and administrative feasibility.

The current over enthusiastic focus on multiple vertical approaches without due consideration to general health system strengthening threatens to divert essential resources, including personnel, away from major communicable diseases such as malaria. For any programme to be successful and have long term gains there will be a need to establish effective partnerships with a range of disease control programmes, development partners and other sectors at local, national and international level. A critical challenge therefore, is the fostering of the collaboration between programmes such as HIV/AIDS, reproductive health, and the expanded programme for immunization (EPI) to ensure that opportunities for integration are maximized for rational use of scarce resources. Nevertheless, it is pertinent to note that a vertical approach may be the most ideal if the target is eradication/elimination and then minimal resources are retained for effective surveillance. Further, there may be a need for an initial vertical approach for some interventions such as IRS and mass campaigns for ITNs to increase coverage to a critical threshold.

4.1.4 Organizational, supervisory and management capacity

A key challenge for scaling up some of the cost effective interventions is the logistical and organizational restructuring that is needed. For example, mass campaigns for free ITNs or IRS require adequate planning, adequate human resources, and timely procurement of supplies, good logistics management, storage, delivery, re-treatment facilities as well as monitoring and accountability. The appropriate delivery channels (public and or private) still remains a key issue and country specific models, that are based on the local context will be needed.

4.1.5 Inadequate monitoring and evaluation systems

Robust monitoring and evaluation of programme processes, outputs, outcomes and impact is a big challenge because for most countries monitoring has largely focussed on process indicators which could be easily monitored through the routine health facility based reporting systems despite their shortcoming of incomplete and non timely reporting. However, several malaria indicators require population based estimates and these have not been incorporated within the data collection systems of most IDB member countries. Monitoring such indicators will demand more frequent population based surveys and in some cases linkages to demographic surveillance sites (DSS) such as the INDEPTH demographic surveillance network. However, the latter should not place an extra burden on the already over-stretched local health

systems. The systems to be established should be complementary to local health information collection and dissemination mechanisms. An important starting step is the identification of key deliverables, milestones and verifiable indicators to be used as benchmarks for assessing progress and evaluating impact.

4.1.6 Inadequate capacity for communicating knowledge to the public

Many malaria control programmes have clear sets of activities to achieve their targets and some countries have best practices in scaling up implementation. However, such best practices have not been widely shared with other countries and the media for dissemination. Experiences about successful components of malaria control programmes are hardly disseminated. Furthermore, a key challenge is inadequate capacity for communication experts with diverse expertise in effectively communicating knowledge. Ensuring regular best practice sharing workshops at which IDB member countries share success stories and lessons learnt will be a major challenge.

4.1.7 Combination therapy and its challenges

The challenge that antimalarial drug resistance poses to the health services, especially in Africa, is enormous. To deal with drug resistance, the most affected countries need to select the best affordable treatment option as quickly and cautiously as possible so as to avert deaths and also 'protect' the drugs from the development of resistance. ACTs at the moment offer the best option for providing efficacious treatment that will hopefully last for a long time. However, some implementation challenges have to be addressed in the era of ACT such as their delivery at the most peripheral level, the patient's compliance and the involvement of the private sector. The implementation of an ACT policy will also require innovative ways of delivering it to the peripheral health units and implementation/operational research is required in this area. ACT will also need improved coverage of confirming the diagnosis of malaria so as to reduce the number of cases that are treated unnecessarily. The rapid diagnostic tests (RDTs) that are currently available should be used more for this purpose. However, such tests will increase costs and the logistical constraints for the management of malaria cases, especially if health workers do not adhere to the results of the test. Further, innovative approaches to validly document adverse drug reactions are required. Monitoring the potency and bioavailability of antimalarial drugs to avoid counterfeits is an extremely important but difficult task that will need efficient drug regulatory agencies (DRAs).

4.2 LOW BURDEN COUNTRIES

Some of the challenges for malaria prevention and control/elimination in the low burden countries are similar to those of the high burden countries. They include inadequate trained staff at different levels and specifically for planning and management; weak health systems (insufficient health care coverage and inadequate facilities for proper malaria diagnosis, weak health information systems) as well as poor health infrastructure and weak capacity of the national malaria control programmes; frequent shortages of commodities such as anti-malarial drugs, especially in rural

areas; use of low quality and ineffective anti-malarial drugs; high treatment failure rates to commonly used affordable anti-malarial drugs; and resistance of vectors to insecticides in most countries.

A critical challenge of the countries that aim at elimination of malaria is ensuring a robust and timely early warning and surveillance system for both autochthonous and imported malaria cases. This will require the estimation of national and sub national annual parasite infection (API) rates as well as Plasmodium falciparum ratios. Further, such countries will need to establish an early detection system (EDS) and to have at the ready adequate resources for prompt response to any new cases of malaria after the certification of a malaria free status.



5. CASE STUDIES

5.1 UGANDA

5.1.1 Country Profile

Uganda is a landlocked country located in East Africa and whose land and water surface covers 241,139 km², of which 18% is open water and swamps, and 12% is forest reserves game parks and mountains. With the exception of the mountainous areas where temperatures may drop below 10°C, temperatures in Uganda range from 16°C in the south-western to 36°C in the north-eastern region. The latter has important consequences on the distribution of vegetation, land use and fauna including human parasitic diseases such as malaria. Uganda, like most of the malaria endemic countries is resource constrained and has poor health status indicators.

5.1.2 Health situation

Prior to the upheavals of the 1970s and early 1980s, Uganda had the best health indices in the sub-region. However, these dropped in rank to among the lowest in key health status indices in the sub region. The years of civil strife left the Ugandan health system in serious disrepair. Although the country has made some steady progress in recovery and rehabilitation since 1986 (as demonstrated by marked achievements in economic growth over the last 15-18 years), there has not been a matched improvement in the health indicators (UDHS Report, 1989, 1995, 2001, 2006). The infant mortality ratio (IMR), child mortality ratio (CMR) and maternal mortality ratio (MMR) still rank among the highest in the region (UDHS Report, 2001, World Health Report 2001). Presently, Uganda has one of the highest population growth rates in the world (3.4% per annum) with the total population projected at 28 million people (Ugandan Bureau of Statistics). The IMR is 76 deaths/1,000 live births and the average life expectancy at birth is 45.3 (male: 43.8 years and female: 46.8 years), while the MMR stands at 435 per 100,000. According to the 1995 Burden of Disease study in Uganda, 75% of life years lost to premature death are due to ten preventable diseases including perinatal and maternal related conditions, malaria, Acute Lower Respiratory Infections, AIDS and diarrhoea. Taken together the latter account for over 60% of the total burden of disease. Poor health outcomes extend throughout the Ugandan society and a significant proportion of the mortality (approximately 20-23%) is attributable to malaria and malaria-related illnesses. A major challenge for Uganda is therefore to improve the health status indicators and the latter has been the basis for the National Health Policy (NHP) and the Strategic Plan.

5.1.3 Access to Health Services

The health care delivery system in Uganda is decentralized and the country's 79 districts have further been sub divided into 216 functional zones called Health Sub-District (HSDs). Within the HSD there are several health units (Health Centre II-IV) that offer curative and preventive services. Eleven (11) regional referral hospitals and the two (2) national referral hospitals (Mulago and Butakika) form the nuclei for strengthening referral functions within the health system. Despite concerted efforts by the Ministry of Health (MoH) to improve access to health care through rehabilitation and construction of new health units, accessibility to basic health services (i.e. percentage of the population living within five kilometers of a health facility) remains low (approximately 49%) and only 43% of parishes (second smallest administrative unit) have any type of health facility (Health Facilities Inventory, 2000). Furthermore, there is wide variation between rural and urban areas. Moreover, there are disparities between and within districts. The Participatory Poverty Assessment Project (UPPAP, 1998) has demonstrated that 44% of the Ugandan population lives below the poverty line. The most recent household survey conducted by the Uganda Bureau of Statistics (UBS) has shown that the population living in poverty is about 31% and the majority of the poor live in rural areas. A major challenge is thus to extend basic health care services to the entire population, while at the same time achieving significant reduction in the disparities in health status between the rich and the poor communities.

5.1.4 Malaria situation and epidemiology

Plasmodium falciparum, the cause of severe malaria is responsible for about 92% of the infections and clinical cases (Uganda Ministry of Health, 1992, unpublished data) and *Anopheles gambiae*, a highly efficient vector, along with *Anopheles funestus* are the two main vectors (Okello et al., 2006). These vectors are predominantly anthropophilic (feed exclusively on humans), endophilic (rest indoor) and endophagic (feed indoor) (Kilian, et al., 1998 unpublished data). Malariometric surveys conducted during the malaria eradication campaign in the 1960s (WHO, 1964; Wilson and Wilson, 1962; Pringle, 1962), and other surveys done in the 1990s (Langi and Lalobo et al., 1994; unpublished data, Talisuna et al., 2002), demonstrate that all levels of transmission exist in Uganda with stable malaria in approximately 90-95% of the country and unstable malaria transmission in about 5-10% of the country. In terms of entomological parameters, the number of infective bites per person per year, a measure of how intense transmission is, varies from 3 (in Mubende) to 1564 (in Apac, Okello et al., 2006). Malaria transmission exhibits seasonality which follows the rainfall pattern. For example, in the south-western region where there are two rainfall peaks, similar peak transmission periods occur that lag behind the rainy season by about 4 weeks and these are associated with malaria morbidity which has been increasing in the recent decades. Morbidity data, based on presumptive diagnosis, demonstrate that malaria has been the leading cause of outpatient clinic visits. Malaria cases observed in health facilities increased from 2.7 million cases (163.1 per 1000 population in 1991 to 3.3 million cases (249.1 per 1000 population in 2000). Similarly, the proportional morbidity ratio (PMR) increased from 20% in 1988 to 38% in 2000.

Like many countries in Africa, there is paucity of malaria mortality data and annual mortality rates for Uganda are not easily available. However, data from selected reporting hospitals show that the case fatality rate (CFR), a measure of the quality of case management, increased in the period 1995-1998 for most hospitals. Data from four districts, compiled in 2000, demonstrate that the CFR for malaria in Uganda is greater than 4%, the lower accepted threshold for sub-Saharan Africa (WHO, 1996).

Malaria epidemics have been observed in Uganda for the period 1992-2000 in three epidemic districts (Kisoro, Rukungiri and Kabale) in south-western part of the country, demonstrating that epidemics have occurred in a cyclical pattern every 2 years. Although, some small epidemics might have been mistaken for seasonal fluctuations because of the difficulty in their recognition, large epidemics have been observed in 1992, 1994, 1997/1998 and 2000. The epidemic in 1997/1998, attributed to increased rainfall as a result of the El Nino phenomenon, is the largest recorded in the country. Indeed, there was higher monthly rainfall in October 1997 through to February 1998 compared to the monthly mean for the period 1951-1997. Similarly, the monthly temperature was higher in the epidemic year compared the monthly median for the period 1993-97 demonstrating the role of rainfall and average temperature in malaria transmission (Talisuna et al., 2004).

5.1.5 Enabling national health policies and plans

The Uganda NHP and Health Sector Strategic Plan I (HSSPI) were launched in 2000, while HSSPII was launched in 2006. The policy and plan identify malaria as one of the priority health problems in the minimum healthcare package. In addition, in 2005, Uganda developed her third malaria strategic plan whose goal is to prevent and control morbidity and mortality and to minimize social effects and economic losses attributable to malaria. The goal of the malaria control programme in Uganda is to prevent morbidity and control mortality and to minimize social effects and economic losses attributable to malaria in the country. Key components of the malaria control strategy in Uganda include:

- Case management- Improving health seeking behaviour; improving access to effective diagnosis and treatment; ensuring adequate supply of effective drugs and ancillary supplies and straightening the referral mechanism;
- Intermittent Preventive Treatment (IPT) -Scaling up access to IPT;
- Vector control- creation of the demand for (Insecticide Treated Nets) ITNs; ensuring availability of affordable quality nets and insecticides; provision of subsidised or free ITNs to vulnerable groups; promoting correct use of ITNs and maintenance of their effectiveness;
- Epidemic preparedness- Development of district malaria epidemic plans; establishment and use of an early warning system; mapping epidemic prone villages and ensuring adequate buffer stocks of drugs, insecticides and other essential supplies;
- Monitoring and evaluation; and

- Enabling and support strategies include advocacy, IEC and social mobilisation, human resource development, systems strengthening, technical support, management and supervision and research.

5.1.6 Current status of control efforts

The Malaria Control Strategic Plan 2001-2005 defines the following key targets to be achieved during the 4 years of its operation:

- To increase the proportion of the population at risk of malaria, who receive appropriate treatment for malaria within 24 hrs of recognition of symptoms, to 60% by end of 2005;
- To increase the proportion of pregnant women receiving IPT to 60% by end of 2005;
- To increase the proportion of children aged less than 5 years, regularly sleeping under ITNs to 50% by end of 2005; and
- To reduce malaria case fatality rate, at hospital level, to 3% by end of 2005.

5.1.6.1 Prevention (Vector Control)

Insecticide Treated Nets

The major focus of the previous vector control strategy was on insecticide treated nets with the intention to achieve the following:

- Creation of demand for nets and insecticides;
- Ensuring availability of affordable quality nets and insecticides in urban and rural retail outlets;
- Provision of subsidised ITNs to vulnerable groups; and
- Promoting correct use of ITNs and maintenance of their effectiveness

To a large extent this has been achieved and has been attributed to the following:

- The waiver of taxes and tariffs on nets and insecticides, the establishment of quality standards for these products through the Uganda Bureau of Standards (UNBS) and the finalization of the ITN policy and strategy document in 2002;
- Active collaboration of all stakeholders in the ITN Working Group of the inter agency coordinating mechanism (ICCM); and
- A good communication strategy that had generic as well as brand specific promotion through the public sector, social marketing organizations and the commercial sector leading to increased knowledge and acceptability of ITNs as a prevention tool.

5.1.6.2 Indoor Residual Spraying

Indoor residual spraying (IRS) is highlighted in the Uganda Strategic Plan as an intervention to halt transmission in epidemic-prone areas. In addition it was proposed to be applied in institutions where the use of ITNs is problematic (e.g. inpatient wards,

military barracks, and dormitories in boarding schools). Start of regular, large scale application of IRS in at least 2 of the epidemic prone districts was envisaged for 2004 funded through the GFATM grant but did not happen due to the delays in procurement. Nonetheless, some progress has been made that will facilitate implementation in the next 5-year plan such as:

- Development of the IRS policy and implementation guidelines as part of an overall Integrated Vector Management (IMV) approach;
- Mapping exercises in the epidemic prone district;
- Detailed, costed plans for the roll-out of IRS operation;
- Training of Staff in several districts in spraying techniques;
- Undertaking studies on the susceptibility of local vectors; and
- In addition, a monitoring and early warning system for malaria epidemics was successfully introduced and operated in two districts in the Southwest, Kabale and Rukungiri.

5.1.6.3 Case Management

The intervention strategy with respect to malaria treatment aims at:

- Improving treatment-seeking behaviour so that patients or caretakers recognise the signs and symptoms, know what action to take and where treatment is available;
- Improving access to effective diagnosis and treatment; in terms of access to physical facilities, drugs and trained providers;
- Ensuring an adequate supply of effective drugs and ancillary supplies; and
- Strengthening the referral system.

a) *Change of the treatment policy*

For the period 1999-2001 chloroquine treatment failures had reached an average of 33% in the country¹ and SP mono-therapy 12% increasing from 5.5% for the period 1995-98. In contrast the combination of CQ+SP had an average failure rate of 7%. Therefore at the end of 2000 a decision was taken to change the 1st line malaria treatment policy to CQ+SP. This was an interim solution due to lack of practical alternatives since data as well as commercial products for artemisinin-based combination therapy (ACT) were still scarce at that time. Treatment guidelines and other training and communication materials were updated, supplies of SP increased and all health staff in the public sector were trained on the new treatment. The actual launch of the policy took place in April 2002 and by 2003 practically all government health facilities used CQ+SP for malaria treatment. In contrast, pick-up was significantly slower in the private sector where in September 2002 only 15% of all shops had both, CQ and SP available².

¹Children under 5 years, 14 day follow-up, average of all studies undertaken.

²Availability of Anti-malarials in the private Sector in Uganda, Commercial Market Strategies Project, October 2002

As had been anticipated, resistance to SP as well as CQ+SP continued to rise and reached an average of 16% and 12% respectively during the period 2002-2004. At the same time, studies indicated excellent efficacy of 98%-99% for ACTs, namely artesunate+amodiaquine and artemether/lumefantrine. A consensus meeting was convened in 2004 and it was decided to change 1st line treatment policy to artemether/lumefantrin. In order to enable broad access to ACT treatment also in the private for-profit sector, artesunate + amodiaquine has been defined as an alternative 1st line treatment³. Detailed projections of the number of treatments needed in the various sectors have been made and funds for the drugs secured through a GFATM grant (round 4). The existing systems for supply management in the public and NGO sectors have been prepared and training and communication materials have been updated. The launch and roll out of the new policy was done in early 2006. The major challenge will be to avail ACTs not only through the public sector but also through the many for-profit outlets that serve as a major source for malaria treatment.

b) Home based management of fever

In order to complement availability of free malaria treatment through public health facilities and bring it closer to the home, a programme of home-based management of [malaria] fever (HBMF) for children less than 5 years of age was introduced in 10 districts in 2002. The blister packed combination treatment of CQ+SP (in two age-dependent and colour-coded packages), one for children 6 months to 2 years and another for 2-5 year olds. The treatment is called “HOMAPAK” and produced by local pharmaceutical companies. The drugs were initially distributed directly to districts by the NMCP but delivery was later integrated into the existing essential medicines supply system. Households, i.e. caretakers of children with fever, access the treatment through volunteers called Community Drug Distributors⁴ (CDD) of which two are selected and trained per village. These CDDs report to and receive supplies from the nearest health facility which is also responsible for the supervision. Between 2003 and early 2005 this programme has gradually been rolled out to cover all districts in the country including the IDP camps in the North. However, not everywhere is each and every village covered concentrating on the difficult-to-reach areas with poor health infrastructure.

Achievements:

A number of surveys and evaluations have been carried out to assess the performance and impact of the HBMF programme⁵.

³At the time reduced price artemether/lumefantrine (Coartem) through the WHO agreement with the manufacturer is only available for public and not-for profit facilities

⁴Increasingly also called Community Medicine Distributors (CMD)

⁵For example: a) baseline and follow-up survey in 9 districts, MoH/WHO/Basics II 2004; b) Baseline & follow-up survey in IDP camps, Kitgum District, MoH/Malaria Consortium/UPHOLD, 2004, c) survey on adherence to community treatment with HOMAPAK in IDP camps in Kitgum, UNICEF/Malaria Consortium, 2005, d) Assessment of implementation and operation of HBMF at district and community level, MoH/WHO/Basics II, 2004; e) Report on workshop to share district experiences of HBMF, MoH 2003; f) Review of implementation of the HBMF strategy in UPHOLD supported districts,

- Results indicate that compliance with this treatment is excellent (>95%) and an increase of timely treatment of fever episodes is achieved: ~55-60% within 24 hours and 80% or more within 48 hours of onset of symptoms;
- A significant reduction of severe anaemia (up to 60%) can be observed, particularly among younger children (less than 2 years);
- No scientific data is as yet available documenting a decline in mortality rates but district records do indicate a reduction in severe cases and death; and.
- HBMF has been shown to mainly reduce the proportion of cases that seek treatment from drug shops and informal private sources where the quality of services is usually poor and difficult to control.

Challenges:

The major challenges for the implementation of the HBMF programme are:

- to sustain the initially excellent motivation of the volunteer s- lack of remuneration or other sorts of incentives often lead to a high attrition rate (up to 50%);
- to improve supervision, data flow and utilization and supply management through the supporting health facilities which often is hindered by insufficient operational funds and human resources;
- to avoid the establishment of a vertical programme and ensure integration with other community-based health activities such as IMCI; and
- to ensure continuity of the programme during the transition to the new treatment policy using ACTs. This is a particular challenge since it involves regulatory issues (are community volunteers allowed to handle this new drug?), safety issues (pharmacovigilance), operational issues (should attempts be made to restrict treatment to parasite positive cases by introducing rapid diagnostic tests? Is that feasible at community level?), and financial issues (how to finance this extra need for drugs?).

c) Laboratory diagnosis

Over the years repeated attempts have been made to improve the availability and quality of laboratory diagnosis of malaria through training and provision of microscopes. However, these efforts have been of limited success and it proved very difficult to ensure that all necessary inputs, sufficiently trained laboratory personnel and equipment and supplies, are available at the same time. While the proportion of health facilities with functional microscopy services has increased over the years still only 8% of all cases reported in the HMIS in 2004 were laboratory confirmed. Particularly regular supervision and quality control of laboratory services in the public as well as in the private sector are still insufficient or absent.

Rapid diagnostic tests (RDT) for *Plasmodium falciparum* have been tested in Uganda repeatedly for their accuracy and feasibility of use in peripheral health facilities⁶ and found to be useful in settings where no laboratory is available and the indication for the test is limited to specific target groups. They have been routinely used for the investigation of suspected malaria outbreaks as well as by some NGOs in the context of clinical services in the IDP camps in the North but not on a larger scale in the public health services.

d) *Management of severe malaria*

Efforts to improve the management of severe malaria at health facility and hospital level started in 1998 with the adaptation of the WHO training materials for Uganda and a first round of training workshops in the districts focusing on physicians. The following activities have been accomplished:

- 2,150 health workers in 80 hospitals (30 districts) were trained in severe malaria management using an updated training manual;
- Additional support materials such as posters with guidelines for severe case management were produced and widely distributed;
- Availability of oral and injectable quinine was improved through procurements funded by DFID; and
- Average case fatality rate in hospitals reported in the HMIS reduced from 4.1% in 2000 to 3.0% in 2004.

While the situation clearly has improved severe malaria management remains a challenge since it not only depends on adequate training and availability of anti-malarial drugs but also on referral practices and general infrastructure and organisation of hospital services which are only slowly improving.

5.1.6.4 *Malaria in Pregnancy*

Although the Malaria Strategic Plan identifies IPT in pregnancy as a key intervention, it was realized very early during implementation that a more comprehensive and integrated package for malaria in pregnancy was needed. This is reflected in the Malaria in Pregnancy Control Strategic Plan published in the second half of 2000 which emphasizes three elements: IPT, case management of clinical cases and prevention with insecticide treated nets. The implementation was to be coordinated principally through the Reproductive Health Programme with support from MCP (malaria in pregnancy focal person) and other departments and stakeholders. The objectives were ambitious:

- To have 60% of all targeted population access IPT by 2004;
- To have at least 80% of pregnant women access quality case management according to national guidelines by 2004; and

⁶ Kilian et al.: Application of the ParaSight-F dipstick test for malaria diagnosis in a district control program. *Acta Trop.* 1999, 72:281-93; and Guthmann et al.: Validity, reliability and ease of use in the field of five rapid tests for the diagnosis of *Plasmodium falciparum* malaria in Uganda. *Trans R Soc Trop Med Hyg.* 2002, 96:254-7.

- To have at least 60% of all pregnant women have access to ITNs by 2004

The activities undertaken include:

- *Distribution of treatment guidelines (IPT and treatment) as well as other materials (Flow charts, posters) to all government and NGO health facilities*
- *Sensitization of health workers (by end of 2003 35% of health workers in 40 districts were trained*);*
- *Development of a training course on malaria in pregnancy for midwives and nurses;*
- *Procurement and distribution of additional SP to meet the increased demand*
- *Integration of the number of IPT1 and IPT2 treatments given into the HMIS; and*
- *Establishment a some performance improvement sites to overcome misconceptions and poor practices by health workers.*

*Roll Back Malaria Scoping Study, February 2003

National ITP2 coverage reported through HMIS increased from 22.0% in 2002 to 26.8% in 2003 and 32.9% in 2004.

5.1.6.5 IEC & Social Mobilization

Repeated household surveys from several sources consistently show that more than 90% of the population are aware of malaria and its dangers, particularly for the biologically vulnerable. More than 70% of households know what interventions and measures should be taken with radio and health workers generally being the most important sources of information⁷. The number of leaflets, posters, radio messages and educational films, newsletters for the general public and health workers etc. produced and disseminated by various partners and coordinated by the Department of Health Education and Promotion of the MOH increased dramatically. Several attempts were undertaken to come up with an overall communication strategy

The most important conclusion from the experiences in the past is that IEC/BCC and social mobilization are not merely a supportive strategy for other interventions but have to be seen as a key intervention in themselves.

5.1.7 Integration and Partnerships

Integration of the Malaria Control Programme within the overall health strategy of the MOH has been achieved and there is evidence to show that malaria receives priority attention during the regular health sector review missions. A significant weakness identified in the management of malaria control is the weak coordination. In order to address this issue the Interagency Coordination Committee for Malaria (ICCM) and its various Technical Working Groups (TWGs) were established. The ICCM

⁷D.W. Batega: Knowledge, Attitudes and practices about malaria treatment and prevention in Uganda – A literature review, Health Communication Partnership, February 2004

was successfully established with broad participation from other departments and ministries of government as well as development partners, civil society and the private sector. While these RBM coordination mechanisms proved useful in principle they will need some organizational improvements in the future. Another management issue identified during various missions (e.g. RBM Scoping Study, 2003) has been the lack of communication and coordination within the MCP and frequent distractions through external requests and demands. Although some progress has been made towards a more efficient organization of the MCP, the situation will need further improvement.

5.1.8 Supervisory and management capacity

In order to fulfil the role of the central level to supervise and technically support districts in the provision of health services and implementation of programmes a system of zonal coordinators was introduced in 1998 jointly with the IMCI programme. However, insufficient funds for the operational cost of this system prevented a smooth functioning. With support from various development partners including the GFATM grant (round 2) this system has successfully been revitalized and the zonal coordinators now play a significant role in support supervision, training and improvements in data collection and quality.

5.1.9 Monitoring and evaluation

Quality, completeness and timeliness of malaria related data from the HMIS has continuously increased over the last years. While in 2000 the average proportion of health facilities submitting their reports in time to the district was 73% this had increased to 88% in 2004. Similarly, the proportion of district reports available at national level increased during the same period from 89% to 99%. Also the flow and utilization of this information within the MOH and MCP has improved to a large extent due to the information officer being added to the MCP team. The principle handicap in monitoring progress towards effective malaria control and the set targets remains the fact that many of the indicators are either extremely difficult to measure such as malaria specific morbidity and mortality with no good proxy measures available from routine data collection, or they cannot be measured at all through HMIS and rely on locally or nationally representative household surveys such as ITN coverage or prompt treatment of fever episodes. With support from development partners MCP has managed, however, to develop a very good data base of all available information and survey results including those from the commercial sector partners which has allowed the monitoring of progress in a very reasonable manner.

5.1.10 Financial Resources

The level of funding for malaria control during the period 2000-2005 has been the highest in the history of Uganda. According to an overview compiled in 2004 for the round 4 GFATM application the total amount available for the national response to the disease increased from US\$ 55 million in 2001 to US\$ 73 million in 2004. This figure, however, includes also contributions to the health services and the Minimal Health Care Package in general. Of the resources calculated for 2004 slightly more

than half (53%) were external funds (development partners). Of the external resources 58% were in the form of budget support, 13% bilateral or multilateral projects and 28% from GFATM grants. Major contributors were ADB, USAID/CDC, DFID, Development Cooperation of Ireland (DCI), WHO, UNICEF while many other donors and international NGOs also supported the implementation of the strategic plan. While the increase of financial and human resources for malaria control in the past 4-5 years has enabled the Ugandan RBM partnership to make significant progress towards the set targets, they were not sufficient to reach the level of scale necessary. While the principle strategies for malaria control could be shown to be adequate to make further progress in the future, availing the necessary resources to achieve national scale remains a challenge.

5.2 SUDAN

5.2.1 Country profile

Sudan is the largest country in Africa with a land area of almost 2.5 million km² (nearly one tenth of the total area of Africa). The country has lengthy borders with nine other African countries: Egypt and Libya to the north; Chad, Central African Republic and Congo to the west and southwest; Uganda and Kenya to the south; and Ethiopia and Eritrea to the east. The population of Sudan was estimated to be 36.2 million in 2005 and is growing at an annual rate of 2.6% per annum. Approximately 39% of the Sudanese population is urban and the rest is rural. In 2005, the adult illiteracy rate was 37%. The country is a Federal Republic made up of 26 States, divided into 112 Provinces which are further divided into 614 Localities. The population is unevenly distributed with the highest density along and between the great rivers (the Blue Nile, White Nile and Main Nile) and in the riverine irrigated areas. 35% of Sudanese live in Khartoum and Gezira States which lie at the confluence of the three rivers, in central Sudan. Children under the age of five years comprise 16% and children aged 0-14 years comprise 44% of the total population. Women of child bearing age make up 28% of the population and the total fertility rate (TFR) is 6.05 children. The IMR is 108 per 1,000 live births and the under-5 mortality rate is 157 per 1,000 live births. The MMR is 365 per 100,000 births. Life expectancy at birth (2005) is 57 years. The adult literacy rate (2005) was 63%.

Land use in Sudan is classified (according to rainfall and proximity to the rivers) into desert (34%), semi-desert (20%), forest (35%), agricultural land (7%), and wetland (1%).

Twenty years of war, compounded by drought and famine, have had a profound impact on all aspects of development in Sudan, not least health. During the 1990s the health infrastructure crumbled leading to an upsurge in communicable diseases including malaria. Major population movements have been an important feature of Sudan's health problems. Recent migration from rural southern states to urban areas in central Sudan has resulted in 15% growth in many towns. Large poorly planned settlements with very limited services now surround many larger cities. The latter is of particular concern in

relation to malaria as it has led to an influx of people from sparsely populated hyper endemic or holoendemic areas in the south to highly populated epidemic prone hypo endemic or mesoendemic areas in central regions.

5.2.2 Health services delivery in Sudan

At independence in 1956, Sudan inherited a very good health care system, with good quality of services which were free of cost for all outpatients and inpatients admitted to the “third class” general wards. Inpatients admitted to the better services in second and first class wards had to directly pay or be eligible for admission through the Government health insurance system. The insurance system was compulsory for all civil workers, with premiums being automatically deducted from salaries. Family members were also covered. However, coverage by the health system was limited to about 10% of the population and its administration was highly centralized. The health care system has undergone considerable expansion in its infrastructure. The expansion started in the early 1960’s when the first ten-year development plan was formulated and has continued since then. Due to the inadequate health care system, the statistics on morbidity, mortality, nutritional status and particularly the communicable diseases are not satisfactory.

5.2.3 Access to Health Services

The overall coverage by basic health services is estimated to be about 45-60%. Further, there are significant urban-rural and regional disparities in the availability of health resources and services. For instance, the coverage with Primary Health Care (PHC) services is worse in the South and war affected areas where it is estimated that only 25% of the population have access to acceptable PHC services. Most of the health services in South Sudan are run by NGOs and Donors. The health system is markedly skewed towards hospital and tertiary care services. There has been increased focus on establishing hospitals during the past 10 years (their number increased from 253 in 1995 to 351 in 2004). The ratio is 1 hospital to every 100,000 of the population. The number of beds also increased from 22,444 in 1995 to 24,785 in 2004. The ratio is 72 beds /100,000. PHC facilities include primary health care units (PHCU), dressing stations (DS), dispensaries, health centers and rural hospitals. In principle, PHC units are staffed by community health workers (CHWs), while dressing stations are staffed by a nurse and/or a medical assistant, and dispensaries are headed by a medical assistant. According to FMOH Health Facility Description and Renaming Policy, the minimum acceptable facility level for health services provision is now the Basic Health Unit -which is structured and staffed to deliver the essential package of PHC services. PHC units and dressing stations are below the minimum standard and should be upgraded to become Basic Health Units (BHU). The health centre is the first referral level for the lower-level facilities. According to the standards, it is supposed to be headed by a physician (medical officer/GP). Lower level PHC health facilities (BHU and Health Centers) are supposed to be managed through and financed by the localities. Rural Hospitals are considered as a part of the PHC level and serve as secondary referral level health institutions. Each rural hospital is expected to

have an average bed capacity of 40 to 100 beds and managed and financed by the State Ministry of Health (SMOH). Tertiary hospitals -include teaching, specialized, and general hospitals- are located in State capitals and operated by the SMOHs. In addition, the FMOH operates 21 tertiary-level hospitals and specialized centers.

A health facility survey conducted in 2003 for inventory and quick assessment of infrastructure showed that the public health infrastructure network is relatively small amounting to (5,465) functioning health facilities. Many of the health facilities are either not functioning or not satisfying the minimum requirement. The current health facility/population ratios of one rural hospital for every 100,000 population and one health centre for every 34,000 of the population are below acceptable levels. There is a marked variation between different regions, for example, the ratio in the South is a health centre for every 75,000 people and a rural hospital for every 400,000 people. According to the estimated population of 36.2 millions, the number of health facilities providing PHC services should be around 7,000 health facilities (one facility for every 5000 of the population), as such there is a gap of more than 1500 health facilities. Sudan Health System Survey 2004 depicts the following situation: Only 12% of the existing primary health facilities are providing the minimum essential PHC package. EPI is provided in 74%, IMCI in 20%, Nutrition services in 20% and ANC in 16% of health facilities. There is no well designed and functional referral system; the exceptions are the health insurance corporation and IMCI implementing health facilities.

5.2.4 Malaria situation and epidemiology

Malaria is the leading cause of morbidity and mortality in the Sudan. The annual number of malaria cases is estimated at 5 million accounting for 20-40% of the total outpatient attendance as well as approximately 30% of the in-patient attendance at hospitals. The annual number of deaths from malaria estimated previously to be 35,000 has been reduced to 7000-10,000. Plasmodium falciparum accounts for approximately 90% of clinical malaria incidence and practically all mortality. Virtually the whole population of Sudan is considered to be at risk of malaria although the epidemiology of the disease varies markedly according to location. In the northern and most of the central States of Sudan, including the States of Khartoum and Gezira, malaria is hypo- or mesoendemic. In these areas the malaria situation is unstable and epidemics are common. In the States of Southern Darfur, Western Kordofan and Southern Kordofan, malaria is predominantly mesoendemic but there are hyperendemic areas along their southern fringes. In most of these areas malaria incidence follows a seasonal pattern, with the peak occurring during the later period of the rain season. In the Red Sea State an additional peak towards the end of the year is common. In Gezira State another peak associated with seasonal irrigation occurs early in the year. In the nine southern States malaria is hyper- or holoendemic and transmission is perennial. The dominant malaria vector in hypo- and mesoendemic areas is *Anopheles arabiensis* whilst in hyper- and holoendemic areas *A.gambiae sensu stricto* (rainy season) and *A.funestus* (dry season) are generally responsible for transmission.

Table 5.1
Epidemiological stratification, population at risk,
main vectors and intervention of choice

Stratum	Endemicity	Population at risk (million)	Vector	Selected Interventions
Desert fringe	hypo endemic	2	Anopheles arabiensis	Case management, ITMs, source reduction where appropriate (with community involvement), IRS during emergency
Unstable seasonal transmission	hypoendemic mesoendemic	15	Anopheles arabiensis	Case management, ITMs, IRS during emergency
Stable perennial transmission	hyperendemic	4	Anopheles gambiae Anopheles funestus	Case management, ITMs and IPTs.
Irrigation schemes	usually in mesoendemic zones	2	Anopheles arabiensis	Case management, ITMs, targeted IRS, IPTs, source reduction where appropriate (with community involvement) during emergency
Urban malaria	hypo-endemic mesoendemic	8	Anopheles arabiensis	Case management, ITMs, source reduction where appropriate (with community involvement), larviciding, IRHS during emergency

The old estimate of 7.5 million cases annually has been over-utilized and dates as early as the 1990s. However, recent data from the malaria indicator survey (MIS survey, 2005) and other surveys suggest that this estimate is quite high. The latter is further supported by the fact that reported annual malaria cases and deaths has reduced from around 4 million (140 cases/1000 population) to around 2 million in 2005 (60 cases/1000 population). According to recent malaria indicator survey (MICs, 2005), the prevalence of malaria among the 2-10 year old children varies from 0.7 to 32%. The states that reported a high prevalence rate (PR) include: Bahr Elgabal (32%), Bahr Elgazal (23%), South Kordofan (21%) and West Darfur (8%). The PR is also significantly higher in rural compared to urban areas. The total number of malaria cases admitted in 2000, 2001, 2002, 2003 and 2004 were 119,256; 196,575; 204,249; 152,686 and 130,585 respectively; and recorded deaths were 2,379; 2,502; 2,757; 2,479 and 1,814 respectively, giving case fatality rates for these years of 1.99%, 1.27%, 1.35%, 1.60% and 1.26%.

The Sudan Household Health Survey 2006 showed that overall, 66 percent of children with fever in the last two weeks were treated with an “appropriate” anti-malarial drug using the new protocol, and 42 percent received anti-malarial drugs within 24 hours of onset of symptoms. Overall, children with fever in the South, where malaria is probably most prevalent, are most likely to have received an appropriate anti-malarial drug while those in the Central region are the least likely to receive an appropriate

drug. Urban children are more likely than rural children to be treated appropriately as are the children of mothers with secondary or higher education.

Table 5.2
Burden of malaria by state in Sudan

State	Malaria prevalence%*	Estimated annual malaria cases **	Estimated malaria cases (per 1000)	Reported Malaria cases***	Reported malaria deaths***
Khartoum	0.19	360,000	60	392,704	149
Gezira	1.61	254,800	64	338,327	63
White Nile	2.00	152,553	89	241,622	138
River Nile	2.04	86,814	86	21,386	30
Central Zone	1.46 /100	854,167	75 / 1000	994,039	380

* MIS, 2005. **Based on Snow Model, 2007. *** Attributed to malaria (annual statistical reports, 2006).

Source: Islamic Development Bank (2007), Country Operations Department-3, Draft staff appraisal Report on the Sudan Central Zone , Malaria Free Initiative (MFI), Republic of Sudan.

5.2.5 Enabling national health policies and plans

The goals of the country in the health sector are to achieve universal PHC coverage by expanding services in all parts of the country and to all segments of the population; to extend material health interventions to attain universal coverage; to improve availability of, and access to, essential drugs and supplies; to rehabilitate referral facilities and hospitals to reach the norm of three hospital beds per 1,000 population, thus reducing the need for treatment outside the country; to promote domestic production of essential health equipment and supplies as a means of attaining self-sufficiency; to develop human resources for the management and delivery of health services; to promote universal access to safe drinking water, protection of the environment and sanitation as a means of reducing morbidity due to infectious diseases; to ensure household food security and eliminate malnutrition; and to improve health information systems and give attention to public health awareness and education.

Specific goals and objectives pertaining to women and children include universal immunization of children and women in the child bearing age; reducing “under five years” mortality rates from 123 per 1,000 to 45 per 1,000; reducing MMR by half, from 552 to 225 per 100,000 live births; developing and extending a national program for school health; reducing malnutrition and promotion of health and nutrition awareness; and consolidation of organization systems for delivery of key child and maternal health programs (EPI, Nutrition, CDD, Acute Respiratory Infection (ARI), and MCH) to optimize efficiency and effectiveness.

Regarding malaria, the treatment protocol has been changed from Chloroquine monotherapy to ACTs. The new drugs are readily available in public health facilities and the private market. The new drug is provided to the patients free of cost in ten States under Global Funds arrangements. The new treatment protocols have been developed in English and Arabic in booklets and posters and provided to health

facilities. About 30% health facility staff has been trained on the new treatment protocols. Sudan RBM is successfully established in 18 out of the total 25 with a State Malaria Control Programme (SMCP) with a minimum of 3 qualified health professionals properly trained in malaria planning and control with expertise in case management, vector control operations and communication/education with backing at federal level. Efforts are currently under way to improve capacity for malaria control activities at peripheral level (localities), to develop control measures tailored to the specific needs and epidemiological situation of each locality. More emphasis will be placed on micro-planning according to the prevailing malaria situations in each locality.

5.2.6 Current status of control efforts

i) Diagnosis:

In most public health facilities the diagnosis of malaria is still based on the clinical presentation of malaria (fever or recent history of fever). Microscopic diagnosis is available in only one third of the health facilities, mainly concentrated in the urban areas. In Khartoum, Gezira and White Nile States the treatment based on microscopic diagnosis is widely available with a quality control system and central reference laboratory under development. In other areas, microscopic diagnosis of malaria is still largely confined to hospitals and major health centers, while in the dispensaries, where approximately 70% of malaria patients seek treatment, therapy is based on presumptive diagnosis. Rapid diagnostic tests (RDTs) were registered for use since early 2000. However, their use has been limited to the private sector because of the relatively high cost of the RDTs.

ii) Treatment:

Treatment in the public health services generally follows the “National Protocol for Treatment of Malaria” where booklet and posters have been made available in all facilities. At present, artesunate plus sulphadoxine-pyrimethamine is the first line and artemether/lumefantrine is the second line medicine for uncomplicated falciparum malaria. Patients with severe falciparum malaria are referred to hospital, where the treatment consists of quinine by the parenteral route or artemether injection, followed oral treatment as soon as the patient is able to take orally. Except in the 11 States covered by the GFATM project where ACT treatment is provided free of charge to the patients, in the rest of the states, malaria diagnosis and treatment is paid for by the patient or caregiver (according to the cost-sharing policy), a policy that discourages people from seeking care at government health facilities and encourages self-treatment, often with inappropriate medicines or under dosed. A pilot project to adopt home management of malaria has been initiated in two districts and ACTs are made available in all dispensaries after training of the health cadre and orientation of the community leaders.

iii) *Vector control:*

IRS in priority areas is largely based on the use of pyrethroids. The operations are mainly conducted in Gezira State and used for controlling malaria outbreaks in focal areas. Mosquito nets have a long history of use in the country. ITNs as a tool for personal protection and vector control was assessed in Sudan in a pilot project in early 1990s. **Following the Abuja Declaration, taxes and tariffs on ITNs has been removed, with a consequent price reduction by 60%.** The ITNs (both conventional and long lasting ones) commonly imported in the country through WHO, UNICEF, the private sector and NGOs. The distribution is usually assured by the National Malaria Control Programme (NMCP), the State Malaria Control Programme, community-based organizations, NGOs and the private sector. With the introduction of Long-lasting insecticide-treated nets (LLINs) in the country, the NMCP developed a policy for distribution. The policy aims to concentrate the distribution in selected areas rather than to go for small-scale distribution everywhere as it occurred previously. Also the policy calls for priority distribution in rural areas as mosquito nets are the only suitable vector control measures in rural areas. Recent surveys showed that coverage with untreated mosquito nets was increased from 23.1% in 2000 to 57.0% in 2005 and with ITNs from 0.4% to 21.1% for the same period. Larval control using chemical larviciding (Temephos) and environmental management is ongoing in urban settings with variable coverage and efficiency. Attempts to scale up the use of larvivorous fish (introduced in pilot areas during the Blue Nile Health Project in the <80s) were tried in 5 areas. In Khartoum, it replaced the use of chemical larviciding by 70% in irrigated schemes. In Gezira irrigated area, an ongoing pilot tries to address issues of self-sustainability, effects of the seasons and of spraying with pesticides in wide use (collaborative project with Gezira University, Faculty of Environmental Health).

Studies of susceptibility of vectors to insecticides (conducted with support from WHO) have evidenced resistance to pyrethroids in two sites. Community participation and intersectoral collaboration are solicited in vector control activities.

5.2.7 Supervisory and management capacity

The NMCP has undergone successful structural reforms both at central and local levels. 19 States have managed to attract and retain at least one trained coordinator (Diploma holder). Out of 96 targeted State cadres, 58 have been trained in Malariology Diploma course. Advanced training in program planning effected for 8 coordinators. Six entomologists have also been trained. Refresher training and short courses are regularly conducted. Approximately, 40% of the States have adequate capacity to implement the interventions without significant support from the central level and another 40% are on the process of development. All northern States of Sudan have reliable transport for the Malaria Control Program.

5.2.8 Integration and partnerships

The main partners at the national level are; WHO, UNICEF, the Government of Egypt (Gambia Control Project) and Saving and Social Development Bank (SSDB). Additional partners, include: NGOs, private companies, neighboring countries, public-private mix schemes, media and press. Private companies show an increasing interest in malaria control, and are contributing to joint programmes at national and state levels. Partners at state level are mainly from cotton cultivation schemes (Gezira) and sugar cane factories (Kenana, Assalaya, Ginaed and New Halfa). They support the costs for insecticides and spraying machines and sometimes also share in the operational costs.

Innovative partnerships with the private sector were established with the SSDB in 2000 to provide ITNs at an affordable price and a total of 100 000 nets were procured and distributed. In 2004, the NMCP approached the Financial Investment Bank (FIB) to be involved in an “ITN Portfolio Fund”, in collaboration with the Bank of Sudan, the SSDB, the Development Foundation of Sudan, the Health Insurance Fund and enlisted individuals involved as shareholders. The NMCP manager served as the technical adviser to the Portfolio manager. The Portfolio Fund initially raised around US\$ 460 000 and was able to procure 300 000 ITNs in the first year to cover about 900 000 people. The nets have been sold to local traders - usually targeting the urban market, for which the NMCP is not currently involved in the distribution of ITNs. Also nets were sold to NGOs and UN agencies. In addition to providing ITNs as a commercial supplier, the involvement of the FIB not only helped raise its image countrywide (with more people buying shares and opening new accounts in 2005), but also saw it operate at a profit of about 54% (CDC newsletter, 2005). Up-to-now a total of US\$ one million has been used to procure 460 000 ITNs through the private sector. In 2006 the SSDB served as an outlet for the distribution of nets in 9 States.

5.2.9 Financing

The support for NMCP operations from the government of Sudan was initially limited to payment of salaries and procurement of insecticides in certain states. The programmatic activities depend on the support from WHO, UNICEF and other national and international non-governmental agencies. However, from 2001 the funding to the programme by the Government has been increasing. The proportion of government contribution at federal, state and local levels also increased compared to other sources from almost negligible (paying for staff salaries) in 2000 to more than 50% in 2005. Following the strengthening of the State MCPs, the contribution of the local level is also growing, amounting to about US \$ 8 million in 2005.

Global Fund to fight AIDS, TB and Malaria (GFATM):

The programme proposal for Round 2 was accepted late in 2002. The total approved amount for 5 years is US\$ 33 million, with an approved grant amount of US\$ 14 million for the first 2 years. In year one of this phase I, the grant amount was disbursed. However, the first installment (US\$ 8 million for the first year) was disbursed in

2005 through UNDP (as a principal Recipient) and WHO as executing agency. The disbursement of Round 2 was affected by reprogramming in order to address a drug policy change and the change from treatable to LLINs.

5.2.10 Challenges

The main challenges for successful malaria control in Sudan include the following:

- Lack of leadership and management capacity at the locality level;
- Low motivation and high staff turn over;
- Limited resources of malaria units at locality level for implementation;
- Limited capacity and resources for supervision and evaluation of control interventions;
- Low access to public health facilities mainly in rural areas;
- Low coverage with key preventive and malaria intervention (IRS, ITNs);
- Limited availability and poor quality of malaria diagnostic services;
- Weak malaria information system; and
- Limited community involvement in malaria control

5.3 THE MALARIA FREE INITIATIVE: A SUCCESSFUL EXAMPLE OF MALARIA CONTROL IN AN IDB MEMBER COUNTRY

The Malaria Free Initiative (MFI) of Khartoum and Gezira States was established to demonstrate the potential of modern malaria control measures. While the primary objective was to reduce morbidity and mortality due to malaria, the goal was to develop a strong political commitment for malaria control at national level and to mobilize additional resources from multiple sectors for MFI, as well as creating a positive momentum for malaria control which could be extended to other endemic areas, thus reversing the deterioration of malaria situation observed over the last 20 years. The MFI was launched in 2002 and major achievements have been made. The malaria mortality in absolute numbers and the proportion of the deaths attributable to malaria in health facilities has decreased remarkably. Similarly the inpatient malaria case fatality rate has significantly declined (Table 5.3 and Figures 5.1 to 5.3).

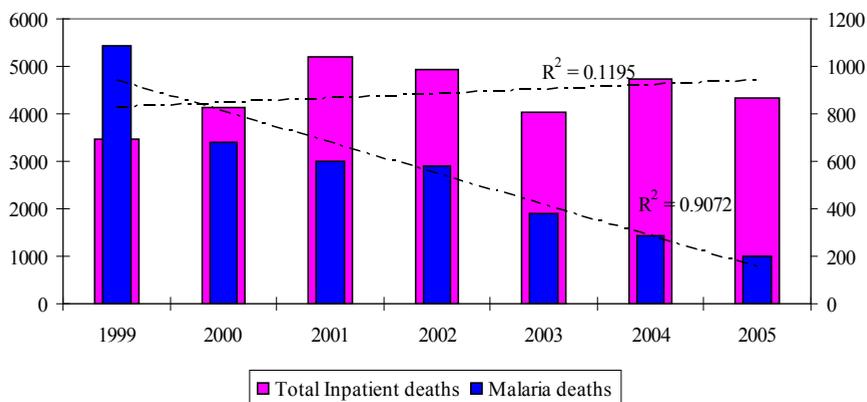
Table 5.3
Malaria Mortality (absolute numbers and % due to malaria) and
Case Fatality Rate, 1999-2006 (Khartoum State)

Year	Total Inpatient Deaths	Malaria Deaths	% Malaria Deaths	Case Fatality Rate%
1999	3 468	1 088	31.3	3.6
2000	4 137	678	16.4	2.6
2001	5 195	600	11.5	1.9
2002	4 919	577	11.7	1.8
2003	4 045	378	9.3	1.6
2004	4 730	289	6.1	1.8
2005	4 335	197	4.5	1.7

Source: Islamic Development Bank (2007), Country Operations Department-3, Draft staff appraisal Report on the Sudan Central Zone, Malaria Free Initiative (MFI), Republic of Sudan

What is very remarkable is that while the reported malaria specific deaths declined significantly ($R^2 = 0.91$), there was a modest increase in the total inpatient deaths ($R^2 = 0.1$), suggesting that the reduction in the malaria deaths was due to the interventions of the MFI (Figure 5.1)

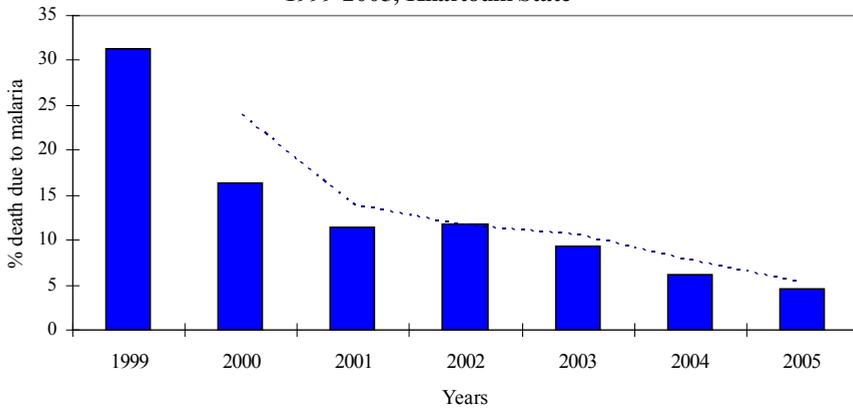
Figure 5.1
Divergent trends in facility based total deaths and malaria specific mortality, 1999-2005, Khartoum State



Similarly, Gezira state has witnessed a marked decrease of 72% in the proportion of inpatient deaths attributed to malaria, from 29% in 2001 to 8% in 2003. Further, results of the Malaria prevalence surveys also revealed that malaria has been controlled under the MFI.

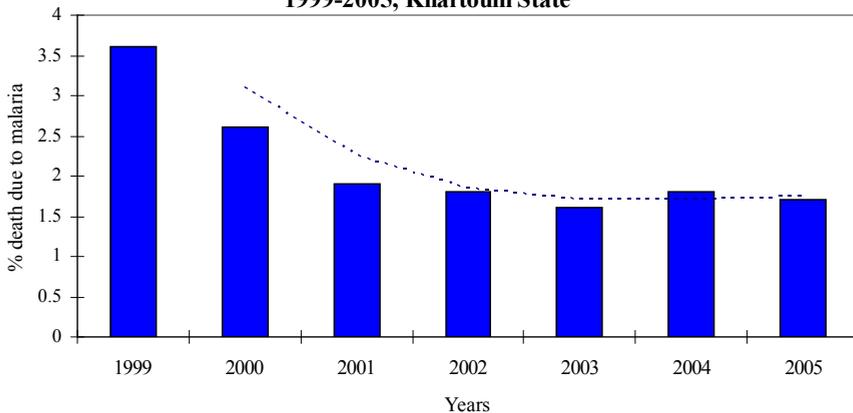
Although the facility reported data on malaria morbidity might have some biases such as inclusion of both laboratory confirmed malaria cases (about 55% of the total) and

Figure 5.2
Trend in the proportion of in patient deaths attributable to malaria,
1999-2005, Khartoum State



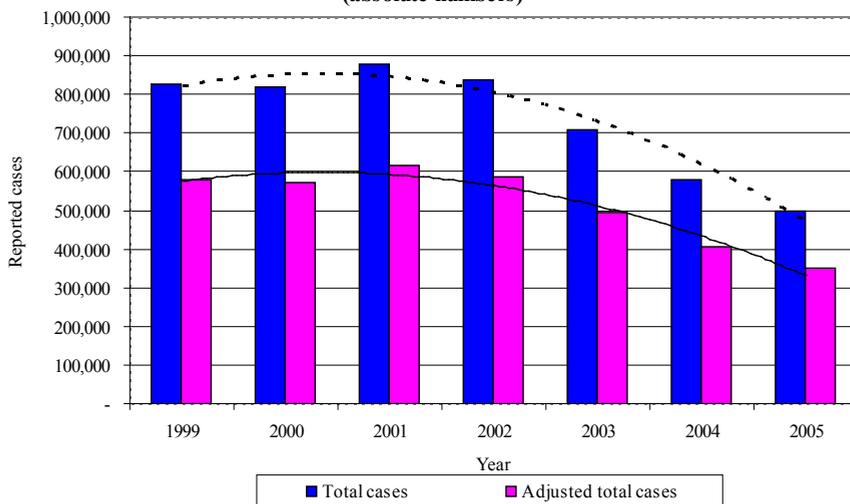
clinically diagnosed cases (some of which might not be true malaria cases), some surveillance bias such as changes in reporting completeness and population movements, the divergent trends observed (Figure 5.1) between facility based all cause mortality in relation to facility based malaria specific mortality suggest that the observations made are real. It will be important in the future, as malaria transmission reduces to make a distinction between indigenous and imported cases from other parts of the country. The reduction in the malaria burden in Khartoum is further demonstrated by the trends in the total reported cases and the estimated cases, derived by subtracting

Figure 5.3
Trend in the case fatality ratio (CFR) for malaria,
1999-2005, Khartoum State



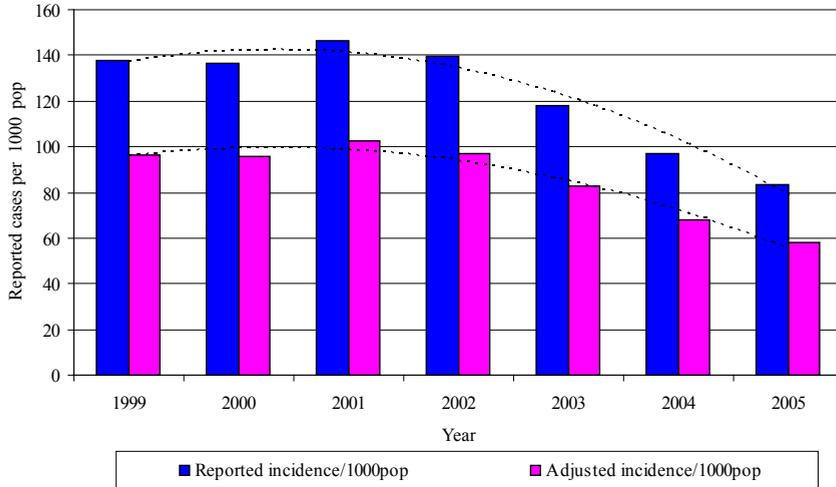
the proportion of false clinical malaria (approximately 20%) and the proportion of imported cases (approximately 15%) (Figures 5.4 and 5.5).

Figure 5.4
Trends in total cases and adjusted cases
(absolute numbers)



Source: Islamic Development Bank (2007), Country Operations Department-3, Draft staff appraisal Report on the Sudan Central Zone, Malaria Free Initiative (MFI), Republic of Sudan. A trend line based on moving averages has been superimposed.

Figure 5.5
Trends in reported cases/1000 population



Source: Islamic Development Bank (2007), Country Operations Department-3, Draft staff appraisal Report on the Sudan Central Zone, Malaria Free Initiative (MFI), Republic of Sudan. A trend line based on moving averages has been superimposed.

The data presented above demonstrate that the MFI is a good success stories in malaria control. It is also important to note that all the major targets set out at the inception of the project have been met i.e. a reduction of malaria mortality and especially morbidity. Within 4-years, malaria morbidity has been reduced almost 2-fold and there are prospects for further reduction of malaria incidence, if the support from the Government and development partners continues.

These data also demonstrate the utility of facility based data (especially in patient data in tracking the impact of malaria interventions. Investments in improving integrated disease surveillance (IDSR) to ensure prompt weekly and monthly reporting as well as dissemination of such data to those who need to know, will have substantial gains in for malaria prevention and control/elimination.

In view of the successes of the MFI project, it is important to document the critical lessons that could be learnt by other IDB member countries. The following were crucial to the success of the MFI project:

- Strong supervisory and programme management capacity;
- Strong political support and commitment for example regular advocacy efforts through weekly cabinet briefings to report on the progress and to maintain political support;
- Intensive information and communication to the public and health education in the schools;
- Mapping of vector breeding sites for larval control and source reduction (repairing broken pipes);
- Setting a weekly surveillance system;
- Strengthening microscopic diagnosis of malaria in the public and private health sectors;
- Indoor residual spraying in selected areas in Gezira State; and
- Large scale distribution of subsidized ITNs targeting pregnant women and children in Gezira

5.4 SENEGAL

5.4.1 Country profile

Senegal is a low income country classified by the UNDP as a country with a low Human Development Index (HDI). The HDI for Senegal is 0.460, which gives Senegal a rank of 156th out of 177 countries with data. The HPI-1 value for Senegal of 44.0, ranks 84th among 102 developing countries for which the index has been calculated. The total population in Senegal is projected to be 11.9 million people (CIA World Fact Book) and approximately 2 million are aged under five years old, while the expected number of pregnant women is 350,000 to 400, 000.

5.4.2 Health system organization and key health statistics

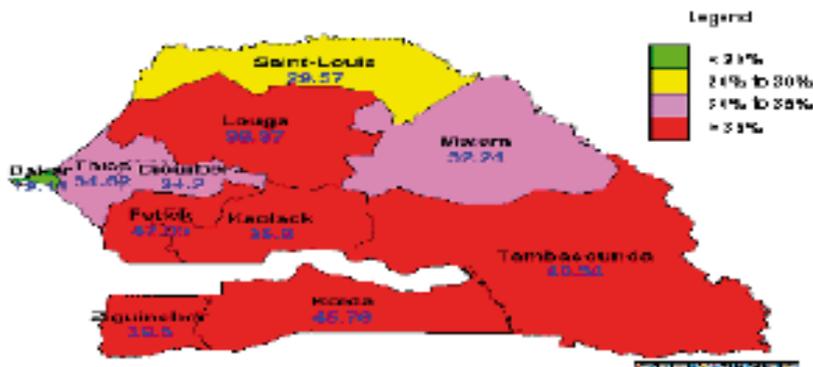
The Health system in Senegal is organized around 3 levels: the Central level; the provincial level and the operational level with 56 districts. The life expectancy at birth is 58.1 (CIA World Fact Book) and the under five mortality rate is 137/1000 live births or approximately 1 in 7 children (UNICEF). Approximately 26% of the Senegalese population lives below one US dollar a day and 68% live below \$ 2 a day. The proportion of the population without access to an improved water source is 28%.

According to the WHO World Health Report 2005 the proportion of new born immunized with BCG is 77%, the DPT coverage is 73% for 1 year old children and the proportion of children under 2 years immunized with one dose measles vaccine is 60%. According to the Last Demographic Health Survey conducted in Senegal (EDS IV, 2005) the MMR decreased from 510 to 434 per 100 000 live births between 2001 and 2005.

5.4.3 Malaria burden and epidemiology

All Senegalese are at risk of malaria. Malaria is responsible for 30-35% of outpatients visits, 20% of hospital admission and 25% of the hospital deaths (RBM 2005, World malaria report, WHO/AFRO, WHO CHERG, 2000). However, the proportional morbidity attributed to malaria could be as high as 45% in the Southern and Eastern parts of the country. Plasmodium falciparum accounts for more than 90% of the annual cases (approximately 1.1 million cases).

Figure 5.6
Proportion of Malaria cases in the Health facilities in Senegal, 2005



5.4.5 Enabling national health policies and plans

5.4.5.1 Goal and Objectives

In Senegal there is a positive institutional environment to scale up malaria control interventions. There is strong political commitment; a well coordinated and dynamic partnership and management capacity within the National Malaria Control Programme. A new strategic plan for malaria control 2006-2010 was developed and validated in 2006

The goal is to halve the malaria burden by 2010 compared to the 2000 levels and the specific objectives are:

- To achieve 80% ITN coverage for pregnant women and children under the age of five years;
- To achieve 80% coverage with intermittent preventive treatment in pregnancy (IPTp2); and
- To ensure that 80% cases of uncomplicated malaria receive effective treatment with ACT within 24 hours of onset of symptoms.

In view of the high *falciparum* resistance to Chloroquine, the country adopted a transition period (2003-2005) where the combination AQ-SP was used as first line treatment. In 2005 the country changed its first line treatment policy to ACT, namely AS-AQ.

5.4.5.2 Strategies

The following strategies have been identified

- Strengthening prevention ;
- Effective treatment at the health facilities and community level;
- Surveillance, Monitoring and Evaluation;
- Capacity building;
- Planning and management;
- Communication;
- Scaling up comprehensive intervention package ; and
- Operational research for action.

5.4.6 Current status of control efforts

With the financial support from the GFATM and other partners and technical support from WHO and other partners, Senegal has achieved a good momentum in malaria control. For example,

- The ITN coverage for pregnant women and children under five has increased. Approximately 38% of households possess at least one ITN;
- ACT treatment have been deployed country wide in 2006;
- The NMCP is well organized and human resources available at national and sub-national level; and
- IPTp is being implemented countrywide.

Table 4
Gap analysis: Evolution of the main outcome and impact malaria control indicators in Senegal and the gaps towards the national targets: 2000-2006

Indicators	2000*	2005**	Targets	Observations/Analysis
Under five who received effective treatment within 24 hours at community level	36,2%	45%	60%	Progress : + 8,8% Gap : - 15%
Availability of ITN	-	52%	80%	Gap : - 28%
Children Under five who slept under ITN the night before	1,7%	18%	60%	Progress : + 16,3% Gap : - 42%
Pregnant women who slept under ITN the night before	1,7%	39%	60%	Progress : + 37,3% Gap : - 21%
IPTp coverage	32%	77%	60%	Progress : + 45%
% morbidity attributed to malaria	35.57%**	32.50%	20% reduction	Progress : + 3,07% Gap : - 11,36%
% mortality attributed to malaria	30.20%**	20.71%	30% reduction	Progress : + 9,49% Gap : 31,42%

*(MICS, 2000), ** (Base de données PNLP)

Priorities to fill the gap:

Despite the important progress some gaps and bottlenecks have been identified and they include:

- Improvements of laboratory diagnosis will be critical with the ACT deployment;
- Quality control of medicines and pharmacovigilance system needs to be established or improved;
- Continuous in service training to improve malaria case management;
- Strengthening the Supervision of CHW and NGOs for CBI;
- There is a need to boost the ITN coverage with a nation wide campaign and to maintain the coverage with the routine system;
- There is a gap between IPT1 and IPT 2 coverage and collaboration with Reproductive Health program will be critical; and
- The Investment on M&E including capacity building should be improved.

Senegal can be a country for quick win in malaria control using concerted partnership and additional funds. Effective malaria control in Senegal will contribute to the overall economic development and to the achievement of the MDGs. To reduce the burden of malaria a comprehensive package of cost effective intervention needs to be delivered at large scale. The main focus for quick win in Senegal will be on prevention and monitoring and evaluation, but the opportunity should be taken to monitor and improve the quality of malaria case management.



6. WAY FORWARD AND PRIORITY ACTIONS

Despite the availability of cost effective interventions, malaria is on the increase especially in most of the high burden member countries. This perverse situation is a direct result of the low coverage of cost effective interventions. For example, for 52 and 38 countries with ITN and IRS coverage data, the median ITN coverage in populations at risk pooled across countries was only 3% (range: 0.13% - 73%), while the median coverage for IRS was only 13% (range: 0% - 40%) in 2001 (Korenromp, 2005). This status quo is unacceptable because it leads to deaths that would otherwise be avoidable. Such sick populations are not very productive. Indeed, ill health due to preventable communicable diseases such as malaria is one of the hindrances for poverty eradication or wealth creation. Therefore, concerted efforts are urgently needed by different stakeholders to radically scale up cost effective interventions. The extent of the malaria problem in the LDMCs requires a paradigm shift from demand creation to the identification and quantification of needs. The populations at risk of malaria are also among the poorest in the world with some of them living on less than one US dollar per day. Consequently, strategies based on demand creation, though good, will take several decades to achieve the Abuja targets and the MDGs.

In line with the mission and vision to promote comprehensive human development focusing on the priority areas of alleviating poverty, improving health, promoting education, improving governance and prosperity for the population, the IDB is implementing a “Quick-Win Initiative:” aimed at combating malaria in the member countries. The program is consistent with the resolutions of the 15th IDB annual symposium on Health related MDGs that focused on malaria held in Teheran 29 Rajab 1425H (IDB, 2004) and the Ten-Year Program of Action of OIC. The Quick Win Program provides an opportunity to the IDB to play a leading role in the Roll Back Malaria Partnership by supporting the implementation of proven cost effective malaria interventions as well as integrated disease surveillance and response (IDSR) in the member countries through direct financing and technical assistance.

This paper has demonstrated clearly that the burden of malaria is still high and unacceptable in most of the IDB member countries and that the prevention, control or elimination of malaria will be critical to the achievement of the health MDGs in the LDMCs. Further, the paper has noted that while in the past, global malaria control strategies have tended to focus on the high malaria endemic countries, there is no justification to omit the low burden countries in Africa where elimination of malaria is feasible.

It is also crucial to note that in malaria prevention and control “one size does not fit all”. Therefore, the way forward and priority actions have to be tailored to the local epidemiological context. Consequently, it is proposed that the priority actions

for IDB member countries should be categorised into the high and low malaria burden countries.

6.1 HIGH BURDEN COUNTRIES

It is proposed that the IDB and technical partners appraise the 5-year national strategic plans of these countries. The IDB in collaboration with the endemic country governments should ensure that there is strong political commitment that translates into adequate financial allocation to malaria. In this endeavor, the IDB should encourage and promote inter-country cooperation and exchange to share best practices at the national and regional levels.

6.1.1 Goals and objectives

The goal for this category of countries should be to quickly scale up malaria prevention and control so as to reduce malaria prevalence so as to shrink the malaria burden map and contribute to the reduction of infant and under five (childhood) mortality (all cause and malaria specific).

6.1.2 The specific objectives

The objectives that could be used for the five-year strategic plans could include among others:

- i. To increase the proportion of the population at risk of malaria who receive effective treatment for malaria within 24 hours of onset of symptoms to 85%;
- ii. To increase the proportion of pregnant women receiving IPT2 to 85%;
- iii. To increase the proportion of households owning at least 2 ITNs to over 90%;
- iv. To increase the proportion of children aged less than five years regularly sleeping under insecticide treated nets to 85%;
- v. To increase the proportion of pregnant women regularly sleeping under ITNs to 85%;
- vi. To increase the coverage of households receiving targeted IRS at least once a year in epidemic prone areas to 85%;
- vii. To reduce the malaria case fatality ratios (CFR) at hospital level to less than 2%; and
- viii. To contribute to the improvement of health systems.

6.1.3 Priority components

Significant reductions in malaria morbidity and mortality in the Malaria Endemic Countries will require targeted scaling up of the priority actions. The focus should be on the achievement of outputs and outcomes (specific to malaria control and general health systems development). However, the implementation processes should be tracked regularly with robust indicators. The priority actions are presented below.

6.1.3.1 National level

The current burden of malaria is unacceptable, even though there are cost effective interventions available. These however, require a quick response/intervention. The components that are articulated below are feasible and tangible, but in many countries they are not implemented to scale (coverage is still below the Abuja targets) and their implementation in most cases is patchy or only a fraction of the interventions are being implemented as a result of inadequate financial resources, yet malaria interventions need to be implemented to scale for tangible benefits to be observed. The following priority components if implemented to scale will reduce the malaria burden in the MECs.

i) Community initiatives

In most of the MECs, physical access to formal health care (proportion of the population within a 5 km radius of a static formal health care facility) is very low averaging about 50%. Consequently, most of the malaria cases are managed at home (Foster et al 1995, Mwenesi et al, 1995, Marsh et al, 2004). Similarly, many malaria deaths are not reported as they occur at home. In these settings, malaria control and prevention without a strong community component is likely to be futile. A key program component should, therefore, be the strengthening of community-based initiatives. Two generic models should be used depending on the country setting; the first model is based on community drug distributors as the core of the village health team (see Uganda case study) who offer a range of services that are free of charge, while the second utilises community schemes that are based on cost recovery or Bamako Initiative. Whatever, model a country adopts, it should be used for the following activities:

- Increasing access to effective case management mainly for children under five years old;
- Identification of vulnerable groups that require ITNs during the mass campaigns and in between the campaigns; and
- Maintaining a basic community health information system (CBMIS) particularly recording cases treated and the outcome, recording households with ITNs, and reporting births and deaths in the village as well as participating in an enhanced passive pharmacovigilance system (monitoring of adverse events).

For each model, the most appropriate incentive/motivation scheme should be adopted. In the first model, recognition through provision of uniforms/T-shirts, a means of transport (e.g. a bicycle), a free ITN for the community health workers, quick access to health services and activity related allowances have been proposed after a consultative process with technical people and the communities, while in the second model, the initial empowerment of the communities through provision of cost generating items (e.g. TENTS or other material as appropriate for the country) to generate funds, for the community health workers is proposed. In addition, extension of partnerships with community based organisations (CBOs), non governmental organisations (NGOs), community resource persons (CORPs), the private sector and

other existing community structures through community dialogue should be fostered. Of particular interest is the development of strategies for increasing access to effective case management (with ACTs) in the informal private sector using a subsidy facility, which will initially require implementation of research to determine the best delivery model. Baseline studies on the demand and supply side should be designed.

ii) Improving Health systems

Health systems improvement is critical but it is a long-term undertaking. However, specific focus should be on the quality of care in health facilities (non referral and referral), promotion of key family and community practices and joint performance assessment. IDB support will be needed for scaling up critical but neglected areas such as:

a) Human resource capacity development

Inadequate human resources (quality and quantity) are presently one of the key obstacles to large scale health interventions. Investments in human resources should be one of the areas for immediate support and is likely to result in capacity to sustain other communicable disease control. The IDB member countries should develop a human resource master plan with clear short-, medium- and long-term objectives. For short-term measures, direct recruitment of additional staff and direct support to the motivation/incentives scheme for those already employed by governments is proposed. However, such initiatives should be linked to delivery of outputs. Specifically, the in-country improvement in human resource capacity for malaria (managerial and technical) will require the conduct of regular (annual) malariology courses for mid level managers especially at sub-national level. A critical gap related to the component immediately below is the creation of a critical mass of laboratory staff to address malaria diagnosis in an integrated package.

b) Increasing access to integrated preventive, diagnostic and curative services

The populations most vulnerable to malaria have difficulties in accessing health services and such difficulties include; poverty, lack of client-focus, poor quality of services and lack of empowerment of women (as patients and carers) to mobilize resources. Most countries are changing to ACTs, which are relatively more expensive than the previously used anti-malarial drugs (CQ, AQ and SP). The World Health Organization's generic treatment guidelines recommend parasitological confirmation of the diagnosis of malaria where malaria transmission is low, moderate, or unstable (WHO, 2006). In settings where the incidence of malaria is low, the WHO recommends that health workers should be trained to identify patients who have been exposed to malaria before they carry out a parasitological test. In stable high transmission settings, where malaria is a common cause of febrile illness in children, WHO recommends that antimalarial drugs should be given to children with fever ($\geq 37.5^{\circ}\text{C}$) or a history of fever that has no other obvious cause. In children 5 years old and above, in pregnant women, and in settings with a high prevalence of HIV, a diagnosis should have parasitological confirmation.

The WHO guidelines do not state that a patient with a negative test should be treated for malaria. However, some countries, such as Uganda, have adopted phrases like, “any patient with fever or a history of fever within 24 hours without evidence of other disease should be treated for malaria even with a negative blood smear for malaria parasites (Uganda, National Malaria Control Programme). Such recommendations are aimed at increasing antimalarial coverage and potentially reducing the risk of progression to severe disease and death, but they could result in over use of expensive medicines or missing other diagnoses. The development of new and effective drug regimes for malaria has been outstripped by the ability of health systems to target them to those who truly have the disease. Widespread misdiagnosis of malaria (e.g. over-diagnosis rates of 60%) leads to wasted resources and contributes to drug resistance. Poor quality diagnostic services are increasingly but belatedly recognized as a major barrier to providing effective treatment and accurate public health information. Increased access to client-friendly diagnostic strategies are urgently required. But such strategies need improvements in infrastructure (laboratories, equipment and consumables) for malaria diagnosis. In addition to well established techniques for malaria diagnosis (microscopy), the newer approaches such as rapid diagnostic test (RDTs) will be needed and initial capital investment in this area along with rational use of resources will be needed.

c) Improving the management of severe malaria

Severe malaria is a neglected aspect of malaria control. The management of severe malaria requires relatively skilled health workers and hence the need for efficient referral networks, yet the latter are poorly developed in most of the IDB member countries. IDB support should focus on the establishment or strengthening of referral networks (good referral facilities linked by a good communication network).

d) Using new channels to increase the coverage/access to cost effective malaria interventions

Cost-effective treatment strategies exist such as pre-packaging, and more recently fixed-dose combinations, but access is limited. Innovative approaches are needed such as working with schools and community providers to scale up existing strategies and to increase effective cures among vulnerable people. A critical new area will be the increased involvement of schools in malaria prevention and control. A special school programme for malaria prevention and control should be developed in relevant member countries to cover case management, ITN distribution/ use and health education and promotion.

iii) Advocacy, social mobilization and behavior communication for change (BCC)

Even well-proven, pro-poor interventions are difficult to get into practice. Policy makers and other stakeholders should be regularly sensitised to ensure that they participate in the scale up of malaria prevention and control. Local ownership of the communication process and results is likely to promote increased coverage and use by

local people. In all aspects, the malaria programme should emphasize working with communities to ensure that their voice is heard at the highest level by those who are influential in legislating for change. A communication and influencing strategy should be developed to maximise the impact of the scale up, particularly in influencing the improvement in the lives of poor and vulnerable people. The communication and influencing strategy should include:

- Identification of target audiences and assessment of their information needs and preferences to encourage the identification of diverse and innovative communication methods to meet user needs;
- Systematically timed and designed communication and dissemination activities staggered throughout the programme to encourage engagement and knowledge about the process as well as the results;
- Improvement of communication capacity;
- Improvement in local access to information as a means of empowering vulnerable people and of increasing their participation and inclusion;
- Production of clear, unambiguous and accessible communication resources - print and non-print – geared specifically for each audience based on a needs assessment; and
- Development of indicators to assess the impact of the communication strategy.

The communication and influencing strategy outputs should be generated by various routes such as local communities through their social and administrative structures using facilitators to ensure they fully understand the interventions and the implications for non-compliance; outsourcing of communication specialists to strengthen the management and use of information. Between and within country documentation and dissemination of successful experiences need to be encouraged for annual dissemination in technical and non-technical formats through capacity-building networks using a variety of media. A range of techniques could be used including: drama, radio and newspapers, as well as face-to-face discussions and presentations to enhance local access to information as a means of empowering communities including vulnerable people and policy makers.

iv) Narrowing the commodity gaps for critical malaria interventions

a. Improving access to effective antimalarial drugs

In light of the increasing resistance to mono-therapy (CQ, AQ and SP), most IDB member countries have changed or are in the process of changing to combination therapy, preferably artemisinin combination therapy. However, quick change is hampered by commodity shortages. There is an urgent need to support commodity procurement, supply and delivery. In addition, there is a need to support the national policy change process, monitoring the implementation of the drug policy (uptake of the policy, pharmacovigilance and regular monitoring of the quality of antimalarial drugs

on the market). However, member countries need to make realistic quantifications of the commodity needs.

b. Increasing coverage of Insecticide Treated Nets (ITNs)

The overwhelming interest of the public health community in Insecticide Treated Nets (ITNs) arose from the additional value that the insecticide brought to the bed nets (Hounye, 2004). The efficacy and effectiveness of ITNs have been confirmed, their cost-benefit certified, and their social acceptability proven (Manga et al., 2004). Studies in Burkina Faso, The Gambia, Ghana, Tanzania and Zaire reported reductions of 30% to 63% in malaria morbidity rates following the introduction of ITNs in households (Snow et al, 1994, Sexton et al, 1990, Carnevale et al, 1990, Stitch et al, 1994, Neville et al, 1996D Alessandro et al, 1995, Lyimo et al, 1991, Lengeler, 2004). However, despite the overwhelming evidence that this strategy can prevent childhood illness and deaths, ITN coverage and utilization in most MECs is presently very short of the Abuja target of 60%, yet several public, private and mixed models have been used for their delivery. The present approaches for the delivery of ITNs which are skewed to the private sector, though useful as a long term measure for improving coverage of ITNs, have been sub-optimal in achieving the ITN coverage targets set at Abuja in 2000. The latter is partially because such models require commensurate improvements in the economies of the developing countries and consequently the incomes of households so that they can procure the ITNs. Therefore such models on their own are unlikely to achieve the Abuja targets or the MDGs in the time frame that has been set. The scale up of ITN coverage, especially among the vulnerable groups (children under five years old and pregnant women) therefore requires the use of other novel approaches. Based on the above observations and the findings from the extensive consultations with WHO experts and country stakeholders in Uganda and Senegal, it is proposed that in the short- to medium-term support for ITNs preferable LLNs should be directed at facilitating the implementation of mass campaigns for net distribution {National Net and Re-treatment Weeks (NNRWs)}. It is anticipated that the latter will lead to a faster achievement of the Abuja targets. For example, using the campaign approach linked to measles immunisation, Togo has been able to distribute over 900,000 nets in just one week. Similarly in one district in Zambia, the campaign approach for ITNs achieved the Abuja targets. Integrating the ITN campaigns with other ongoing campaigns such as child health days or measles campaigns (see Zambia and Togo) could help rationalise the scarce logistics and human resources. However, the campaign approach requires that the ITNs are free or very highly subsidised and a critical gap that needs to be urgently addressed is the supply of the ITNs. Once the Abuja targets are achieved, the private, mixed and the public delivery models (for those who can not afford) should run in parallel to maintain and sustain the coverage. Some experts have argued that the ITN campaign approach might stifle the emerging private sector for ITNs.

c. Indoor residual spraying (IRS)

Targeted IRS is a cost effective approach that should be implemented by the MECs. Furthermore, most IDB member countries have mapped their epidemic prone areas and can conduct IRS before the main malaria transmission season. One subject that needs further investigation is the use of IRS in very high malaria transmission areas and its impact on ITN use. Indeed some countries such as Uganda plan to conduct implementation research on this subject and it would be prudent to await concrete evidence before indiscriminate use of IRS in areas with high malaria transmission. However, an IRS plan for boarding schools should be developed in each member country irrespective of whether the school is located in low or high malaria transmission settings.

d. Commodities for malaria in pregnancy

The scale up of malaria prevention in pregnancy (MIP) should be addressed as a package which includes: ITNs, intermittent preventive treatment (IPTp) with sulphadoxine-pyrimethamine and management of malaria and anaemia in pregnant women. Furthermore, countries should establish a mechanism for monitoring and evaluation of MIP, including standardization of outcome measures. It would also be good use of resources if the multiple resources directed at reproductive health could be efficiently used in an integrated approach for malaria prevention and control.

v) Malaria control in complex emergencies

Complex emergencies offer unique challenges for health care delivery in general and malaria control in particular. In most cases populations are crowded and the formal health care delivery system is fragmented, staff are not motivated because in most cases there is insecurity. Consequently, innovative approaches for delivering malaria interventions are needed. Residual indoor spraying needs to be promoted where semi-permanent structures have been constructed. In addition, each camp should identify a community resource person to deliver malaria interventions and a work based incentive scheme could be used as a method of motivation. In all aspects the malaria interventions should be integrated with other services such as outreach services for HIV/AIDs, EPI and reproductive health.

vi) Monitoring and evaluation

This is a critical component that has previously been under funded in most health projects/programs, partly because the focus for monitoring was on the implementation process and to a limited extent on the output level indicators. However, the Quick Win initiative has clearly indicated a need to support malaria prevention and control within the framework of the RBM and the Millennium Development Goals. Consequently, strengthening surveillance and health information systems should be a priority component for countries so as to track the implementation process, the program outputs, outcomes and impact. A strong surveillance and health information system will enable local use of the data to track program implementation and for measuring

annual program outputs. However, periodic population based surveys will also be important for national and supra-national monitoring and evaluation for measuring coverage of interventions (in particular ITNs), all-cause under-5 mortality and other disease burden indicators such as anaemia prevalence and parasite infection prevalence in children. Institutionalizing the conduct of population and facility based surveys and strengthening integrated disease surveillance and Health Management Information Systems is a crucial sub-component for investment. A requirement for effective periodic evaluation, that shall preclude any funds disbursement, should be the development of a comprehensive monitoring and evaluation framework that articulates how performance assessment will be measured for each of the key strategies. The monitoring and evaluation framework should articulate among others the following:

Sub-National monitoring and reviews: this should be the responsibility of the implementing agencies at sub-national level and reports should be provided during quarterly review meetings. The latter meetings need to be reviewed by the National monitoring teams and important achievements and deviations from original plans should be discussed and reviewed by the national teams.

National monitoring and reviews: measurement of progress against national level indicators needs to be reviewed at least quarterly by the monitoring and evaluation technical committee and should be used to refine the annual work plans. Annual reports should be widely disseminated to facilitate periodic external assessments of programme implementation and impact.

vii) *Pharmacovigilance*

Prior to product registration and marketing, data about safety and efficacy are limited to observations in preclinical and clinical trials. However, such trials utilize a small number of subjects because of the strict criteria and requirements to rigorously follow up the subjects. Therefore, the conditions in clinical trials do not necessarily reflect what happens in the general practice. Consequently, data from clinical trials alone, though useful for product registration, might not be adequate in the documentation of adverse drug effects. Pharmacovigilance involves the monitoring of pharmaceutical products as they are used in the “real world”. The purpose is to identify previously unrecognized patterns or changes of adverse effects; assessing the risks/benefits of medicines in order to improve their safe use; providing information to clients to optimize safe and effective use of the medicines; and monitoring the impact of actions taken about the specific warnings in product information, which allow safe and effective use of the products.

Presently, antimalaria drug pharmacovigilance is a topical issue in Africa, largely because of the high prevalence of parasite resistance to safer drugs such as chloroquine and sulphadoxine-pyrimethamine, which has compelled several African countries to adopt combination therapy, most preferably artemisinin combination therapy (ACT). Although ACTs have good safety profiles in clinical trials, there is little data about

their post-marketing safety outside south-east Asia. Pharmacovigilance for ACTs and other newer antimalarials is therefore important because these medicines are relatively new in Africa and are being adopted simultaneously in several African populations which offer an opportunity to identify rare or unexpected adverse effects not previously documented during the pre-registration clinical trials. Secondly, the safety of these medicines is a concern because of the high prevalence of co-morbidity of malaria with HIV/AIDs, tuberculosis and malnutrition. Thirdly, the safety profile of ACTs in pregnancy is yet to be established. Despite the keen interest for pharmacovigilance in Africa, the approaches to use are problematic. Passive reporting of adverse effects is notoriously poor in developed countries and largely non-existent in Africa. Pharmacovigilance in Africa will require a combination of models and a multidisciplinary approach. Country specific capacity needs for pharmacovigilance should be supported and each country should identify lead persons to coordinate in-country Pharmacovigilance activities. Multiple monitoring systems need to be piloted/implemented, depending upon the capacities of the individual country such as:

- Spontaneous and enhanced spontaneous passive reporting of adverse events;
- Detailed prospective surveillance for recent adverse drug reaction and drug exposures;
- Hospital-based or population based pregnancy registers and follow-up of deliveries against detailed drug exposure histories;
- Hospital-based matched case-control studies to detect possible drug-related side effects and test the relationship to drug exposure (to assess causality); and
- Continuous demographic surveillance systems (DSS) at selected sentinel sites to encourage capturing and investigating deaths in sentinel populations.

For each of these approaches, standardized tools should be refined/developed to document drug exposure and possible side effects. Furthermore, the reporting hierarchy and organisational framework for pharmacovigilance needs to be developed in each country.

viii) *Operational research*

Operational research is a critical component to generate new evidence for new strategies and the IDB special programme will support this sub-component. On-going research initiatives on vaccine candidates and new drugs and insecticides in some of the IDB member countries such as at the Malaria Research and Training Centre (MRTC) in Bamako, Mali; Manhica, Mozambique; the Medical Research Centre (MRC) in Banjul, Gambia, Centre Muraz in Bobo Dioulasso, Burkina Faso, and the the Multi Disease Surveillance Centre (MDSC) in Ouagadougou, Burkina Faso, need to be supported within the framework of creating centres of excellence in member countries. Nonetheless, it is important to propose some critical themes that support policy implementation. The following key research themes could be a starting point but could be expanded:

- New approaches to the management of severe malaria: Quinine has been the recommended drug for the management of severe malaria for a very long time. However, its administration is parenteral and requires relatively skilled health workers, conditions that are not usually available in most peripheral health units. A critical area for operational research is therefore the assessment of the efficacy or effectiveness of other drugs for the management of severe malaria. The rapid spread of drug resistance has led to the increased use of quinine as a second line drug. Therefore, the assessment of quinine efficacy or effectiveness as a second line drug is an important research topic;
- Operational and feasibility studies are required for the different models for the deployment of ACTs in the formal and informal sector and at the community level;
- Monitoring the anti-malarial drug policy change implementation process;
- Monitoring the efficacy of anti-malarial drugs and conducting clinical trials for new anti-malarial drugs within the framework of sub-regional collaborations such as EANMAT, WANMAT I and II and HANMAT; and
- Monitoring insecticides resistance and mapping vector distribution and characteristics.

6.2 LOW BURDEN COUNTRIES

6.2.1 Rationale for specifically identifying the low burden countries

Global malaria control such as the malaria control strategies proposed by the ministerial meeting in Amsterdam in 1992, and the Roll Back Malaria (1998) initiative, have tended to focus on the high malaria endemic countries. The low burden countries in Africa where elimination is feasible have often been omitted. However, recent achievements in malaria elimination in some African countries (especially those in the WHO/EMRO region) have compelled the WHO Global Malaria programme to renew its interest in malaria elimination. Indeed, some countries are approaching malaria elimination in efficient, well-funded national malaria control programmes, while others are implementing programmes deliberately aimed at malaria elimination but still using the term “malaria eradication”.

6.2.2 Aims and objectives

The planning for malaria elimination should be incremental, initially aiming at reducing the incidence of malaria to a level where it is of limited public health importance, and subsequently aiming at interrupting local transmission and finally to maintain a malaria free status. The strategies should combine intensive efforts to control the disease locally through case management and targeted vector control with extensive screening and follow up of imported cases.

6.2.3 Priority actions at national level

The feasibility of malaria elimination in a given country will depend on a careful analysis of previous experience in malaria eradication in that country along with the analysis of the environmental, epidemiological and socioeconomic factors related to malaria. There is a need to estimate the population at risk and the geographical areas affected, the available infrastructure, the social and economic situation of the areas affected, including political instability and conflicts, the situation in the neighbouring countries and the possibilities for cross border collaboration. Recent successful malaria elimination programmes had the following preconditions (WHO, 2006):

- Strong political commitment supported by fund allocation;
- The elimination programme was included as part of the country's social development programme;
- Good coordination mechanism, supported by a regional policy.
- Strong international support including official bilateral and inter-country cooperation; and
- The programmes were based on sufficient knowledge of the critical epidemiological aspects such as local malaria species; local vector species and their ecology, biting habits; eco-epidemiological types of malaria; patterns of malaria transmission and susceptibility of malaria parasites and vectors to antimalarial drugs and insecticides respectively.

Any elimination strategy should be based on the stratification of the malariogenic potential and should have a detailed description of the implementation of control and elimination measures for each stratum in critical areas such as:

- Vector control;
- Case management;
- Information systems and surveillance;
- Monitoring and evaluation; and
- Operational research and identification of training needs.

Priority actions should be linked to the phases and time frames in malaria elimination that have been used in the eradication programmes, namely:

The preparatory phase: This phase usually takes approximately 2-3 years and is used to clearly state the goals and objectives, analyse the situation through an initial assessment so as to identify gaps in resources (financial, human, equipment, laboratory, commodities and supplies, logistics and transport as well as information systems). In addition, stratification should be done according to the malaria epidemiology and entomology, seasonal patterns including GIS mapping of all population characteristics. After the initial assessment, a time bound plan of action should be developed for strengthening capacity in the critical areas identified by the assessment. A critical aspect of the preparatory phase is the introduction of epidemiological investigation

and classification of cases. An overview of the terminology used in the eradication programme is provided in the glossary.

The attack phase: This usually lasts about 3-5 years depending on the malaria species and is the period during which full implementation and monitoring of all planned activities is done so as to reach a low malaria incidence level (usually defined as an annual parasite index of less than one case per 10,000 population at risk). The parameters to be considered in selecting interventions are:

- Cost;
- Operational applicability and feasibility;
- Ecological acceptability;
- Acceptability by the population; and
- Administrative applicability, including available infrastructure, trained personnel, financing, transport and logistics, legislative support and policy framework, technical direction/support, public information and participation.

Priority actions should include:

- Ensuring early detection and prompt treatment of every malaria case. Coverage should be for the entire population;
- Responding adequately to any local transmission; and
- Provision of adequate laboratory services, including the use of rapid diagnostic tests.

The consolidation phase: The aim of this phase is to clear any remaining foci and to interrupt local transmission completely. This phase should start when there are only a few indigenous cases and total coverage surveillance is in place. In this phase, the epidemiological services should be capable of: detecting any possible continuation of transmission and determining its causes in order to eliminate them; and detecting any possible reintroduction of malaria transmission following importation of cases. This is a period of unlimited duration, but usually ends after three years of active surveillance have shown the absence of any new indigenous cases.

The maintenance phase: This is a period of the prevention of reintroduction after the last identified autochthonous case with no evidence of local transmission for 3 consecutive years, usually aiming at strengthening proactive surveillance and vigilance and maintaining selective vector control operations, inter-sectoral collaboration and maintaining vigilance, awareness, and skills of health care workers, including those in the private sector; maintaining entomological monitoring, surveillance and vigilance system; maintaining malaria awareness among the population with special attention to travellers; preventing the re-introduction of malaria in malaria-free areas by early detection of cases and effective treatment; and mounting a strong and time-limited attack on malaria to eliminate transmission whenever it occurs.

6.3 ROLES OF DIFFERENT STAKEHOLDERS

Different stakeholders will have different critical roles

6.3.1 Roles for the countries

The countries shall have the following roles:

- to ensure that the implementation of the malaria programme is successfully conducted;
- to revise the malaria situation analysis so as to refine and re-quantify the commodity needs (anti-malarial drugs, ITNs, diagnostics etc.);
- to establish the delivery mechanism for scaling up malaria prevention and control/elimination interventions and to ensure that relevant commodities are procured and delivered to the appropriate site timely;
- to ameliorate the human resource constraints through capacity building and improved incentive schemes for health workers;
- to maintain a functional surveillance system and design appropriate community based surveys for malaria indicators;
- to establish a mechanism for monitoring to track progress and achievement of targets; and
- to build and maintain partnerships with different stakeholders.

6.3.2 Role of regional bodies

Existing regional bodies need to be supported. These include the RBM regional networks that are used for sharing best practices. Particularly good examples of regional bodies that are presently on the brink of collapse as a result of inadequate financial resources are the networks for monitoring anti-malarial treatment. These networks are non-governmental, non-profit-making organisations which are politically and religiously neutral. Their main purpose is to assist in the development of evidence-based anti-malarial treatment drug policies in the member countries so as to provide effective malaria treatment and to reduce malaria morbidity and mortality. To accomplish this goal, the East African Network for Monitoring Antimalarial Treatment (EANMAT) in eastern Africa, the West African Network for Monitoring Antimalarial Treatment (WANMAT I and II) in west Africa, and Horn of Africa Network for Monitoring antimalarial Treatment (HANMAT) in the horn of Africa set out to work in partnership with member countries and associate members to pursue the following objectives:

- to rationalize the establishment and distribution of the sentinel sites for monitoring anti-malarial drugs in the member countries;
- to regularly monitor therapeutic efficacy of the first and second-line anti-malarial drugs in the sub-region and other potential alternative treatments (with possibility to include therapy for severe malaria);

- to establish and support a sub-regional database on anti-malarial drug efficacy and develop mechanisms for exchange of information and expertise between member countries;
- to facilitate the effective communication of results and implications of anti-malarial drug efficacy monitoring to country level decision-makers;
- to establish a mechanism for data interpretation at the network level for use in updating anti-malarial treatment policy for member countries;
- to initiate and promote priority operational research relevant to effective case management of malaria in the member countries; and
- to identify and collectively address issues related to malaria case management within and between member countries.

In addition to these networks, there are ongoing efforts in various research fields, including on vaccine candidates at the Malaria Research and Training Centre (MRTC) in Bamako, Mali; the Medical Research Centre (MRC) in Banjul, (The Gambia); The Centre Muraz in Bobo Dioulasso, Burkina Faso; and the Multi Disease Surveillance Centre (MDSC) in Ouagadougou, Burkina Faso. These centres are important in generating evidence that could later be used to guide policy so they have a critical role to play and IDB support for operational research at these centres will be good value for money.

6.4 ROLE OF INTERNATIONAL AGENCIES

International agencies such as WHO, USAID, UNICEF, should provide technical support to the countries and also should play a bigger role in advocacy for resource mobilization, in the creation of a database for malarialogists. Further, they should coordinate technical assistance to countries. This could be streamlined through regional and sub-regional meetings to facilitate and rationalize procurement of scarce commodities such as ACTs and ITNs. International agencies should also technically advise and support national priorities and plans of actions as well as support monitoring and evaluation

6.5 ROLE OF THE IDB AND OTHER DEVELOPMENT PARTNERS

The IDB and other development partners need to commit themselves to providing funding for cost effective malaria interventions in terms of commodities, training and implementation costs. There is a need to work with numerous stakeholders (endemic country partners, NGOs, and CSOs, WHO/GMP, the pharmaceutical industry, academia and research institutions and other partners, to be able to leverage resources.

In order to achieve tangible results, the IDB and other development partners will have to commit substantial resources to address the short-, medium- and long-term objectives. The IDB member countries as a group will require approximately 150-200 million US dollars annually to implement holistic malaria prevention and control plans. Most IDB member countries have gone through the lengthy process of developing their five year strategic plans as part of their comprehensive national health strategic plans or

as part of their Global Fund applications. However, there will be a need for the IDB in collaboration with endemic countries and international agencies such as the World Health Organisation, to conduct quick technical appraisal missions for all the member countries. These missions will help the IDB to define the bank's contribution to the RBM aim of a sustainable response to malaria, and to acquire an overview of the country-specific and cross-country needs and opportunities for achieving a sustainable reduction in malaria. Further, the missions will facilitate gap analysis so that IDB can refine the financial requirements for each country. Moreover, the appraisal missions will identify the countries that have the biggest need. It is proposed that contiguous member countries are grouped to enable the assessment of cross-country needs and opportunities. The mission appraisal teams should be comprised of experts in malaria control, health systems development, public health, and IDB operations. These joint missions will meet key stakeholders including government officials, health sector staff, researchers, NGOs, academia and manufacturers. Through these missions, countries will be identified on a needs basis. It is also proposed that the Quick Win Initiative is carried out in phases, so that the countries with the biggest need (in both high and low burden category) should be included in the first phase.

6.6 ROLE OF THE PRIVATE SECTOR

In several countries, the private sector plays a critical role in the delivery of health services. The high and low burden countries need to develop country specific models that integrate the public and private sector. Public private partnerships are important in research and development of new tools, including new antimalarial medicines, new vector control interventions or a malaria vaccine when one becomes available. Further, there is a need to develop innovative ways to increase access to life saving malaria interventions in the private sector. The affordable medicines for malaria (AMFm) currently under discussion is likely to be one of the mechanisms for increasing access to artemisinin combination therapy in the private sector including the non premium private sector and this initiative needs to be supported. In addition, the private firms should work closely with countries as part of their corporate social responsibility to ensure the supply of the good quality commodities and their quality delivery within national guidelines and established frameworks for monitoring the effectiveness and safety of malaria interventions at the country level.

6.7 CONCLUSION

There is presently a renewed call to eliminate or eradicate malaria. There is an opportunity for increased funding from agencies such as the IDB, GFATM, BMGF, PMI, Affordable Medicines Malaria (AFMM), UNITAID. Indeed there are some early success stories such as Rwanda, the MFI in the Sudan, Eritrea, Zanzibar, Mozambique, Zambia and Ethiopia that demonstrate that with good use of resources, good programmes and policies the malaria burden can be reduced. The approaches presented in this position paper are generic but they could be adapted to the local epidemiological context to achieve maximum impact. Although, the approaches in the high burden countries seems modest, they are likely to be pragmatic. The IDB and other MDBs should be key players in eliminating this old scourge of malaria.

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Annex 1									
Human Development Indicators									
Country	Human Poverty Index				Human Development Index				
	HPI Value ^a		Rank		HDI Value ^b			Rank	
	2003	2004	2003	2004	2000	2003	2004	2003	2004
Algeria	21.3	21.5	48	46	0.701	0.722	0.728	103	102
Benin	48.4	47.8	95	90	0.416	0.431	0.428	162	163
Burkina Faso	64.2	58.3	102	101	0.330	0.317	0.342	174	174
Cameroon	36.2	35.6	67	61	0.502	0.497	0.506	148	144
Chad	58.8	57.9	100	100	0.357	0.341	0.368	173	171
Comoros	31.2	31.6	57	56	0.539	0.547	0.556	132	132
Cote D'Ivoire	41.9	41.5	84	82	0.427	0.420	0.421	163	164
Djibouti	29.5	30.0	53	52	0.485	0.495	0.494	150	148
Egypt	30.9	20.0	55	44	0.654	0.659	0.702	119	111
Gabon	..	27.3	..	50	..	0.635	0.633	123	124
Gambia	44.7	44.7	88	86	0.459	0.470	0.479	155	155
Guinea	..	52.0	..	96.0	..	0.466	0.445	156	160
Guinea-Bissau	48.2	48.2	93	92	0.353	0.348	0.349	172	173
Libya	15.3	..	33	..	..	0.799	0.798	58	64
Mali	60.3	60.2	101	102	0.332	0.333	0.338	174	175
Mauritania	40.5	41.0	79	81	0.447	0.477	0.486	152	153
Morocco	34.5	33.4	61	59	0.610	0.631	0.640	124	123
Mozambique	49.1	48.9	96	94	0.364	0.379	0.390	168	168
Niger	64.4	56.4	103	99	..	0.281	..	177	177
Nigeria	38.8	40.6	75	76	0.433	0.453	0.448	158	159
Senegal	44.2	44.0	87	84	0.439	0.458	0.460	156	156
Sierra-Leone	54.9	51.9	98	95	..	0.298	..	176	176
Somalia	..	..	..	..	..	..	..	..	..
Sudan	32.4	31.3	59	54	0.496	0.512	0.516	141	141
Togo	39.5	39.2	76	72	0.504	0.512	0.495	143	147
Tunisia	18.3	17.9	43	39	0.739	0.753	0.760	89	87
Uganda	36.0	36.0	66	62	0.474	0.508	0.502	144	145
IDB MCs	27.5	21.8	--	--	0.549	0.584	0.557	--	--
Memo:									
OIC Countries	27.5	21.8	--	--	0.549	0.584	0.557	--	--
LDCs	--	--	--	--	--	0.518	--	--	--
Developing Coun.	--	--	--	--	--	0.694	--	--	--
High Income Coun.	--	--	--	--	--	0.910	--	--	--
World	--	--	--	--	--	--	--	--	--

a Measures the extent of deprivation, the proportion of people in the community who are left out of progress.

b Value of 0.8 and above means high human development, value between 0.5 and less than 0.8 means medium human development, and value less than 0.5 means low human development

Source: UNDP

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