

**Report on Malaria Consultancy:
Support to the Zambian National Roll Back Malaria
Programme**

UNICEF Zambia and the Malaria Consortium

September 21 – October 6, 2000

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Final Report

Executive Summary

This consultancy was undertaken in Zambia between the 21st September and 5th October 2000, with the objective of reviewing the current draft plans for the National Roll Back Malaria programme and making specific recommendations that would assist in the scaling-up process. A number of key organizations and personnel involved in malaria control activities in Zambia were visited and a number of relevant reports were reviewed.

It is clear that malaria is a major public health problem in Zambia and it has been increasing in prevalence and severity over the past decade. Part of this increasing burden is due to the growing resistance of the parasite to the standard chloroquine treatment. The Roll Back Malaria (RBM) initiative has gained widespread political support in the region, including the Government of Zambia. There is support at the government level for the RBM process, plus a willingness and desire to improve malaria control activities.

The current draft RBM plan contains 11 key areas:

- Insecticide Treated Nets (ITNs)
- Vector Control
- Information, Education and Communication
- Epidemic Preparedness and Response
- Clinical Management and Prophylaxis/Intermittent Presumptive Treatment
- Drug Procurement and Distribution
- Laboratory Diagnosis
- Malaria and Nutrition
- Monitoring and Evaluation
- Research
- Human Resources and Capacity Building

Each of these areas is reviewed in detail and recommendations are set forth under each heading, further sub-divided for the level of implementation, either central or district/community. These are detailed in Section 5.

The challenges for planning and operationalizing a National Malaria Control strategy in Zambia are clear. At the central level, there is a tremendous amount of capacity and technical resources available, spearheaded by the National Malaria Control Centre (NMCC) and a multi-sectoral malaria working group. This partnership seems to be working well at the central level, with representation from a wide range of ministries, organizations and agencies. There is a need, however, for more emphasis on 'partnerships' at the district and community levels. First and foremost, there is a need to establish strong public-private partnerships and a multi-sectoral coordinating body for the RBM activities at the district level, as this will impact strongly on all other planning and implementing processes of RBM.

There should be increased efforts at community IEC and communication for behaviour change with regard to ITNs, utilizing multiple media (including traditional media), and

targeting vulnerable groups with subsidized ITNs through a voucher system. Limited vector control strategies should be utilized in selected areas, with support from the private sector. Key IEC messages have been developed, but these now need to be disseminated widely along with the development and distribution of appropriate materials and teaching aids for health workers and volunteers. Chloroquine resistance is worsening and there is a critical need to change the first-line drug treatment for malaria in order to improve clinical management, with sulphadoxine-pyrimethamine (SP) appearing to hold the greatest promise. There is a need to intensify efforts at intermittent presumptive treatment during pregnancy, using SP, and integrating antenatal services in the areas of malaria control, HIV/AIDS and nutrition.

Training of health workers in the integrated management of childhood illness (IMCI) is encouraged and this is especially vital in terms of community-based IMCI training for community health workers (CHWs) along with the provision of drug kits. There is a need to bring the treatment of malaria as close as possible to the community, and linking this to an integrated health intervention like IMCI is to be encouraged. The national and district-level drug procurement system will require strengthening, and perhaps could go hand in hand with a change in national drug policy. Steps should be taken towards ensuring that hospitals and *larger* health centres have functioning, quality-controlled laboratories, whereas consideration should be given to providing rapid malaria diagnostic test kits for use at rural health centres, in order to improve case management and decrease the overuse of malaria drug treatment.

There is a need to integrate malaria with nutrition activities at the district and community levels and this is particularly important for the provision of micronutrient supplementation (iron, folic acid, vitamin A, zinc) in combination with SP presumptive treatment for women during pregnancy. The key malaria indicators that are presently included in the health management information system (HMIS) should be supplemented with information from sentinel surveillance sites. The key indicators necessary for effective monitoring of country-wide RBM activities are listed. Further work at coordinating priority research efforts should be undertaken.

The human resource and capacity-building needs are well articulated in the Ministry of Health 5-Year Plan. The operationalization of this plan should be supported as it will strengthen RBM activities. There needs to be a concerted effort to train community health workers (CHWs) and provide them with the necessary skills and logistics as they will be the driving force behind the malaria control activities in the long term. Also, there needs to be a strong, competent district administration and coordinating body for RBM activities.

The overall RBM plan for Zambia needs support from the government of Zambia and the cooperating partners in order to succeed. UNICEF Zambia can support efforts in all of these key areas and build on their current strength of community-based participatory action, as this is the key to success for Roll Back Malaria.

Table of Contents

EXECUTIVE SUMMARY	I
TABLE OF CONTENTS	III
LIST OF ABBREVIATIONS	IV
1 GOAL AND OBJECTIVES	1
2 METHODOLOGY	1
3 FINDINGS	2
3.1 Malaria Situation Analysis – Zambia	2
3.2 Background to Roll Back Malaria	3
3.3 Roll Back Malaria Strategy for Zambia	4
3.3.1 <u>Insecticide Treated Nets</u>	7
3.3.2 <u>Vector Control</u>	14
3.3.3 <u>Information, Education and Communication</u>	15
3.3.4 <u>Epidemic Preparedness and Response</u>	16
3.3.5 <u>Clinical Management and Intermittent Presumptive Treatment</u>	17
3.3.6 <u>Drug Procurement and Distribution</u>	21
3.3.7 <u>Laboratory Diagnosis</u>	21
3.3.8 <u>Malaria and Nutrition</u>	23
3.3.9 <u>Monitoring and Evaluation</u>	27
3.3.10 <u>Research</u>	31
3.3.11 <u>Human Resources and Capacity Building</u>	31
3.4 Review of Capacity Building Strategy and Materials for the Community-Based Malaria Prevention and Control Programme	35
4 CONCLUSIONS	37
5 SUMMARY OF RECOMMENDATIONS	41
6 ACKNOWLEDGEMENTS	48
ANNEX 1 – PERSONS CONTACTED	49
ANNEX 2 – DATES AND PLACES VISITED	50
ANNEX 3 – DOCUMENTS REVIEWED	51
ANNEX 4 – LOGFRAMES – EXAMPLES	53

List of Abbreviations

AFRO – Africa Regional Office (WHO)
AIDS – Acquired Immune Deficiency Syndrome
ANC – Antenatal Clinic
CBMPCP – Community-Based Malaria Prevention and Control Programme
CBoH – Central Board of Health
CDC – Centres for Disease Control
CFR – Case Fatality Rate
CHH – Child Headed Household
CHW – Community Health Worker
CMAZ – Churches Medical Association of Zambia
CMR – Childhood Mortality Rate (under 5 years)
CQ - Chloroquine
CRS – Catholic Relief Services
DALY – Disability Adjusted Life Years
DDC – District Development Committee
DDH – District Director for Health
DHMT – District Health Management Team
DHS – Demographic and Health Survey
DOT – Directly Observed Therapy
EBF – Exclusive Breastfeeding
EDL – Essential Drug List
EPI – Expanded Programme on Immunization
FHH – Female Headed Household
GRZ – Government of the Republic of Zambia
HIV – Human Immunodeficiency Virus
HMIS – Health Management Information System
IEC – Information, Education and Communication
IGA – Income Generating Activity
IMCI – Integrated Management of Childhood Illness
ITN – Insecticide Treated Net
JICA – Japan International Cooperation Agency
KAP – Knowledge, Attitudes and Practices
LFA – Logical Framework Analysis
MA – Malaria Agent
MCC – Malaria Coordinating Committee
MCH – Maternal-Child Health
M&E – Monitoring and Evaluation
MOH – Ministry of Health
NFNC – National Food and Nutrition Centre
NGO – Non-Governmental Organization
NHC – Neighbourhood Health Committee
NMCC – National Malaria Control Centre
PHC – Primary Health Care
PNG – Papua New Guinea

PSI – Population Services International
RBM – Roll Back Malaria
RHC – Rural Health Centre
SAMC – Southern Africa Malaria Centre
SFH – Society for Family Health
SP – Sulphadoxine-Pyrimethamine
STG – Standard Treatment Guidelines
SWAP – Sector-Wide Approach
TBA – Traditional Birth Attendant
TDRC – Tropical Disease Research Centre
U5 – Under Fives
UNDP – United Nations Development Programme
UNICEF – United Nations International Children’s Fund
USAID – United States Agency for International Development
VAC – Vitamin A Capsule
VAD – Vitamin A Deficiency
WHO – World Health Organization
ZNF – Zambian National Formulary
ZIHP – Zambia Integrated Health Programme

1 Goal and Objectives

The goal of the present consultancy is to provide technical input to key areas of the malaria programme in Zambia in order to assist with a scaling up of activities and operationalization of the National Roll Back Malaria strategy. The objective is to support the detailed action planning process of the National Roll Back Malaria strategy in collaboration with key partners in Zambia, most importantly the National Malaria Control Centre (NMCC), the Central Board of Health (CBoH), World Health Organisation (WHO) and United States Agency for International Development (USAID), and make recommendations that will facilitate and improve the existing planning process. Priority areas include scaling up of both the ITN component and integrated management of childhood illness (IMCI), changing the antimalarial drug policy, capacity building, advocacy and information, education and communication (IEC).

2 Methodology

The goals and objectives of the consultancy were accomplished through a combination of activities undertaken during the period of 16 days between 21st September and 13th October 2000. This included a period of 14 days in-country in Lusaka from the 21st September to the 5th October. The activities undertaken included:

- Reviewing the available literature, including previous Malaria Consortium reports, those that have been provided by UNICEF, and additional material as appropriate (see list in Annex 3)
- Meeting with relevant staff from UNICEF, Government (MOH, CBoH, and other relevant departments) and other partners involved in malaria control in Zambia (see list of people/offices visited and itinerary in annexes 1 & 2).
- Reviewing the capacity building strategy and materials for the UNICEF-supported Community-Based Malaria Prevention and Control Programme (CBMPCP) in Luapula Province.

3 Findings

3.1 Malaria Situation Analysis – Zambia

It is clear from the well-recorded Malaria Situation Analysis for Zambia (May 2000), that malaria, particularly that caused by *Plasmodium falciparum*, is an important public health problem in the country. Incidence of the disease has been steadily rising from 1976 through to 1999, to the point where it is now estimated that the incidence rate, from facility-based data, stands at about 331 per 1000 population. This is obviously an underestimate as many malaria cases occur at a community level, which do not get reported to the formal health system. Even more importantly, the case fatality rate of malaria has also been steadily rising through 1994 (the last year when hospital level data were available). As expected, those most affected by the disease in Zambia include children under the age of five years, pregnant women, those infected with HIV, the chronically ill, the poor and marginalized of society. The economic burden of the disease is staggering in terms of the impact on rural, subsistence families, and the nation as a whole, where malaria by far represents the greatest disability adjusted life years (DALYs) lost.

The clinical management of malaria in Zambia has been complicated in recent years by a growing resistance to the first-line treatment, chloroquine (CQ). The clinical failure rate ranges between 24% and 52%, levels beyond which an examination of formal change in drug policy is recommended by international health bodies such as the WHO. In addition, supply of appropriate medications for malaria control is often erratic, decreasing accessibility to treatment in rural areas. Studies on knowledge, attitudes and practices (KAP) find that, although malaria is widely recognized, there remain many misconceptions about the disease. Few families, particularly those in rural areas, take any appropriate preventative measures against the disease.

Zambia is an acknowledged leader in health reforms in the sub-Saharan Africa region. Since 1992 a system of decentralization has been instituted, with health administration and service delivery being primarily devolved to the district level. It is under this reform process that the current malaria control strategy for the country is being implemented. Over the past 5 years there have been a number of malaria control projects in various areas and regions through the public sector, private sector and with non-governmental organizations (NGOs). This includes programmes supporting and promoting the use of ITNs, improved case management and support to malaria IEC and communication for behaviour change. There is an impressive list of collaborating and cooperating partners in this process:

- National Malaria Control Centre (NMCC)
- UNICEF
- USAID
- WHO
- JICA
- Churches Medical Association of Zambia (CMAZ)

- Society for Family Health (SFH)
- CARE/Zambia
- Development Aid People to People/Zambia (DAPP)
- World Vision/Zambia
- Adventist Development and Relief Agency (ADRA)
- Lutheran World Federation (LWF)
- Project Concern International
- Plan International
- Private Sector mining and agriculture companies

It is clear that there are a number of major constraints to the provision of effective malaria prevention and control activities in Zambia. These include:

1. Growing levels of chloroquine resistance;
2. Drug shortages;
3. High costs of ITNs and insecticide;
4. Inadequate accessibility to services in many rural areas;
5. Inadequate human resource coverage in the health sector;
6. Lack of appropriate supplies for effective IEC and behaviour change;
7. Inadequate laboratory diagnostic capabilities.

3.2 Background to Roll Back Malaria

The Roll Back Malaria (RBM) initiative was launched by the Director-General of the World Health Organization, along with UNICEF, UNDP and The World Bank, in October 1998. The overarching goal of RBM is to achieve a 50% reduction in malaria-related mortality and morbidity by the year 2010. This will be achieved by:

- Fostering better coordination among all partners such as governments, donors, UN Agencies, NGOs and communities;
- Strengthening existing health services to improve access and quality of health care;
- Setting up sustainable prevention and control measures;
- Using existing and newer tools to combat malaria effectively, including new drug combinations and personal protection measures such as use of insecticide treated mosquito nets;
- Making effective and affordable drugs available to communities in need and encouraging the development of even more effective antimalarial drugs and vaccines.

This was further modified during the African RBM meeting in Abuja, Nigeria in April 2000 (attended by representatives from Zambia). At that gathering, the African leaders and heads of state 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, can 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.

The leaders also pledged to reduce or waive taxes and tariffs for mosquito nets and materials, insecticides, antimalarial drugs and other recommended goods and services that are needed for malaria control strategies; to allocate the resource required for sustained implementation of planned Roll Back Malaria actions; and to commemorate the summit by declaring April 25th each year as African Malaria Day.

The seven pillars on which Roll Back Malaria in the African Region intends to achieve success in the reduction of malaria morbidity and mortality are:

- Ownership
- Building and strengthening partnerships
- Increasing coverage of cost-effective technical interventions
- Contributing to the Health Sector Reform
- Strengthening Health Management Information System and Research
- Strengthening community participation
- Integration of malaria control activities into primary health care and socio-economic development activities

3.3 Roll Back Malaria Strategy for Zambia

It is within this current context and within the constraints listed in section 3.1 above that the Roll Back Malaria (RBM) Strategy for Zambia was planned. A malaria strategic planning development meeting took place in March 2000, involving many of the organizations listed above, and also including other government ministries, professional bodies, academic and research institutions. As a result, strategy papers on eleven specific areas were developed and rolled into one overall draft RBM-Zambia plan. NMCC staff then traveled to each province to disseminate the results of the Malaria Situation Analysis and RBM plan to DHMT members, and provide each DHMT with the tools needed to produce their own situation analysis of malaria and an action plan for control over the next year (2001). These are presently being received at NMCC and collated. A final National RBM Strategy for Zambia will be produced shortly, along with specific district plans, and it is hoped that the results of this current review will assist with this process.

In order to improve the planning and implementation process, it is suggested that a logical framework analysis for the final RBM plan (LFA or LogFrame) be developed from the existing information and in collaboration with key staff members of the National Malaria Control Centre. This would include activities, outputs, outcomes and indicators

of process and impact linked to each objective. LogFrames have been developed for a few of the key areas in the RBM strategy and are included here as examples in annex 4. These LogFrames were devised to reflect a paradigm where:

Outputs	=	work that is done
Outcomes	=	behavioural changes (KAP)
Impacts	=	health changes

Within a results-based management framework, outputs are the easiest to achieve and demonstrate, while impacts are the hardest to achieve and demonstrate. It must be realized just how challenging it will be to demonstrate how RBM-Zambia helps to decrease morbidity and mortality rates in the short term. This is especially true when we look at how the outcomes are now defined. Behaviours are not easy to change, especially when the programme often works through intermediaries such as government health workers, who then work with village volunteers (malaria agents and CHWs), who then try to change household behaviours. If behavioural changes are therefore modest, then the impact that the programme is striving for will likely be that much more difficult to attain. Given the pivotal role that behavioural change plays in this programme, there needs to be a commitment to monitoring changes in knowledge, attitude and practice (KAP) very intensively and the programme should work very hard to coordinate and improve IEC strategies, to maximize the programme results.

Overall, it is encouraging to see the progress that has been made in this country with regard to planning for malaria control activities, given the difficult conditions with which to work with. There is an active, multi-sectoral working group at the central level, with representation from various collaborating partners and organizations, which has been instrumental in the RBM process. This type of inclusive, participatory process needs to continue, and needs to be replicated as much as possible at the district level in order for RBM to be an effective and sustainable movement. Globally, Roll Back Malaria is a 'social movement', building partnerships for effective control of a difficult public health problem. These partnerships, however, need to go beyond the health sector and include as wide a range of possible of representation from the community level, including education, agriculture, community development, churches, other community-based organizations, and the commercial sector, although this list is not exhaustive. With that in mind, it is suggested that a separate section on 'building partnerships' be added to the present mix of activities and strategies for RBM. This concept is included specifically as part of the first two objectives under ITNs but should be separated out, as it will be such a key ingredient to success.

In the present RBM draft, there are two objectives under ITNs which contain reference to 'public private' partnerships. The consultant would suggest that one core objective be to establish effective public-private partnerships at the central, district and community levels. This will impact on all the other activities and strategies and go beyond ITNs.

As RBM originated as a 'social, multi-sectoral movement', this implies that it should not necessarily be simply an MOH/CBoH strategy. Do not rely on DHMTs alone to do all the work as they are already overloaded and understaffed. The movement needs a coordinated effort, not only at the central level but most importantly at the district and community levels, with NGOs, the Churches Medical Association of Zambia (CMAZ), commercial sector and other ministries such as Education, Agriculture and the NFNC. DHMT could be involved with the coordination of RBM activities, but it is important to go beyond the health sector. RBM could make use of the various 'arms' of the CBoH system but it is also important to use the dynamic groups and organizations that are already operating in the districts and at the community level. This may vary from district to district but what is important is to identify the 'driving force' that is in operation and use these strengths for carrying out the RBM activities. The NMCC, through the DHMTs would provide the technical support for the process, but the actual coordination should be through a multi-sectoral 'District RBM Coordinating Committee', on which the DHMT is represented but is not necessarily the driving force. In reality this will probably be the District Development Committee (DDC), as this system is already functional and it is best to utilize existing systems and structures. This process would take time (and money for meetings etc.) but in the end will be more comprehensive, more efficient, more effective, and likely more sustainable. Perhaps the RBM plan at present is too 'DHMT focused'? Of course, it is vital that the DHMT be involved, as we can see from the comparison evaluation of the Eastern Province and Luapula projects, but not necessarily in a coordinating role. There should be an RBM 'focal point person' at the district level as this will ease the work burden and ensure that monitoring, supervision and evaluation takes place (someone appointed by the DDC).

For example:

Objective 1: To establish effective public-private partnerships for malaria control using ITNs (at central, district and community levels).

Strategy: Effective working group with regular meetings and full representation from the private sector (the public sector seems to be well represented already at the central level, but there may be others that can be included e.g. NGOs). With regard to the central-level working group it may be advisable to consider planning a yearly longer (2-3 day?) conference to review, strategize and prioritize. This may already be planned, as the original meeting was a week long planning workshop held in Siavonga. At a district and community level, it may be advisable to work through an established committee such as the District Development Committee (DDC). This system is already in place, although many districts may not at present have a functioning DDC and this would need to be revived. It will important that in initial stages all the key players in the district be identified and invited to participate.

Targets: Regular, monthly (or quarterly) working group meeting at central level attended by at least 75% of members. Regular, monthly (or quarterly) District RBM Coordinating Committee (DDC) meeting attended by at least 75% of members. Yearly action plans developed for district malaria control.

Another key strategy that should be included in the overall management process of malaria control in Zambia is the formation of specific ‘specialty sub-groups’ within the overall malaria working group of the NMCC. These groups were formed as part of the initial planning process for RBM but they need to continue to meet (perhaps quarterly) in order to monitor and review the planning process. This is especially important for monitoring & evaluation, clinical management, communication for behaviour change (IEC) and ITNs.

The other strategic areas of the RBM draft plan are reviewed and each section is critiqued here in turn, followed by a set of key recommendations based on the findings of this review process.

3.3.1 Insecticide Treated Nets

Much of the background information on ITNs has been gleaned from documentation and evaluation of various projects in the country, most notably that in Luapula Province. The Community Based Malaria prevention and Control Programme (CBMPCP) began as a pilot project in Samfya District, Luapula Province, in 1994 with support from UNICEF and included the communities of Kasanka, Mushili and Matongo. In 1998 – 1999 implementation was expanded to the rest of the communities in Samfya and to communities in three more districts in Luapula Province – Mansa, Mwense and Nchelenge. The focus of the programme is on community-based sale of insecticide treated mosquito nets (ITNs) through community health workers (CHWs), capacity building of health workers in malaria case management through integrated management of childhood illness (IMCI), training of CHWs in malaria case management and community-based information, education and communication (IEC).

Although the ITN component of the Luapula CBMPCP is progressing satisfactorily, ITN sales were certainly higher in the pilot phase than in the expanded programme. Various evaluations and reviews of the programme have raised a number of concerns and constraints, which will need to be addressed in the current RBM-Zambia plan. Some communities still have not received the necessary logistics and in other communities and districts there is poor recording of supply, distribution and sales of ITNs. The ‘flow’ of information appears to be generally weak at all levels and it is difficult to calculate ‘population coverage’ with ITNs, although ‘sales coverage’ ranges from 1.1% to 10.8%. Sales generally follow a seasonal pattern, following ‘cash availability’ post-harvest. It is noted that supervision has been generally poor, as a result of transportation problems and distances.

Retreatment rates are generally poor in most communities, partly it appears as a result of perceived ineffectiveness of ICON used during the 1998/99 period. This may change with the recent switch to KO-Tabs, although these are relatively expensive and may prove not to be sustainable due to cost. The current rate of subsidization for nets in the

Luapula Province UNICEF project stands at about 23%, but this takes into account only the UNICEF net cost and not the other associated project costs such as IEC and training¹.

In many communities a barter system was preferred, with payment ‘in-kind’ of household crop items such as maize, beans and cassava. However this resulted in problems for the DHMT in storing and selling of the produce and resulted in much lost profit. It had been suggested that the barter system be discouraged, yet it is the community who are saying that they want to be able to take advantage of this opportunity as it would improve their accessibility to ITNs and improve ITN coverage. Therefore, those in the position of programme planning should take note of this and look for ways to make this system work. There is especially a need for use of the barter system in rural areas, where access to cash is often poor. The DDC (or district RBM coordinating committee) needs to examine options for the local storage and sale of produce. This may not be possible in all areas, but should be investigated. Perhaps limit the process to few common commodities such as maize, cassava and beans and try to identify a local merchant or company to sell to. The Salvation Army has done this in one district with success already.

Another innovative programme in the Ekwendeni community of northern Malawi circumvented this problem by utilizing community-run ‘grain banks’ for the storage and sale of produce (primarily maize and soybeans). These are a type of ‘cooperative’, which were set up in 1991 with initial support from USAID through the SHARED Project. Coordination with the local ITN programmes has allowed a system of ‘in-kind’ contribution (or barter system) to be arranged, where (primarily) maize is ‘sold’ to the local community grain bank in exchange for an ITN, with the ITN revolving fund receiving the appropriate money in return. This has helped address the local food security problem at the same time. It may be possible for a similar initiative to be looked at within selected regions of this country. It is therefore recommended that RBM examine the feasibility of this ‘community grain bank’ concept, although it would take initial start-up costs for infrastructure and training. It is suggested that if there is interest in this concept, a visit to the project site in Malawi should be made².

There is presently a social marketing ITN commercial sales programme operated by the Society for Family Health (SFH) with support from USAID. It is being conducted within the Integrated Malaria Control Initiative and has been operating in Eastern Province for since 1998, with the sales of ‘PowerNet’ and ‘POWERCHEM’ through community agents. It was expanded recently to the Kitwe area, where it will mainly involve sales through the private sector. SFH coordinates and implements all aspects of the programme although this is gradually being handed over to the DHMT.

SFH plans to use the present procurement system to assist with the supply of nets for other programmes, both private (NGO) and public (DHMT). SFH is to begin marketing

¹ see consultancy report on UNICEF support to malaria control in Zambia by Jenny Hill, Jayne Webster and Mulenda Basimike

² Further information about this innovative project can be obtained from the Health Coordinator of the Synod of Livingstonia Health Department, P. O. Box 1000, Mzuzu, Malawi (e-mail: ccaphealth@malawi.net).

of 'SafeNight' net, which is a 'permanently treated' net and withstands up to 21 washings while maintaining full effectiveness of the (Deltamethrin) insecticide. Although the initial supply of these nets will be white, there are plans to have them supplied in a different colour so that they can be more easily distinguished from the others. In the meantime, they have a tag on the inside, which will identify them as a 'permanently treated net'. In initial stages, these nets will be marketed at a higher price than the 'PowerNet', due to their increased supply cost, and therefore are likely to be affordable by a minority of the population. However a 'cross-subsidy' is planned so that the sales of the higher priced 'SafeNight' can help offset the cost of the 'PowerNet' and therefore reduce the price of the nets being sold in rural areas.

From a comparison study that was undertaken to examine the Eastern Province and Luapula models, it is clear that involvement of the DHMT at the beginning is one of keys to success and sustainability through establishing a sense of ownership. The consultant would go beyond this to suggest the involvement of a multi-sectoral management group (as mentioned above), including other organizational and community representatives in addition to DHMT, in initial stages would be an even more effective approach. It was also clear from this comparison that intensive IEC and community promotion at the initial stages of an ITN programme is another key to success.

The Churches Medical Association of Zambia (CMAZ) will be a key partner in the implementation of the National RBM strategy. Being the primary provider of health services to a large part of the country, particularly in rural areas, means that CMAZ will need to continue to play a key role in malaria control. It is important for CMAZ to maintain a presence on policy-making boards within the MOH/CBoH and on the Malaria Task Force and working group. It is not clear if the CMAZ health units are represented adequately at a district level in all cases, and this should be ensured in order to take advantage of their ITN experience and close relationship with the community.

There is experience within CMAZ particularly with regard to ITN programming and lessons to be learned from their experience. Some areas have been successful in using the barter system for net sales to the community, by using the maize that has been traded for ITNs within their own health units for patient feeding. In other areas, storage of the maize has been a problem, as was seen in the Luapula project. Many CMAZ hospitals are now using ITNs on their hospital wards, primarily children's wards and maternity, as well as promoting them for all staff members, and this is proving to be a helpful advocacy tool for awareness raising. ITN retreatment is a problem however, as it is in other areas. Most CMAZ health units work through CHWs at the community level, providing support and supervision, however this level needs to be strengthened with regard to supervision, training and the supply of drug kits for community-based malaria control.

It is likely that NetMark will begin the large-scale marketing of ITNs through the commercial sector next year. If this is the case, then it will allow for more of the public health effort to be put into reaching the more rural and vulnerable populations, who will not have easy access to the commercial sector ITNs. NetMark is a public-private partnership between AED and SC Johnson Wax, which plans to market ITNs and

insecticide through commercial outlets in selected African countries. The identification and selection process for countries is underway by the company at this time and Zambia is one potential site. Indications are that it is most likely that NetMark will select Zambia for implementation to begin early in 2001.

It is possible that there is a role for small-scale local manufacture of nets as an income-generating activity (IGA) by working through, for example, women's groups? Employment is a problem and local manufacture would assist with this aspect (albeit on a small scale) of poverty reduction. Many ITNs are needed for RBM and there will be a role for as many activities as possible. The major procurement and supply is likely to be through one central body, such as SFH, in order to bring large numbers easily in to the country. There is a role, however, for the local manufacture of nets on a commercial basis (there is one small producer in Ndola right now) and on a community basis. JICA has expressed some interest in the small-scale community production of nets. They may be willing to bring in netting material and supply this to local groups who would then undertake the production and sale of the nets in the community. This has worked on small scale in other countries such as Kenya. It must be kept in mind that this would be primarily an associated 'poverty reduction' scheme on a small-scale, rather than a large commercial 'profit making' venture. There is a group in Mumbwa District (Atusole Women's Health Project) undertaking this at present with netting from the market, which is expensive.

There may be consideration given to a 'net for work' programme for vulnerable groups, the very poor, female-headed households (FHH) etc. Many communities and organizations have experience with 'food for work' activities, usually with regard to infrastructures such as road and bridge improvement. An ITN can be used as compensation for work output for those who do not have the cash to pay. This would be especially useful in areas where people would like to use the barter system, due to lack of cash, but there is not system in place to utilize this. The 'work' involved could be linked to malaria control or other health activities, such as environmental control activities, digging and protection of shallow wells, construction of pit latrines, the construction of community structures such as grain storage facility, or community gardens.

It would be helpful to try to 'harmonize' the pricing of ITNs at the community level in order to reduce confusion and mistrust. If there was a national, central procurement system, this would allow for easier supply and pricing coordination. There has been an offer from SFH to be the 'procurement unit' for other organizations and this should be encouraged. This system is working well in Malawi where the PSI BITNET Programme is acting as the central supplier for ITNs and insecticide, and also in Tanzania. PSI is able to negotiate an improved pricing agreement with suppliers due to large volume of purchase and this can then be passed on to all ITN projects in the country, including the government public sector. Furthermore, the supply, storage and distribution of ITNs and insecticide at the district level should be integrated or harmonized as much as possible with existing systems. Supply of ITNs and insecticide to rural health centres (RHCs) can be coordinated with the supply of drugs from the district to the RHC level on a monthly

basis. In this way, transportation and stock-keeping costs can be reduced. This is being attempted by SFH in Eastern Province at the present time.

It is a 'given' that if one ITN exists in a household, the male head of household will have priority. This has been seen in evaluations of all the ITN programmes in Zambia to date. This will be very difficult behaviour to change, although attempts should still be made through various communication and education strategies. In the meantime, it is imperative that households be encouraged to purchase two nets (or a second net for those that already have one) so that the main target group (under 5s) would be more likely to be covered. 'Two for one' promotions for households with under 5s is one possibility. This would require subsidy, but subsidization is already in place, therefore there should be more of a 'targeted subsidy' system.

There is a proposal for collaboration in Kasama District, between UNICEF and SFH, and this appears to be a good combination of skills and expertise. It was seen from the comparison and evaluations of the existing Luapula project that IEC has been a weak point. Therefore utilizing the strong IEC and procurement/distribution skills and experience of SFH, combined with the community capacity-building expertise of UNICEF to target vulnerable groups, should prove to be a very effective combination, which could potentially be replicated in other areas.

With regard to retreatment, many projects are currently using KO-Tabs, which are convenient but expensive (about \$1.30 or K4000). Consideration should be given to promoting 'mass community retreatment' activities, along the lines of the 'retreatment festivals' held in Eastern Province as part of the SFH activities. KO-Tabs would require subsidy at present in order to be affordable to the vast majority of the rural population. Therefore, why not put this subsidy into an already inexpensive mass campaign using bulk insecticide (like Deltamethrin, which costs about K1000 per treatment when purchased in bulk). By using this approach, even free retreatment could be provided in rural areas for the next few years at the same cost as the present subsidy for KO-Tabs. This would no doubt increase coverage, as more people are likely to access treatment. This would need to be accompanied by an effective IEC campaign to extol the benefits of insecticide treatment (which needs to occur anyway) and the need to treat all nets, whether purchased commercially or through the particular project at hand (unless this is a "SafeNight" net). This can be undertaken in the more rural, inaccessible areas and leaving the more urban and peri-urban areas to be covered by the commercial sector purchase of retreatment kits. Mass retreatment campaigns can also be linked to other activities, such as VAC supplementation for children on a yearly or twice-yearly basis in order to increase the incentive for participation and increase the likelihood of a synergistic action in effects (see section 3.3.8 on Nutrition).

It goes without saying that there need to be coordinated efforts directed toward a lobby for a reduction in taxes and tariffs for the importation of ITNs and insecticide. This was a key issue discussed and agreed upon by the Heads of State in Abuja. Tanzania has already done so a few years ago and more recently the country of Uganda did the same.

There are a number of recommendations included in the consultancy report by Jenny Hill et al, based on an extensive review and evaluation of the Luapula CBMPC Project. These need not to be repeated but suffice to say that there have been a number of lessons learned over the five years of the project and it is imperative that these lessons be taken into account when scaling-up of activities proceeds. A few should be mentioned here however as they have also been identified in the information gathering stage of this present report:

- The need for improvement in the delivery of IEC in order to sensitize community members, particularly in the initial stages of the malaria prevention and control programme. It is imperative to raise awareness and ensure that the correct messages are being conveyed. The important messages should be kept to a minimum, so as to avoid confusion and misinterpretation. The key messages have been already identified by the National Malaria IEC Working Group. Further materials and aids, as well as guidance in the delivery of these messages, using multiple media, should be provided to the community volunteers. The link between UNICEF and SFH in Kasama District is one such initiative to improve the ‘marketing’ of ITNs through an increase in awareness raising and education.
- Need to concentrate on the targeting of vulnerable groups, for the ‘public’ portion of the ITN programme. This can be done through various means such as vouchers, by way of a targeted subsidy.

Below is a list of some of the specific revisions that would be recommended for the ITN strategy under the existing RBM draft plan. This is followed by a list of general recommendations for the ITN section as mentioned in the discussion above:

- 1) The overall goal of this section should be to increase ITN use to **60% by 2005** – in line with the Abuja Declaration to which Zambia was signatory. Whether this is feasible and realistic is open for discussion, however this is the official African RBM goal. It would be wise to ensure that all objectives and targets are on line with those of the Abuja RBM agreement:
 - 60% of households using ITNs by 2005
 - At least 60% of those at risk of malaria, particularly children under 5 years of age and pregnant women have access to affordable nets (need to define “access” and “affordable”)
- 2) Since the issue of partnerships has been removed from **Objective 1**, it is suggested that the first ITN objective read:
 - To raise awareness of malaria and its prevention and to create demand for ITNs and retreatment.
 - It will be important to include targets that are addressing key KAP questions, e.g. % of the target group with knowledge of ITNs as preventative measure, % with knowledge of necessity of insecticide, % willing to purchase ITN and retreat (specific wording appropriate to KAP questions in use).

3) **Objective 2** can then read:

- To ensure availability of affordable bednets and appropriate insecticides to all sectors of the population.

4) That leaves **Objective 3** to read:

- To promote the regular retreatment of ITNs with appropriate insecticide.
- The key strategy needs to go beyond 'promotion' however to the provision, access and affordability of retreatment.

5) General ITN recommendations:

- Need for effective public-private partnerships for ITNs. The centrally-based malaria working group is a good start, but are there more private organizations that could be involved? Try to enlist more NGO support and try to ensure that they are represented on the working group and DDC. Should make efforts to ensure that all organizations in Zambia involved with ITNs are informed and on board and represented on working group.
- If NetMark takes off in Zambia then this may effectively cover the private sector and upper segments of society. There will be a need to concentrate on vulnerable groups and perhaps subsidize the identified groups by way of a 'voucher system'. NGOs and church-based health organizations often have good working relationships with rural communities in terms of development efforts and can assist with identification of vulnerable groups.
- Examine ways to implement a functioning barter system in selected communities, utilizing some of the strategies mentioned in the discussion above.
- Concentrate heavily on awareness raising and communication of key malaria ITN messages, utilizing multiple media, before beginning the sale of ITNs. Take the lead from the SFH project in Eastern Province on this.
- Ensure that ITNs are in use by all hospitals and clinics, at least for children and pregnant women (paediatric and maternity wards). This acts as an important awareness raising and advocacy tool and allows for education of community members on their use and care. ITNs are being promoted as an important disease prevention issue for children by health care providers, yet if people do not see them in use in health facilities, this is presenting conflicting and confusing information. Also try to ensure that ITNs are in use by health care workers and CHWs themselves early on in the process by way of a targeted subsidy. Health workers are more likely to pass on messages about ITNs if they themselves are using them. This is also a benefit for health facilities as it reduces work-time lost due to illness.
- Consider a 'net for work' activity, with labour linked to other health or malaria control activities.
- Promote the use of more than one ITN per household in order to increase the likelihood of ITN use by children. This could take the form of a subsidy targeted at households with under-five children through a 'two for one' campaign, which has proven to be successful in other areas.

- Harmonize the procurement, supply, distribution, and pricing of ITNs and insecticide as much as possible. Utilize the SFH procurement system to bring in large quantities of standard size, affordable nets and insecticide for as many ITN programmes as possible.
- Mass community dipping in harder to reach rural areas. Consider provision of ‘free’ retreatment to vulnerable groups and rural areas in this manner. Retreatment for ‘all’ nets in use. If and when the ‘PermaNet’ becomes affordable to the majority of the population (or if retreatment rates continue to be very poor) then consideration can be given to promoting these as the preferred ITN for use.
- Lobby for a reduction in taxes and tariffs on the importation of ITNs and insecticide.

3.3.2 Vector Control

The rationale for limiting efforts and resources to be expended on environmental management are well articulated in the Situation Analysis and RBM plan, as they are likely to have limited impact in an area with large vector densities. However, there should be some guidelines and policies in place so that districts can take appropriate action as needed. In regard to spraying, this is best done only in well-defined urban areas and during malaria epidemic situations because of the cost and technical demands of this strategy.

This is an area where the ‘health System’ *per se* could ‘contract out’ the services and/or enlist the assistance of other cooperating partners on the district level RBM Committee. This would obviously be more feasible with a widely representative and functioning intersectoral committee in the district. In areas where there is a large employer, such as industry or farming estate, these partners could be given the responsibility of undertaking vector control activities within their work areas and compounds. In the present guidelines provided to districts, it may be wise to limit the proportion of the budget that should be allocated to vector control when the district committees prepare the budgets, say to no more than 5%-7%. This would free up more funds for some of the other, potentially more effective strategies such as ITNs, IEC and improved case management.

The move to review and update the applicable Public Health Acts is commendable, since there is much more recent evidence on which to make informed decisions regarding effective malaria vector control and the NMCC seems to have this well in hand.

Once again, the overall goal of this section should be in line with RBM, in this case the reduction of malaria by 50% by the year 2010. Since ITNs are covered quite comprehensively in section 1, there would be no need to include details in the vector control section, other than to say that this will be a complementary strategy. One of the strategies is to build capacity among ‘health staff’ in spraying and larviciding, although the consultant would suggest that this not be limited to health staff alone as mentioned above and include other government extension officers.

One of the targets states that “40% of households will have bought and be using an ITN by 2005”. If this is going to be included, it should match with the targets that have been set under section 1, namely, coverage of 60% of households by 2005.

3.3.3 Information, Education and Communication

The section on information, education and communication (IEC) appears to be very well done with regard to gathering of present information and development of key messages. There is a process in place for the development of a National Communications in Health Strategy, including malaria, which is being supported by USAID/Zambia Integrated Health Programme (ZIHP) and WHO. We have seen from evaluations of some of the existing malaria control programmes that effective IEC is an integral component and should be intensified in the initial stages of a scale-up of RBM activities. There does appear to be a relative lack of materials however for malaria IEC and this needs to be addressed. At the present time, many health workers are passing on outdated messages and there is often lack of consistency in the messages that are passed on, leading to confusion at the community level. The training of health workers and volunteers is covered under section 3.4 below, in the discussion of the capacity building strategy and materials for the UNICEF-supported CBMPCP.

The ‘key messages’ that have been developed are quite appropriate and cover all the important areas of malaria prevention and control (see box below). It is important to keep messages simple and short and this has been done.

SFH should be encouraged to take the lead in the IEC area, drawing on their expertise in social marketing and the lessons learned in the implementation of the Eastern Province project. They have developed messages and materials in the course of this project and these can be used to reach the rural areas as much as possible. The potential collaboration with UNICEF in Kasama District is a step in the right direction. It is important to involve as many media as possible, including traditional media of songs, dances and drama to effectively communicate messages for behaviour change.

If NetMark does indeed come in to Zambia in the new year, the malaria messages that are disseminated as a result of this programme will no doubt improve the general knowledge base in the country. Their impact, however, and their malaria/ITN messages will be felt more in the urban areas through mass media, and therefore more effort can be put into the rural IEC campaign by NMCC. It will be important to ensure that the NetMark messages are consistent with the overall malaria messages that have been developed so that confusion does not result.

KEY MESSAGES

- Malaria is transmitted *only by mosquitoes*
- The best way to prevent malaria is by *sleeping under an insecticide treated net every night*
- ITNs need to be *retreated with insecticide every 12 months or after 3 washes* in order to be effective

- ***Pregnant women and children under five are at highest risk*** of serious illness and death from malaria and therefore ***should sleep under and ITN every night***
- Pregnant women may have serious malaria but not feel sick. ***This could affect their unborn child***
- Women should ***take malaria medicines during pregnancy***
- ***If you or your child has a fever*** (body hotness), you may have malaria and should ***seek health care immediately***
- Antimalarial drugs should be taken properly. ***Make sure to take the correct and complete dosage***
- If there is no improvement in 24 hours, ***return to the health centre***
- If the patient's condition worsens, ***take then immediately to the health centre***

Once again, the overall goal of this section does not match with the others, and should therefore be changed to be consistent. It presently states “to reduce the morbidity and mortality due to malaria by 30% in five years...” This should read “50% over 10 years”. Also, Objective #3 and the targets under this objective relate specifically to ITNs and can either be removed, since they are already covered in section 1, or changed so that the RBM plan maintains consistency. The indicators for measuring the change will be the key indicators included in the HMIS and in the sentinel surveillance system and therefore the same as for measuring the other sections.

With regard to the target groups that the IEC strategy is to be focused on, the consultant would add ‘the very poor’, ‘female-headed households (FHH)’, ‘child-headed households (CHH)’, and ‘refugees’ to the current list of vulnerable groups (under 5’s, pregnant women, chronically sick and orphans). These are the groups that need to be targeted with subsidized ITNs through a voucher system as well.

3.3.4 Epidemic Preparedness and Response

It would appear from the available evidence that malaria infection is endemic in almost all regions of Zambia, with the likelihood of epidemics of the illness being low. There are a few areas where this can occur however, including some of the urban areas in the country, and therefore there needs to be a system in place for the identification of, and response to, epidemic malaria.

Once again, this area is quite well covered in the existing plan and little needs to be added. The most important issue here is the ability to recognize an epidemic when it is in the early stages of occurrence, so that appropriate measures can be taken. This would appear to be a weak area at the moment, with a relative lack of data being monitored for this purpose. It is important that data on malaria morbidity and mortality be monitored regularly (at least monthly) by district-level health staff, as well as central-level staff, so that changes in trends can be identified immediately, and that a staff person in each of these areas be identified for this purpose. Appropriate response mechanisms are included in the RBM draft plan, however this would require support in order to mobilize the necessary resources and logistics.

3.3.5 Clinical Management and Intermittent Presumptive Treatment

The goal of this strategy is to ensure prompt, effective and safe treatment and prophylaxis for malaria disease. The two key aspects are therefore:

- Providing treatment that is known to be effective
- Providing treatment as close as possible to the community

First and foremost, the drug used as first-line treatment must be effective and this is currently in question in Zambia. Chloroquine (CQ) has clinical failure rates ranging from 24% to 52%, meaning that many people treated with this for malaria do not respond and require subsequent additional therapy, or die from worsening illness. There is an expert committee that is currently examining this issue and which will make recommendations in the coming months. It is sponsored by the World Health Organization (WHO) and chaired by Professor C. Chintu of the School of Medicine, University of Zambia, Lusaka. It also includes representation from:

- Medical School/University Teaching Hospital
- TDRC
- UNICEF
- WHO
- NMCC
- USAID
- Traditional Healers
- MOH/CBoH
- Private Practitioners

It is hoped that once the evidenced-based recommendations are presented by the expert committee, the Ministry of Health (MOH) will immediately take appropriate action and make any necessary policy changes. Whatever the decision, if changes to drug policy need to be made (as they no doubt will), the MOH will need to ensure that the appropriate changes are made as quickly as possible to policy, guidelines, and the essential drug kits that are supplied to the districts. This includes necessary changes to the essential drug list (EDL), the Zambian National Formulary (ZNF) and Standard Treatment Guidelines (STG) and communication to health care providers and the wider community. Obviously a nation-wide education and awareness campaign would be required and this would fit well with the necessary increased malaria IEC that would accompany the National Roll Back Malaria programme. This would require additional resources over the next year but would be essential to the success of the RBM programme for Zambia.

It would appear that sulphadoxine-pyrimethamine (SP) has the best potential as a new first-line malaria treatment. There is presently only minimal resistance to this drug and it is readily available and at relatively low cost. There is much experience in its use from neighbouring Malawi, where SP has been the first-line malaria treatment since 1993. Malawi switched first-line treatment for malaria from chloroquine to SP ahead of all other countries in this region and has had much success in its use. Although reliable data

are always hard to come by within the context of a developing country health system, morbidity and mortality from malaria appear to have improved as a result of the switch. Even after 7 years use under close surveillance, SP still maintains an effectiveness greater than 85% overall³. SP is also very beneficial for prophylaxis/presumptive treatment during pregnancy. Of course, careful monitoring of resistance is needed, as any drug will eventually lose effectiveness over time. One advantage that SP has over CQ for malaria treatment is the fact that it requires a 'one-time' dose only (age-dependent). Chloroquine requires a regimen given over 3 days and as a result, compliance can be a factor. With SP, the health worker can give the full treatment under supervision to ensure that the correct dose was taken and therefore increase compliance.

It will be vital for intensive IEC and promotion to accompany the drug change. Necessary policy changes need to be instituted as soon as possible following the decision of the expert technical working group and approval by MOH. This needs to be followed by an intensive IEC campaign for health workers and the community at large. Materials are in use already for SP and there are others that have been developed in neighbouring countries, which can be accessed. This is especially true for Malawi, where SP has been first-line treatment since 1993. No need to 're-invent the wheel'! Costs can be cut and activities can proceed faster by making use of existing materials.

With regard to presumptive treatment during pregnancy, although there is presently a policy in place, CQ is often not given to pregnant women as health centre staff save their precious stock for clinical episodes. If it is given to women, often the women themselves save the CQ for their own clinical episodes. This brings up 2 important points:

- There is a need for education and awareness not only in the community but among health workers as well regarding the risks of undetected malaria during pregnancy and the importance of providing intermittent presumptive treatment (this point does seem to be well covered in the present plan).
- This problem can be partly addressed through a change to the use of SP for intermittent presumptive treatment during pregnancy. As SP is given as a single (3 table) dose at two points during pregnancy (first visit, and at beginning of third trimester), directly observed therapy (DOT – similar to TB treatment) at the point of contact during antenatal care can be used to ensure compliance. This method of giving SP presumptive treatment has increased compliance from 50% to over 80% in one study in northern Malawi (conducted by author).

Even if there is not a decision to change the national drug policy, presumptive treatment with SP on at least 2 occasions during pregnancy (first visit and beginning of third trimester) should be considered as a National Policy for all pregnant women. The role of providing pregnant women with monthly SP should be further examined by the NMCC,

³ For more information and statistics about Malawi SP use contact Mr. Alan Macheso, National Malaria Control Programme Director, CHSU, Lilongwe, Malawi, e-mail: malariaccontrol@malawi.net

as this has been found recently to be even more effective, particularly for HIV positive pregnant women⁴.

There is evidence that HIV positive women are more likely to develop severe malaria during pregnancy, and this occurs in all gravidae, unlike HIV negative women who are more prone to malaria during their first pregnancy⁵. This also appears to impact on higher rates of malaria in newborns of HIV+ mothers, higher rates of prematurity and higher risk of infant death. Whether or not this increases the likelihood of vertical (perinatal) transmission of HIV is under investigation. There also is evidence that malaria is more frequent and more severe in HIV+ people in general, although the data on this is not yet completely clear.

In addition to this, there appears to be a relationship between micronutrient status and HIV, as those who are vitamin A deficient (VAD) are more likely to have higher viral loads. HIV+ women who are suffering from VAD have a higher rate of viral shedding and also a higher risk of perinatal transmission. There are currently studies ongoing with regard to the effect of vitamin A and other micronutrient supplementation on the perinatal transmission of HIV.

This brings up the important issue of an integration of malaria control, HIV/AIDS control and micronutrient strategies, particularly during pregnancy. During antenatal care, multiple-micronutrient supplementation should be provided (see section 3.3.8) along with presumptive SP treatment, and important key messages for the control of all three public health problems should be integrated into the routine antenatal IEC programme.

Another important issue in clinical management is the availability of prompt treatment for malaria. This requires, among other things:

- providers trained in diagnosis and management

⁴ Parise, M. E., Ayisi, J. G., Nahlen, B. L., Schultz, L. J., Roberts, J. M., Misore, A., Muga, R., Oloo, A. J. & Steketee, R. W. (1998). Efficacy of sulfadoxine-pyrimethamine for prevention of placental malaria in an area of Kenya with a high prevalence of malaria and human immunodeficiency virus infection. *Am J Trop Med Hyg* 59, 813-22.

Verhoeff, F. H., Brabin, B. J., Hart, C. A., Chimsuku, L., Kazembe, P. & Broadhead, R. L. (1999). Increased prevalence of malaria in HIV-infected pregnant women and its implications for malaria control. *Trop Med Int Health* 4, 5-12.

⁵ Hoffman, I. F., Jere, C. S., Taylor, T. E., Munthali, P., Dyer, J. R., Wirima, J. J., Rogerson, S. J., Kumwenda, N., Eron, J. J., Fiscus, S. A., Chakraborty, H., Taha, T. E., Cohen, M. S. & Molyneux, M. E. (1999). The effect of *Plasmodium falciparum* malaria on HIV-1 RNA blood plasma concentration. *AIDS* 13, 487-94.

Steketee, R. W., Wirima, J. J., Bloland, P. B., Chilima, B., Mermin, J. H., Chitsulo, L. & Breman, J. G. (1996). Impairment of a pregnant woman's acquired ability to limit *Plasmodium falciparum* by infection with human immunodeficiency virus type-1. *Am J Trop Med Hyg* 55, 42-9.

Verhoeff, F. H., Brabin, B. J., Hart, C. A., Chimsuku, L., Kazembe, P. & Broadhead, R. L. (1999). Increased prevalence of malaria in HIV-infected pregnant women and its implications for malaria control. *Trop Med Int Health* 4, 5-12.

- awareness among community members
- adequate supply of appropriate drugs
- treatment available as close to the home as possible

All of these are therefore important activities to include in the scale-up of RBM in Zambia and have been addressed to some degree in the plan. There are plans to scale-up the ‘integrated management of childhood illness (IMCI)’ training for providers and this is currently underway in selected areas. This is being complemented with training of community health workers (CHWs) in ‘community-based IMCI’ and providing them with the necessary skills and drugs for treatment of malaria. Of course, IMCI goes beyond malaria to include an integrated approach to priority childhood illness in Zambia, although malaria identification and treatment plays a major role. Priority for health worker and CHW training should be given to areas that are hardest to reach, and these areas can be identified at the district level through the present malaria needs assessment and situation analysis process.

Training of health workers in IMCI is presently planned for selected districts in 7 Provinces, with trainers being trained at the Provincial level (see National IMCI Implementation Plan for 2000). There is a plan to cover all health workers over a period of years, although more funds and more facilitators are required. Some technical support for this is being supplied from ZIHP. Hand in hand with IMCI goes the issue of ‘drug availability’. If workers are trained in management but do not have access to appropriate drugs, this leads to frustration and lack of motivation. It is vital that the drug supply logistics be worked out to ensure adequate supply to all health units, including the CHWs with drug kits. If this is primarily a funding issue, this needs to be rectified before an effective RBM campaign can take place.

The training of CHWs in community-based IMCI has begun in the past few months, with a training of 6 weeks duration, according to the IMCI Coordinator, Mrs. M. Siame. This is a vital first link in the clinical management chain and absolutely necessary in order to achieve the RBM goal of providing early diagnosis and treatment and ensuring that “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 present, the money for IMCI activities comes out of the district grant, so IMCI may not get priority, therefore there needs to be a mechanism in place for prioritizing of integrated CHW training and provision of drug kits.

Another problem with IMCI is that related to referral and communication. At the RHC level, many do not have access to transport or communication. There is a need for a radio system at the RHC level to connect these to referral health facilities and the ability to transport severely ill malaria patients when needed. This will improve the effectiveness of not only the IMCI process but also the process of referral in general, including maternity cases, which has a bearing on the high rates of maternal mortality in this country. There is a problem with staff shortages at the RHC level, and this has been noted by the CBoH and MOH. In most areas the same staff is used for curative and preventative activities. This usually results in less time available for preventative activities due to the

seemingly pressing immediate needs of curative services. This is being addressed in the 5-year MOH Strategic Plan, however will take time to overcome. In the meantime, increase efforts aimed at the community level and CHWs.

3.3.6 Drug Procurement and Distribution

Availability of an adequate drug supply is a vital component to RBM. You can do all the training and capacity building you want and have every health worker and CHW in the country raising awareness and implementing IMCI activities, but if they do not have adequate stocks of appropriate drugs for treatment of malarial illness, the ultimate goals and objectives of RBM will not be achieved. There are reports from many districts that they rarely have adequate stocks of chloroquine, Fansidar or quinine. In the case of the Mwinilunga District Health Board, they estimate that in 1999 they received only 40% of the required CQ, 25% of the requires Fansidar and only 20% of required quinine injectable. This also includes equipment for injection, such as needles and syringes. In this case, Mwinilunga received less than 25% of the necessary needles and syringes for effective malaria control during 1999.

There is a system in place, for procurement at the central level by MOH/CBoH and distribution to districts and then on to Health Units, through an Essential Drug Kit system. This process, however, seems fraught with difficulties at present. The management of the central Medical Stores Limited has been contracted out to a private company in a process that was alleged not to be transparent and as a result there is loss of confidence in the process and the performance. This is an internal MOH/CBoH issue that needs to be addressed so that the RBM process does not suffer.

Part of the problem also is related to the fact that the purchase of drugs by the district health board must come out of the existing grants, which do not allow purchase of adequate stocks. The budget for drugs on a national scale exceeded the actual financial resources by about 40% last year, meaning that some drugs were not purchased in adequate amounts. In order for the early diagnosis and treatment of malaria under RBM to be effective, this issue needs to be addressed as soon as possible with the cooperating partners.

3.3.7 Laboratory Diagnosis

Proper laboratory diagnosis of malaria infection is a key factor in the fight against the disease and appears to be a constraint in the scale-up of RBM in Zambia. At present it is estimated that only about 75 health centres (less than 10%) are able to provide laboratory facilities in the periphery. This is due to both a shortage of trained personnel and functioning equipment. The MOH Strategic Plan includes plans for training of increased numbers of laboratory technicians over the next 10 years and hopes to “equip 50% of health facilities with minimal equipment over the next 5 years”. This will be a difficult process, knowing the present funding constraints and the lack of trained staff who are willing to work in the periphery. It is probably more realistic to look at providing trained staff and adequate laboratory equipment to hospitals and some of the larger health

centres, but not every health centre. This leaves a gap in the ability of health workers at the rural level to adequately diagnose malaria infection, however this can be partly addressed through the judicious use of new, rapid diagnostic tests for malaria. The simple, rapid immunochromatographic (IC) strip test is able to detect *P. falciparum*-specific antigen in blood samples in less than 20 minutes by technicians with minimal training (peripheral health workers). Evaluations conducted by USAID and CDC in multiple centres and in different conditions demonstrate a sensitivity of over 96%, while retaining a specificity of over 93%. Most false-negative results have been at very low parasite densities⁶.

There may be role, therefore, for limited use of rapid malaria diagnostics under the RBM plan of action. It is estimated that the cost supplies needed for a blood slide test (slides, reagents etc.) stands at about K4500 (almost \$1.50) per test and the training of laboratory technicians and supplies of microscopes much more. The present cost of rapid malaria tests is \$0.55 to \$0.60. Their use at the front line level in rural health centres should be considered. This is especially important in connection with the issue of drug supply and drug resistance. The ‘judicious’ use of drugs is imperative in a country with limited funding, supply and distribution channels. Use of improved diagnostics at the front-line (RHC level) has potential to improve case management of malaria by improving the diagnostic capabilities of front-line health workers. In addition, this should result in the more judicious and targeted use of drugs, which will in turn reduce the potential for development of resistance. This is especially important as Zambia moves toward SP as first-line treatment and the need to look at ways to prolong the viable ‘life-span’ of current antimalarial treatment.

The usefulness of rapid test dipsticks at the RHC level is apparent and should be explored further. This would drastically reduce the amount of training and capacity building that would be necessary in the laboratory sector and these resources could be applied to another area. Priority can then be given to ensuring laboratory diagnostics at hospitals and larger clinics, which the CBoH/NMCC and DHMT can prioritize. This would also help to address the ‘time factor’, as training of adequate numbers of personnel would take years but the rapid tests can begin to be used immediately.

In the present draft RBM plan, the consultant thinks that the target of “100% of health centres and hospitals being staffed with qualified laboratory personnel” is unrealistic. As mentioned above, it would be more realistic to set a target of “100% of hospitals” only, and perhaps include 100% of the “larger” health centres, which can be defined either in terms of number of staff (e.g. 3 or more), number of patients served (e.g. >2,000/month.),

⁶ For more information contact Terry Elliot at PATH, Seattle, e-mail: telliott@path.org or visit the PATH website at <http://www.path.org>

Manufacturers:

- 1) Vision Biotech (Pty) Ltd, Unit 5, 7 Inyoni St., Ndabeni, Cape Town, South Africa (contact Mr. Nick Borain, e-mail: nborain@iafrica.com or visit the website at <http://www.visionbiotech.com>)
- 2) Orchid Biomedical Systems, Plot No. 88/89, Phase IIC, Verna Industrial Estate, Verna, Goa 403 722, India (contact Natajaran Sriram, e-mail: orchid@goatelecom.com)

or the size of the area served (e.g. catchment area >50,000). This can be decided by the DHMT. The other, smaller health centres can then be targeted to receive rapid malaria diagnostic tests for use, within certain set guidelines.

The other objectives and strategies, including the establishment of a quality control system, can be maintained.

3.3.8 Malaria and Nutrition

The issue of looking at the integration of nutrition interventions within the wider scope of a comprehensive malaria control programme is a new one on the global scene and those involved with developing this as part of the Zambian Roll Back Malaria strategy need to be commended. This issue is one in which the author has considerable interest and experience and as a result this section may appear to be covered in somewhat more detail than others are. The strategies of malaria prevention with prophylactic medication or ITNs, and improved case management of illness are obviously very important and should not be underemphasized. However, nutritional strategies also appear to have the potential for marked impact on the negative effects of malaria.

Nutrition status influences susceptibility and immunity to various infectious diseases. Some early studies suggested that malnourished (low weight-for-age) children were *less* susceptible to malaria, although in more recent years others have found that malnourished subjects are at greater risk of infection, illness and splenomegaly, and are more likely to die from malaria than well nourished controls. This includes a study carried out about 20 years ago in Zambia [R. W. Wenlock, 1979].

Deficiencies of specific nutrients have been found to alter cell-mediated immunity both in humans and animal models. This has been particularly well documented over the past decade with regard to the effects of vitamin A on childhood mortality and morbidity from measles, respiratory and gastrointestinal infection. Vitamin A is necessary for normal immune function and the effects of vitamin A supplementation in the reduction of childhood mortality has been known for some time. However, the more specific effects of vitamin A on malaria morbidity and mortality are less well documented and there is only one well-controlled study in Papua New Guinea (PNG) which has shown a significant reduction in *P. falciparum* malaria illness and parasite density.

Zinc is known to be an immune modulating agent and is essential for normal immune function. A number of studies have found that zinc supplementation reduces the incidence and severity of diarrhea and pneumonia, however only two have examined the effects of zinc supplementation in malaria. These found a reduction in malaria episodes among zinc supplemented pre-school children in The Gambia and a reduction in fever associated with Pf malaria parasitemia, as well as reduced episodes of severe disease (parasitemia with densities greater than 100,000/uL) in PNG.

Micronutrients, particularly vitamin A and zinc, have a role in immune mechanisms and malaria control. Specific immunity to malaria develops over several years of exposure to

repeated infection. The immune response to malaria is characterised by antibody-mediated immunity, cell-mediated responses and non-specific immunity, all areas that are potentially affected by vitamin A and zinc deficiency. ITNs prevent malaria infection by reducing human contact with the malaria vector. Vitamin A and zinc work to improve the 'defensive' reaction of the human host (cell-mediated immunity) and both have actions on multiple aspects of the immune system. Lessening the incidence of malaria infection with the regular use of ITNs will improve overall health status of the individual and likely improve micronutrient status through less systemic illness, the lowered utilisation of micronutrients like vitamin A by the infective agent, and improved diet (less anorexia, improved absorption). A proposed integration of micronutrient supplementation with malaria prevention and control, including ITNs, combines one strategy that reduces contact with the parasite and improves overall health, with another strategy that improves the defensive reaction and the development of immunity once contact is made. Therefore, the potential for actual synergism in the effects of the two strategies is apparent and should be further examined and explored.

The issue of infection and iron supplementation is more controversial, and there are few data that suggest a role for iron in the immune response. With regard to malaria infection in particular, malaria seriously worsens iron status and satisfactory improvement cannot be achieved by iron supplementation unless underlying malaria is treated. Also, low serum iron levels inhibit replication of the malaria parasite and some studies have shown an increase in malaria episodes after iron deficiency has been treated. Review of the available evidence by the International Nutritional Anaemia Consultative Group found that prophylactic iron supplementation was associated with relatively small, and often non-significant, increases in certain malariometric indices and that improvements in hematological status following iron supplementation were substantial and have clear public health benefit. They conclude that "*concurrent implementation of iron supplementation and malaria control activities is the ideal*". There is concern however that within the Zambian context, where at least two-thirds of children are undernourished and anaemic, often with underlying malaria parasitemia, iron supplementation may have negative effects on the underlying malaria infection. Clearly, if iron supplementation for vulnerable groups (particularly young children) is to be considered in this country, as it should, this issue needs to first be examined so that a clear policy for supplementation in Zambia within the wider context of malaria control can be stated. This issue is not as much as concern during pregnancy as these women are to receive presumptive treatment for malaria (in addition to ITN promotion) as well as iron supplementation as part of routine antenatal services.

The regimen of intermittent (weekly) iron supplementation for children has potential for reducing the risk of exacerbating parasitaemia, while at the same time improving iron status for deficient individuals and should be explored in this country. There is a need to clearly establish the effect of iron and vitamin A supplementation on malaria parasitaemia in undernourished and anaemic Zambian children first, to provide an 'evidence base' for which to make National recommendations. There is a research study proposal on this subject, which has been developed to answer the necessary questions mentioned here. This research should be given priority and proceed as soon as possible,

so that the necessary information is available to make programme decisions for use of micronutrient supplementation (particularly iron) as part of the overall, integrated RBM plan.

The issue of the role of micronutrient supplementation in malaria was further discussed with the Acting Executive Director of the National Food and Nutrition Commission (NFNC). The NFNC, which is affiliated with the Ministry of Health, has a mandate to coordinate and facilitate nutrition programmes in the country and as such will be instrumental in coordinating nutrition interventions as part of RBM-Zambia. This will involve working in an intersectoral manner at national, district and community levels. At the national level, the inclusion and participation of the NFNC Executive Director on the malaria working group is important.

At the present time there is only one district that has a NFNC focal person for nutrition, Kasempa in Northwest Province, although some districts employ nutritionists as part of the work that the DHMT oversees. Ideally every district should have a person with nutrition expertise to provide technical guidance for the nutrition interventions. This would not have to be a trained nutritionist however and could be a public health nurse or environmental health technician. At the present time, there are few nutrition indicators that are part of the formal HMIS. Ideally these indicators should go beyond simply reporting the proportion of children who have low weight-for-age (which is important none-the-less) to include supplementation coverage with vitamin A (and iron), and periodic surveillance for anaemia (haemoglobin) and vitamin A deficiency. As well it would be wise to include the prevalence of exclusive breastfeeding (EBF) and periodic assessment of height-for-age (as a reduction in the prevalence of stunting is a documented medium-to-long-term effect of improved nutritional status and zinc supplementation).

Since 1998, there has been a pilot project in Kitwe District facilitated by the NFNC through the DHMT, which trains community volunteers to monitor and promote child growth. These 'Nutrition Agents', or 'Community Child Health Promoters' as they are presently called, could easily be trained in the prevention and control of priority childhood illness and function as full community health workers (CHWs) with roles in malaria management and promotion of ITNs. Conversely, those CHWs originally trained as 'malaria agents' should receive the necessary training in growth monitoring and nutrition so as to be able to advocate at a community level for the essential links between nutrition and illness. This requires key nutrition information and messages to be included in the integrated health training modules for CHWs.

There was discussion about a 'cocktail' at the International HIV/AIDS Conference in Durban this year, for the suppression of HIV viral load, which included vitamin A, ASA, chloroquine and selenium. More information needs to be gathered on this concept to see if something like this could be incorporated at some point into the national plan of action.

As far as the objectives and strategies within the RBM-Zambia plan go, it is recommended that, under Objective 1, guidelines for the integration of multiple

micronutrient (iron, vitamin A, zinc) supplementation and presumptive treatment for malaria, as well as prevention (ITN promotion) for pregnant women, be developed as soon as possible. UNICEF is currently testing a multiple micronutrient supplement in neighbouring countries and information on this should be accessed so that an appropriate daily micronutrient supplement for pregnant women can be included in the programme and in routine antenatal services.

Along with this, a few key IEC messages on the importance of improved nutritional status during pregnancy, and the role of supplementation of nutrients such as vitamin A and zinc in malaria control, should be developed and widely disseminated. The programme would not want to give the false impression that micronutrient supplements are a type of 'malaria vaccine', but at the same time convey the important message that a combination of strategies (presumptive treatment, ITNs and micronutrient supplements) are more effective than simply presumptive treatment alone. These messages should then be included in the CHW and health worker training modules.

Another similar objective on the integration of micronutrient supplementation with malaria prevention should be added for children. This could involve linking ITN promotion, sales, distribution and retreatment with micronutrient supplementation, such as periodic (six-monthly) vitamin A capsule (VAC) distribution linked to ITN retreatment. First and foremost under this objective would be research to provide evidence on the role of micronutrient supplementation (particularly iron) in malaria parasitemia, as mentioned above. Once this is established then firm guidelines can be set forth with development of appropriate training and IEC. This research should be undertaken with the collaborated efforts of the NFNC, CBoH and TDRC.

The objective of improving dietary intake of micronutrients through food-based approaches would best be undertaken at the district and community level by a cooperative effort between the DHMT, the NFNC, the Ministry of Agriculture and NGOs with experience in nutrition programming (such as World Vision International and CARE). This will most easily be accomplished if there is a multi-sector coordinating team at both the district and central level, as proposed above.

Objectives 3 and 4 would best be rolled into one as both are involved with integration of nutrition activities with malaria case management, and the use of indicators for the monitoring of nutrition interventions within RBM (Objective 5) is discussed above.

In summary, there is a need to integrate nutrition and malaria programmes as much as possible at central, district and community levels.

Example of Revised Objective and Strategies for RBM Plan:

Objective 1: To integrate micronutrient (vitamin A, iron, zinc) supplementation with malaria prophylaxis regimens for pregnant women.

Strategies:

- Develop and disseminate guidelines for micronutrient supplementation during pregnancy.
- Link supply and distribution issues between micronutrients and SP.
- Link micronutrient supplementation with malaria prophylaxis provision at ANC level (and TBA level?)
- Provide malaria prophylaxis and micronutrient supplementation using 'DOT' protocol at antenatal visits (with provision of further micronutrient supplements to take at home)

3.3.9 Monitoring and Evaluation

A set of 'key indicators' for malaria, and the methods to accurately measure these indicators, needs to be established, and this process appears to be underway. It will be important not to overload the data collection capacity at community, district and central levels and therefore indicators should be kept to a minimum. The monitoring and evaluation system of RBM should work within the present health management information system (HMIS) as much as possible.

There is presently an HMIS in use, and many of the necessary indicators are included, although the quality of these data is dependent on many factors, including the motivation of health centre, hospital and DHMT staff. The health-seeking behaviour patterns of the population, in the case malaria treatment-seeking behaviour, impacts strongly on the quality and usefulness of HMIS data. Therefore, it would be advisable to also institute data collection based on surveillance in a few, specific sentinel sites on a longitudinal basis. The need for sentinel surveillance sites for monitoring of malaria/RBM is especially important for key elements like drug sensitivity, ITN coverage, parasitemia and anaemia rates. If this is felt to be too costly or not manageable, then periodic, cross-sectional household surveys can be substituted, although the mortality data will not be as reliable. These sites should be representative of the population as a whole and representative of various geographical and epidemiological regions of the country.

The major issue will be in the 'use' of the data rather than simply in the 'collection' of the data. The important question is, "What is this information telling us about the malaria situation in Zambia and how can we use it for planning purposes?" It will be vital to focus on a few, key indicators, which can be included within the HMIS (CFR etc.), which would be complemented by periodic surveillance data and further linked and coordinated with data gathered by other organizations such as ZIHP (ITN coverage, drug resistance). There is nothing worse for someone working on the 'front-line' than to be told to collect data that is not seen to be useful. Therefore, efforts need to be made to ensure that data collection is kept to a minimum and what is collected is reported back to the front-line in a timely fashion, with information as to how the planning and implementation process has (or has not) been changed as a result. This would be improved if there was a 'focal point person' for monitoring and evaluation of malaria activities at each level.

Another important question will be, “Are we reaching those who are especially hard to reach, the most vulnerable?” Therefore there will be a need to concentrate efforts on poorly functioning and/or inaccessible health centres in the collection of periodic surveillance data.

In reviewing the DHMT action plans and budgets, it is clear that there is no specific plan for overall monitoring and evaluation of the RBM activities, although there is room within the sub-areas to include this. The monitoring and evaluation component has been a weak area historically as we can see from other reports and reviews and needs to be strengthened in order to improve the ‘results-based’ management and planning of ongoing RBM activities. It may be advisable to include a section on the district worksheet specifically for monitoring and evaluation, with a stipulation that a certain proportion of the budget, say 5-7%, should be allocated to this area.

The most important key indicator will be all-cause mortality in children, particularly for children under 5 (CMR). This can, and probably should (for the reason mentioned below), be complemented by ‘malaria specific’ mortality rates in under 5’s, although this will require verbal autopsy to be performed in the sentinel surveillance sites. An important point to keep in mind, when interpreting the all-cause mortality data for a country like Zambia, where under-five mortality is currently high, is that malaria may be a ‘competing risk’ rather than an ‘additive risk’ for children. What this means is that, even after an effective malaria control programme is implemented, all-cause mortality for children may not decline if these deaths are offset by more deaths from other causes, and this could be attributed to ‘failure’ of the malaria control programme. Therefore, it would be advisable to have a measure of specific malaria mortality in addition to all-cause mortality, even though there is further effort and cost involved.

Since the collection of data from the field is so important, it may be advisable to have ‘benchmarks’ or ‘minimum standard’ for reporting from districts, that the DHMT would need to meet in order to receive the necessary logistics. In addition, a quality control system should be in place, in order for the NMCC/CBoH to identify problems at DHMT level and take appropriate action with training, capacity building etc.

Periodic sensitivity tests should be performed, in order to monitor the effectiveness of the insecticides that are in use, and this is particularly important for the ITN programme. These are expensive however, and need not be performed every year. Limited use of these assays, complemented with information from neighbouring countries and the region (through WHO) would provide the necessary data for decision making.

ITNs are a critical area within RBM and there needs to be an efficient system for monitoring and evaluating their use. A few key indicators for this are listed below, however these cannot be included in the HMIS and will require periodic surveys to measure. Coverage is seen as one of the most important means of monitoring ITN use, especially coverage of children under five years of age. A cluster sampling technique has recently been evaluated and validated against a standard, simple random sampling method by the Navrongo Health Research Centre in Ghana in collaboration with PATH

Canada. This method, based on the WHO EPI cluster survey sample method (30 x 7), was found to be rapid, much easier than the standard method, take less time and resources while at the same time maintaining reliability and validity in assessing ITN coverage and KAP related to ITNs. It would be advisable to use this method in the assessment of ITN coverage and ITN KAP as part of a period evaluation system in selected sentinel sites.

The suggested 'key indicators' for a National RBM Plan, based on the WHO RBM 'Monitoring Outcomes and Impact Report', are listed in the Table below. Many of these can also be included on the periodic DHS by way of inclusion of a 'malaria module' to the overall basic survey design. The RBM 'Monitoring Outcomes and Impact' report was discussed at the 3rd RBM Partnership Meeting in Geneva in Feb 2000, and there was general consensus on their usefulness at that time. It is true that all these indicators may not be feasible given the present constraints, but many are already included in the HMIS (as indicated) and just need to be reinforced. Only a few would need to be added as part of a sentinel surveillance system, or periodic cluster survey. The impact indicators should be particularly gathered for children under 5 and pregnant women.

KEY INDICATORS FOR MONITORING OF RBM

Impact Indicators (for Children under 5 and Pregnant Women):

- **All Cause Mortality, under 5's, under 10's (HMIS plus Surveillance)**
- **Malaria Mortality (HMIS plus Surveillance) – Not vital**
- **Malaria Case Fatality Rate (HMIS)**
- **Malaria Incidence (HMIS plus Surveillance)**
- **Parasitemia Prevalence (sentinel sites – yearly survey)**
- **Anaemia Prevalence (sentinel sites – yearly survey)**

2) Outcome Indicators:

- **% Households with ITN (yearly community random cluster survey)**
- **% U5 using ITN (yearly community random cluster survey)**
- **% Pregnant women using ITN (yearly community random cluster survey)**
- **% ITN retreated (in past year?) (yearly community random cluster survey)**
- **% Pediatric & Maternity beds covered with ITN (HMIS)**
- **% U5 treated within 24 hrs for fever (yearly community random cluster survey)**
- **% U5 completing full treatment (yearly community random cluster survey)**
- **% Women receiving full presumptive treatment during pregnancy (HMIS)**

3) Process Indicators:

- **# and % Health workers trained in IMCI (HMIS)**
- **Health Worker knowledge of IMCI (i.e. one key question - yearly survey)**
- **# CHWs trained (HMIS)**
- **% CHWs with drug kits (HMIS)**
- **% Population within (5 km?) of source of malaria treatment (HMIS)**
- **% Health Units with adequate antimalarial supplies (HMIS)**
- **# IEC materials distributed (HMIS)**
- **% Caregivers with knowledge of malaria danger signs & risk groups (yearly survey)**
- **% Caregivers with knowledge of appropriate antimalarial dose (yearly survey)**
- **% Subsidy on ITNs (HMIS)**

3.3.10 Research

Once again, this seems to be an area that is well covered in both the RBM plan and the Situation Analysis for Malaria. Priority areas for further research have been identified and this has been facilitated by the presence of the Tropical Disease Research Centre.

There is a need, however, for a ‘research forum’ for prioritizing and leverage of funding for applied research on key areas, to answer key questions that arise (e.g. role of iron and vitamin A supplementation in malaria infection and parasitemia), and for disseminating and utilizing the research data. It is not clear if this is in place at the present time. There is a ‘national health research conference’ being held in November and this will likely be a good forum for further discussion of the issue.

There also should be a system in place at the NMCC for the documentation of existing data from recent malaria research, as well as ongoing research in the region (such as the Wellcome Trust Malaria research Centre in Blantyre, Malawi). Much useful data can be gathered in this way and be used for planning and policy development, without having to conduct all necessary research in this country.

3.3.11 Human Resources and Capacity Building

The Government of Zambia (GRZ) is presently one of the leaders in the Health Sector Reform process, with much of the health care planning and management being provided by the District Health Management Team (DHMT) in each of the 72 districts. The Ministry of Health (MOH) is the overall planning and policy formulation body with the Central Board of Health (CBoH) being the ‘implementation arm’ of the MOH. The National Malaria Control Centre (NMCC) is a ‘specialized entity in malaria’ and houses the Malaria Secretariate. There is much political support for the Roll Back Malaria process, with the formation of a high-level RBM Task Force, chaired by the Deputy Minister of Health and with representation from a wide range of government ministries.

There is a well developed National Strategic Health Plan 2001-2005, developed by the MOH, which details the human resource and capacity-building needs in the area of health, with a section devoted entirely to malaria control. The only stumbling block may be the identification of adequate resources to carry out this plan. If the resources are identified and the human resource and capacity-building plan can proceed as planned in this document, then there will no doubt be a substantial impact on the burden of malaria in Zambia.

Since most of the administration for the overall health activities, and the malaria control activities in particular, rests with the DHMT and the District Director of Health (DDH), it is vital that this position is occupied by a strong and qualified health administrator. There should be a system in process for assessing the training needs of the DDH and DHMT members and the resources for providing the necessary upgrading in management skills.

Some of the key human resource and capacity-building areas for malaria are well covered in the MoH strategic plan (*National Health Strategic Plan 2001-2005, Draft*) and supporting Sector-Wide Approach (SWAP) documents (*Sector Wide Approach to Health: A Proposed Health Sector Support Investment Programme (2001-2005) – Volumes 1 and 2*). They will be mentioned here as they apply to the present RBM planning process.

There is a plan for ‘partnerships’ at the health centre/community level and the district level. This includes the development of community-based work plans and sharing implementation of the planned activities. It also includes the training of neighbourhood health committees (NHCs), community health workers (CHWs), traditional birth attendants (TBAs) and other volunteers, including the community-based management of simple diseases. At a district level, there are plans for ‘partnership formation’ and ‘multi-sector collaboration’ in the areas of HIV/AIDS, malaria and nutrition. These are obviously vital components to RBM, as spelled out in the various sections above and the fact that they are included in the overall 5-year health plan is encouraging. In this way, the recommendation of these activities within this present RBM review fits well in the current GRZ plans.

The service delivery of basic health care packages prioritizes ‘services close to the family’, ‘services aiming at the most vulnerable groups’, and ‘services aiming at health promotion and prevention’, which again fits well within the recommendations enclosed here.

Malaria is listed as one of the 8 Public Health Priorities in the Strategic Plan and includes efforts aimed at:

- improving partnerships
- improving case management
- improving prevention among the community
- improving IEC
- improving the monitoring and evaluation system

Again, this fits well with the current RBM plan and the recommendations for capacity-building and human resource development in the sections above. This includes a focus on the training of community health workers and the provision of drug kits, an area that will require much emphasis and human resource training in the coming years.

There is a general consensus in the MOH planning document that health centres are generally understaffed, without laboratory facilities and with few drugs. They are said to be often not functioning at even the ‘health post’ level. This has great significance for RBM in the areas of:

- diagnosis of malaria with IMCI. As IMCI is promoted, this will mean more work for already overworked staff (examination needed on each child)
- diagnosis of malaria with blood slide. This will not usually be possible

- treatment within 24 hours - This will not always be possible unless there are a number of CHWs trained immediately (while waiting for more trained professional staff), but need to ensure supply of drug (SP, CQ) is there.

These critical areas have been addressed in the various sections above.

There appears to be a wealth of technical support and expertise at the central or national level in this country with regard to malaria control. There is a strong WHO presence and the provision of technical support from WHO to NMCC through a link between the WHO Africa Regional Office (AFRO) and GRZ. This includes a Regional Advisor for Malaria based in Harare (AFRO) – Dr. Y. Kassankogno. There is also connection with the Southern Africa Malaria Centre (SAMC), mainly with regard to support for IEC.

Also at the technical level, there is a malaria working group, made up of all key players and interested parties in the field of malaria control. This is chaired by the NMCC and is involved with the ‘operationalization’ and ‘implementation’ of malaria control through the formulation of the Roll Back Malaria Strategy for Zambia. The one area of need at this level, however, would appear to be a focal point person at NMCC who is skilled in the area of participatory processes and community development.

Another area of concern (particularly expressed from some NGOs and CMAZ) is funding support, which is critical to the continuing success of ITN and other malaria control activities within the CMAZ units. There is concern that donor support will only flow to the public (MOH/CBoH/DHMT) level for RBM activities. This is dependent on how the coordinating system for RBM is set up. If there is indeed a strong, intersectoral coordinating body for RBM at the district level (not the DHMT but with input and technical support from them) then this will ensure that districts prioritize funds in an efficient manner.

An effective RBM programme will require a fundamental shift in thinking with regard to coordination. A more participatory approach is required, building on the community development or participatory development model. This process is slower, takes time, but in the end you are left with a more efficient, more effective and more sustainable system. Is it possible for RBM to look at this approach and utilize it for RBM programming? It is realized that NMCC may be under pressure to scale-up activities and show results and it is also realized that the community participatory approach will take further resources for training and meetings. Is it possible to look at using this approach for capacity building under RBM in a few districts? There would be a need to go into the district and into communities and ask “who are the key players here?”, “who are the key individuals and groups that are getting things done?” In some cases this may be a church leader, in other cases a teacher, a progressive traditional leader or someone in the commercial sector. These individuals and groups then need to be “on board” with regard to the planning and implementation of community-based RBM activities and would need to receive basic training in participatory techniques and integrated health issues.

As mentioned earlier, there needs to be a District Coordination Committee for RBM, which is separate from the DHMT and includes representation from various sectors, including the key individuals and organizations identified. Try to use existing structures where they exist. Districts are supposed to have a District Development Committee (DDC), on which there is representation from a broader, multisectoral group. In some districts the DDC may not be functioning, but the structure is there and this is the fundamental structure that needs to be in place for an effective community response to RBM.

It is understood that there is not a history in Zambia of a 'civil society' concept, of communities taking responsibility for making the necessary decisions with regard to their own welfare. If RBM is to be successful as a social movement then there will need to be more participatory-focused education at this level. Many NGOs have the skills and are already working in a participatory fashion in development at the community level. Some skills in this area may need to be provided to DHMT and DDC members, but it would be money well spent. It is possible that this could be the approach taken for implementation of RBM activities in selected districts, with one suggestion being the 12 ZIHP demonstration districts. Support for the participatory approach to RBM is required, building on the analyses and plans that have been developed at the district level. It will be important to demonstrate 'best practices' in this manner, which can then be applied to other areas. Although RBM or malaria would be the catalyst in the beginning, this will go beyond simply malaria to the wider health and development arena.

Most likely, there is the need to begin scale-up in those districts with strong, committed DHMT and DDH, or where a District Development Committee is active. These can be identified through current district RBM planning focus. Only a proportion (25%?) of districts can begin scale-up anyway in the first year, as this is a 5-year process and those districts which have been identified as having the best capacity at present would be chosen to begin. However, if there is a priority district or region for malaria control (based on analysis of the current malaria situation) without effective leadership at present, a decision may have to be made to begin scale-up there and put extra effort into capacity building at the outset.

It will be important to integrate RBM malaria control activities into existing PHC programmes whenever possible at the health unit level (hospital and health centre). This is particularly important for education, IEC and health promotion. Other PHC activities such as MCH clinics, ANC clinics and EPI activities can be used to raise community awareness. This adds no cost to the programme and therefore is very cost-effective. Of course other media and IEC strategies need to be employed, such as posters, drama, radio and TV, but these will have extra costs involved. Remember to use the contacts that are currently available and in use.

Overall, the scale-up needs to be realistic and should try to work within the existing systems. This is a system ravaged by lack of resources, lack of adequate numbers of skilled personnel and being affected constantly by HIV/AIDS. We do not want to bring in an activity (or activities) that will break the system. In the end it will take time and be a

slow process, however it is vital that the process be a participatory one that will be sustainable over the long term.

The key recommendations in the development of human resources and capacity building under RBM are therefore:

- Support the human resource development and capacity building processes in the overall GRZ/MOH 5-year health plan.
- Focus efforts on the training of community health workers in integrated health management using the community-based IMCI approach, with the provision of drug kits.
- The formulation and training of an 'RBM Coordinating Committee', which could likely be the District Development Committee, in selected districts over the next year, perhaps starting with the 12 ZIHP districts.
- Management training for the DDH, or the chair of the DDC, whichever is the district RBM Coordinating body.
- Process for assessment of training needs for DHMT/DDC members.
- Provide training in participatory techniques for DDC and/or DHMT members and follow a "Participatory Community Development Model" for planning and implementation at the community level. Make use of the existing NGOs in the district as they often have the necessary skills and capacity in participatory community development.
- Participatory Community Development specialist based at NMCC.

3.4 Review of Capacity Building Strategy and Materials for the Community-Based Malaria Prevention and Control Programme

The first step in this process was to review the present materials for the CBMPCP, that have been developed as a result of the Luapula programme. This includes the training manuals for DHMT and community members. A review of these materials was well covered in the report by Jenny Hill *et al* and there is no need to duplicate those efforts here. There are a couple of additional points that emerged from the present review:

- It would be advisable to have more of a focus on IEC if possible (section 8 of the manual). This seems to be a weak point from the various review and comparison studies that were done. More emphasis should be placed on the importance of communicating the messages, assistance/suggestions with various forms of IEC communication and perhaps some aids/materials as well.
- It would be advisable to put a 'key message' in each section, which is highlighted to stand out and can be used as a reference point for participants, something that they are likely to take away with them (even if they remember nothing else!).

Although most participants usually complain that training sessions are too short, I believe that 7 days is too long for the CBMPCP training. It could probably be cut down to 4-5 days at most and therefore save money, which could be substantial when there are many courses planned. In Malawi the malaria/ITN training for volunteers is 2 ½ days and in Kenya (CRS) is 3 days (although these do not include case management and drug

handling). However, in the end it is preferable to provide ‘comprehensive’ health training for the volunteers, rather than having large numbers of variously trained front line workers. The final result will be as many fully trained community health workers (CHWs) as possible. The CBMPCP training can make up part of the CHW training, perhaps as one ‘module’, but more emphasis should be placed on ensuring that as many rural communities as possible have trained CHWs with drug kits (as well as ITNs).

At district level, capacity needs are mostly in the area of supervision and monitoring, whereas at the community level it is mostly in the area of IEC provision as well as early management of illness. Therefore, support efforts that are aimed at improving the capacity in these two key areas. From the comparison study that was undertaken to examine the Eastern Province and Luapula models, it is clear that involvement of the DHMT at the beginning is one of keys to success and sustainability through establishing a sense of ownership. The consultant would go beyond this to suggest that the involvement of a multisectoral management group (as mentioned above), including other organizational and community representatives in addition to DHMT, in initial stages would be an even more effective approach. It was also clear from this comparison that intensive IEC and community promotion at the initial stages of an ITN programme are another key to success.

Make use of those volunteers (MAs) who have already received some training, assuming that they are functioning adequately (this can be assessed by the NHC and RHC staff) to be upgraded to full CHWs. There have been volunteers trained in many projects, by many organizations and in many areas, not just Luapula alone. Some of these are in the field of malaria control, some in nutrition (see section 3.3.8). Identification of these volunteers and further training in community-based IMCI would be of benefit to the overall RBM programme.

Motivation of volunteers is often a difficult factor in continued work and high drop-out rates result. If there is supportive supervision available, with some minimal (non-monetary) incentive also involved, it is more likely that volunteers will continue to serve their respective communities. We have seen that supervision from the RHC and DHMT is often a problem. Support can also be provided from ‘within’. Using the ‘care group’ model, volunteers at the community level are formed into groups of 10-15 who operate in neighbouring communities in relatively close proximity (as is presently done with MAs and MCCs in Luapula). These groups meet regularly (bi-weekly, monthly) and support one another in their efforts. If one is having problems in a particular community, say in the area of communicating messages about ITNs, assistance can be provided by others in the group. A couple of the members are identified as ‘volunteer supervisors’ and are given the extra responsibility of supervision the CHWs in their care group. It is these ‘primary CHW supervisors’ who should sit on the NHC and report on activities to the local RHC. It is also these CHW supervisors who can in turn be visited regularly by RHC staff. To be effective and to be manageable, each volunteer should not have more than 50-100 households under their ‘care’. This would mean an increase in the number of volunteers as RBM expands.

As volunteers would receive training as full CHWs, it may not be possible for all to be able to carry out ITN sales. One or two in each group could be identified to receive extra training as ITN agents (as per training programme established). Another one or two CHWs in the group would receive extra training in diagnosis and treatment (community-based IMCI) and be provided with drug kits. Others perhaps as ‘nutrition agents’ as seen in section 3.3.8. In this way, various ‘specialists’, each with various specific roles and responsibilities, would be available in each ‘care group’ of CHWs within a geographical area. It is not necessary, nor feasible for all CHWs to be trained as ITN agents, or nutrition agents, or in the administration of drugs, as long as these services were available within a reasonably short distance and people could be directed to them. These CHW groups then select a couple of members to sit on the NHC and report to the RHC staff.

There is a national CHW module, with guides and handbooks for both CHWs and facilitators. There is also a booklet for use at the Neighbourhood Health Committee level and a Guide to Participatory Planning. Malaria is currently imbedded in the full, integrated health training for CHWs, or which malaria plays a key part.

In summary, the reduced capacity at the DHMT and RHC level will always be there to some extent, despite training, as staffing problems will persist. This is most pronounced in the most rural areas. Therefore it would be advisable, and most likely more effective, to put more effort and resources into the community-level training:

- upgrading active Malaria Agents to CHWs
- training more CHWs
- providing trained CHWs with drug kits
- forming CHWs into ‘care groups’
- strengthening NHC with representation from local leadership
- promoting the most competent and effective CHWs to be ‘primary supervisors’ of other CHWs in the care group, to represent the CHWs on the NHC and DHMT, and to report to the RHC.
- Non-monetary incentives would need to be provided in the form of bicycles and other necessary materials for carrying out duties, commission from drug and ITN sales, and ensuring that necessary bicycle repairs are made. Refresher training provided on a regular basis also serves as an ‘incentive’ for the continuation of activities.
- Multi-sectoral District Development Committee as coordinating body for RBM activities at the district level, with appropriate training in management and participatory techniques.
- Ensure participatory processes are followed as much as possible in the above activities.

Finally, at the UNICEF Country Office level, it is recommended that there be a ‘malaria focal person’ who can coordinate the UNICEF efforts in this regard, and it is noted that this appointment is planned for the near future.

4 Conclusions

Malaria is a major public health problem in Zambia and it has been increasing in prevalence and severity over the past decade. Part of this increasing burden is due to the growing resistance of the parasite to the standard chloroquine treatment. The Roll Back Malaria initiative has gained widespread political support in the region, including from the Government of Zambia. There is support at the government level for the RBM process, plus a willingness and desire to improve malaria control activities.

There is a 'perceived pressure' to scale-up these activities as a result of the Global RBM partnership initiative as well as the recent Africa RBM Abuja Declaration. At the same time, the health reform process is ongoing and the Health Monitoring Information System (HMIS) in Zambia has recently been revamped. There are many malaria control activities being undertaken through the public health system and a number of malaria control projects in various stages of implementation, all with various strengths, weaknesses and capacities.

The challenges therefore, for planning and operationalizing a National Malaria Control Strategy, are obvious. At the central level, there are a tremendous amount of capacity and technical resources available, spearheaded by the National Malaria Control Centre (NMCC) and a multi-sectoral malaria working group. This partnership seems to be working well at the central level, with representation from a wide range of ministries, organizations and agencies. There is a need, however, for more emphasis on 'partnerships' at the district and community levels. First and foremost, there is a need to establish strong public-private partnerships and a multi-sectoral coordinating body for the RBM activities at the district level, as this will impact strongly on all other planning and implementing processes of RBM.

Much is being done and credit is to be given to the multitude of people and organizations involved in malaria control. There are lessons to be learned from the existing small-scale projects, as activities are scaled-up and further 'operationalized'. The present working group provides an excellent forum for coordination of RBM activities. There is good representation from public, private, NGO, research, academic, donor and technical support institutions, although perhaps commercial sector could also be represented. There should be sub-groups (task forces) on each of the key areas in RBM to further formulate appropriate strategy and activities, such as monitoring & evaluation, IEC, clinical management, and ITNs.

With regard to ITNs, there need to be increased efforts at community IEC and communication for behaviour change, utilizing multiple media (including traditional media), and targeting vulnerable groups with subsidized ITNs through a voucher system. Commercial sector social marketing of ITNs should be encouraged, especially among the 'wealthier' of Zambian society. This will leave the public system (including community NGOs, CMAZ and UNICEF) to intensify efforts targeting the most vulnerable and unreachable. Vector control strategies need to be limited to a few well-defined areas and the private sector should be encouraged to participate in these activities.

With regard to IEC, key messages have been developed and these need to be disseminated widely along with the development and distribution of appropriate materials and teaching aids. It is important to keep the messages simple and not to overload either the 'communicators' or the 'recipients'. There is a need for a simple surveillance system, using the HMIS indicators, to monitor the development of epidemic situations, so that an appropriate response can be mounted. It is likely that these situations will arise infrequently however.

Chloroquine resistance is worsening and there is a critical need to change the first-line drug treatment for malaria in order to improve clinical management. Sulphadoxine-pyrimethamine (SP) appears to hold the best promise, due to its low cost, availability and effectiveness, although it is realized that resistance will slowly develop and this needs to be closely monitored. There is an expert committee examining this issue at the present time and recommendations will be forthcoming soon. If the decision is to switch, then the necessary policy changes need to be implemented immediately. There is a need to intensify efforts towards the adoption of intermittent presumptive treatment during pregnancy, using SP, and integrating antenatal services in the areas of malaria control, HIV/AIDS and nutrition. Training of health workers in the integrated management of childhood illness (IMCI) is encouraged and this is especially vital in terms of community-based IMCI training for community health workers (CHWs) along with the provision of drug kits. There is a need to bring the treatment of malaria as close as possible to the community, and linking this to an integrated health intervention like IMCI is to be encouraged.

There is a drug procurement and supply system in place for the public system, however this is not functioning effectively due to infrastructure, logistical and financial constraints. This will require strengthening, and perhaps could go hand in hand with the possible change in national drug policy. Proper diagnosis of malaria is crucial, however laboratory resources (human and equipment) are lacking. Steps are being taken to rectify this, but given the constraints, these efforts should be targeted toward ensuring that hospitals and larger health centres have functioning, quality-controlled laboratories. Consideration should be given to providing rapid diagnostic test kits for use at rural health centres, in order to improve case management and decrease the overuse of malaria drug treatment. The field tests of the rapid diagnostic test kits are finding that low levels of parasitemia are not picked up, and therefore a positive test in a subject with 'symptoms' of malaria would be more likely to be actual clinical malaria. Many children in Zambia have some level of parasitemia, but often low levels that would not be detected by the rapid test. These tests would screen out those children either without parasitemia or with low levels of parasitemia, who also have fever or symptoms due to other causes such as viral infections, who would otherwise be given malaria treatment if no test were available.

It is recognized that there is potential for marked impact on malaria through nutrition interventions, particularly with regard to vitamin A and zinc supplementation. There is a need to integrate malaria with nutrition activities at the district and community levels. This is particularly important for the provision of micronutrient supplementation (iron,

folic acid, vitamin A, zinc) in combination with SP presumptive treatment for women during pregnancy. There is a need for the iron deficiency anaemia problem to be addressed, through the provision of weekly iron supplementation for children and daily supplementation for pregnant women, preferable as part of an overall multiple micronutrient supplement. However, there is urgent research needed on how best to provide iron supplementation for malnourished and parasitemic Zambian children, so that a wide-scale iron supplementation programme can proceed.

There are a few key malaria indicators included in the HMIS and this needs to be supplemented with information from sentinel surveillance sites. The key indicators necessary for effective monitoring of country-wide RBM activities are listed. There should be a person at each level of the programme to monitor these indicators, to ensure that the necessary reporting back to the community level is done and that the information is used in the decision-making process. There should be an overall 'research forum for coordinating research efforts in the country, and this can also be used for the gathering and documentation of existing data and ongoing data from regional malaria research efforts.

The human resource and capacity-building needs are well articulated in the Ministry of Health 5-year plan. The operationalization of this plan should be supported as it will strengthen RBM activities. There needs to be a concerted effort to train community health workers and provide them with the necessary skills and logistics as they will be the driving force behind the malaria control activities in the long term. There also needs to be a strong, competent district administration and coordinating body for RBM activities.

The overall RBM plan for Zambia needs support from the government of Zambia and the Cooperating Partners in order to succeed. UNICEF/Zambia can support efforts in all of these key areas and build on their current strength of community-based participatory action, as this is the key to success for Roll Back Malaria.

5 Summary of Recommendations

5.1 General

Central Level

- Establish one ‘key objective’ in the national RBM plan for the formation of effective public-private partnerships at the central, district and community levels. This will impact on all the other activities and strategies and go beyond ITNs.
- Formation of specific ‘specialty sub-groups’ within the overall malaria working group of the NMCC. These groups were formed as part of the initial planning process for RBM but they need to continue to meet (perhaps quarterly) in order to monitor and review the planning process. This is especially important for monitoring & evaluation, clinical management, IEC and ITNs.

District/Community Level

- Identify partners and key players at the district and community level. It will be important that in initial stages all the key players in the district are identified and invited to participate.

5.2 Insecticide Treated Nets

Central Level

- Utilize the strong IEC and procurement/distribution skills and experience of SFH, combined with the community capacity-building expertise of UNICEF, in order to target vulnerable groups. This should prove to be a very effective combination, which could potentially be replicated in other areas.
- Lobby for a reduction in taxes and tariffs for the importation of ITNs and insecticide.

Central, District and Community Levels

- Investigate methods of utilizing the ‘barter system’ in selected communities, using some of the suggestions listed in section 3.3.1, as it would improve accessibility to ITNs for some rural communities and improve ITN coverage.
- Ensure that all hospitals and health centres are using ITNs in their facilities, primarily children’s ward and maternity, as well as promoting them for all staff members
- Consider a ‘net for work’ programme for vulnerable groups, the very poor, female headed households (FHH) etc.
- Try to ‘harmonize’ the pricing of ITNs at the community level in order to reduce confusion and mistrust. If there was a national, central procurement system, this would allow for easy procurement and pricing coordination. There has been an offer from SFH to be the ‘procurement unit’ for other organizations and this should be encouraged. Also, the supply, storage and distribution of ITNs and insecticide at the

district level should be integrated or harmonized as much as possible with existing systems.

- Consideration should be given to promoting ‘mass community retreatment’ activities, along the lines of the ‘retreatment festivals’ held in Eastern Province as part of the SFH activities. Consider free retreatment in rural areas to increase coverage.
- Mass retreatment campaigns can also be linked to other activities, such as VAC supplementation for children on a yearly or twice-yearly basis in order to increase the incentive for participation and increase the likelihood of a synergistic action in effects (see section 3.3.8).
- Encourage households to purchase at least two nets (or a second net for those that already have one) so that the main target group (under 5s) would be more likely to be covered. ‘Two for one’ promotions for households with children under 5 is one possibility.

5.3 Vector Control

Central Level

Communication and education strategies developed for districts and communities about the effective use, and limited role, of vector control.

District/Community Level

- Limit the proportion of the budget at a district level that is allocated to vector control to no more than 5%-7%.
- Try to limit residual spraying campaigns only to well-defined and identified urban areas and during malaria epidemic situations because of the cost and technical demands of this strategy.
- In areas where there is a large employer, such as industry or farming estate, these partners could be given the responsibility of undertaking vector control activities within their work areas and compounds.

5.4 Information, Education and Communication

Central Level

- Intensify planning of IEC activities in the initial stages of a scale-up of RBM activities.
- There does appear to be a relative lack of materials at the present time for malaria IEC and this needs to be addressed with the development, production and distribution of aids and materials.
- SFH should be encouraged to take the lead in the IEC area, drawing on their expertise in social marketing and the lessons learned in the implementation of the Eastern Province project. They have developed messages and materials in the course of this project and these can be used to reach the rural areas as much as possible.

- Ensure more effort is put into the rural IEC campaign by NMCC. This will be most important if NetMark begins implementation in Zambia. Try to ensure that the NetMark messages are consistent with the overall malaria messages that have been developed so that confusion does not result.
- With regard to the target groups that the IEC strategy is to be focused on, the consultant would add ‘the very poor’, ‘female-headed households (FHH)’, ‘child-headed households (CHH)’, and ‘refugees’ to the current list of vulnerable groups (under 5’s, pregnant women, chronically sick and orphans).

District/Community Level

- Intensify IEC activities in the initial stages of RBM implementation at the community level.
- Include ‘the very poor’, ‘female-headed households (FHH)’, ‘child-headed households (CHH)’, and ‘refugees’ in the current list of vulnerable groups (under 5’s, pregnant women, chronically sick and orphans) for targeting of IEC.

5.5 Epidemic Preparedness

Central, District and Community Levels

- It is important that data on malaria morbidity and mortality from the HMIS be monitored regularly (at least monthly) by district-level health staff, as well as central-level staff, with a view towards identifying potential epidemics so that changes in trends can be identified immediately. A staff person at each of these levels should be identified for this purpose.

5.6 Clinical Management and Intermittent Presumptive Treatment

Central Level

- Based on available evidence, suggest changing of first-line malaria treatment from chloroquine to SP, or at least the recommendations of the ‘expert committee’ should be put into action as soon as a decision is made.
- MOH should try to ensure that, once a recommendation is forthcoming from the expert committee, the appropriate changes are made as quickly as possible to policy guidelines, and the essential drug kits that are supplied to the districts.
- It will be vital for intensive IEC and promotion to accompany the drug change. Use existing materials from Malawi and other countries as much as possible in order to save time and money.
- Even if the decision is made not to change the national drug policy, presumptive treatment with SP during pregnancy (2 doses) should be considered on its own for implementation on a national level.

District/Community Level

- Institute a policy of ‘directly observed therapy (DOT)’ for SP presumptive treatment during pregnancy (2 doses).
- Integrate malaria control, HIV/AIDS control and micronutrient strategies, particularly during pregnancy. During antenatal care, multiple-micronutrient supplementation should be provided (see section 3.3.8) along with presumptive SP treatment, and important key messages for the control of all three public health problems should be integrated into the routine antenatal IEC programme.
- Focus efforts on IMCI for health workers and volunteers, with provision of drug kits to trained volunteers.
- At present, the money for IMCI activities in some districts comes out of the district grant, so IMCI may not get priority, therefore there needs to be a mechanism in place for prioritizing of integrated CHW training and provision of drug kits.
- There is a need for a radio system at the RHC level to connect these to referral health facilities and the ability to transport severely ill malaria patients when needed.

5.7 Drug Supply

Central Level

- Availability of an adequate drug supply is a vital component to RBM and efforts should be made to ensure that the system of procurement and distribution is transparent and efficient.
- The budget for drugs on a national scale exceeded the actual financial resources by about 40% last year, meaning that some drugs were not purchased in adequate amounts. In order for the early diagnosis and treatment of malaria under RBM to be effective, this issue needs to be addressed as soon as possible with the GRZ and the cooperating partners.

District/Community Level

- Ensure the regular and reliable supply of essential drug kits to all health units and clinics, and for community health workers.

5.8 Laboratory Services

Central Level

- Priority should be given to ensuring that laboratory diagnostics (personnel and equipment) are available at hospitals and larger clinics, which the CBoH/NMCC and DHMT can prioritize.
- The target of “100% of health centres and hospitals being staffed with qualified laboratory personnel” is unrealistic. It would be more realistic to set a target of “100% of hospitals” only, and perhaps include 100% of the “larger” health centres,

which can be defined either in terms of number of staff (e.g. 3 or more), number of patients served (e.g. >2,000.mo.), or the size of the area served (e.g. catchment area >50,000). This can be decided by the DHMT. The other, smaller health centres can then be targeted to receive rapid malaria diagnostic tests for use, within certain set guidelines.

District/Community Level

- Priority should be given to ensuring that laboratory diagnostics (personnel and equipment) are available at hospitals and larger clinics, which the CBoH/NMCC and DHMT can prioritize.
- Use of ‘rapid malaria tests’ at the level of rural health centres should be considered. This is especially important in connection with the issue of drug supply and drug resistance.

5.9 Malaria and Nutrition

Central Level

- There is need to integrate nutrition, HIV/AIDS and malaria programmes as much as possible at central, district and community levels.
- Examine the feasibility of a national policy for the provision of multiple micronutrient supplementation (vitamin A, zinc, iron, folic acid at a minimum) to women and children, with priority to pregnant women and children under 5. For children, this should use a weekly regimen, whereas a standard daily regimen can be used during pregnancy.
- Develop guidelines for the integration of multiple micronutrient (iron, vitamin A, zinc) supplementation and presumptive treatment for malaria, as well as prevention (ITN promotion) for pregnant women as soon as possible.
- Another similar objective on the integration of micronutrient supplementation with malaria prevention should be added for children. This could involve linking ITN promotion, sales, distribution and retreatment with micronutrient supplementation, such as periodic (six-monthly) VAC distribution linked to ITN retreatment.
- Conduct priority research on iron/vitamin A effects in childhood malaria.
- More information needs to be gathered on the concept of the ‘HIV suppression cocktail’, which was introduced at the International HIV/AIDS Conference in Durban this year, to see if this could be incorporated at some point into the National Plan of Action.

District/Community Level

- Ideally every district should have a person with nutrition expertise to provide technical guidance for the nutrition interventions (as part of RBM coordinating committee/DDC).

- Include appropriate nutrition indicators as part of RBM monitoring. Ideally these indicators should go beyond simply reporting the proportion of children who have low weight-for-age (which is important none-the-less) to include supplementation coverage with vitamin A (and iron), and periodic surveillance for anaemia (haemoglobin) and vitamin A deficiency. As well it would be wise to include the prevalence of exclusive breastfeeding (EBF) and periodic assessment of height-for-age (as a reduction in the prevalence of stunting is a documented medium- to long-term effect of improved nutritional status and zinc supplementation).
- Try to include the present ‘community child health promoters’ in the CHW training. Conversely, ensure that CHWs receive the necessary training in growth monitoring and nutrition so as to be able to advocate at a community level for the essential links between nutrition and illness.
- Key nutrition information and messages need to be included in the integrated health training modules for CHWs.

5.10 Monitoring and Evaluation

Central Level

- Need to establish a set of ‘key indicators’ for malaria, and the methods to accurately measure these indicators (suggestions listed in section 3.3.9).
- Ensure that as many as possible of these key indicators are included in the HMIS.
- Complement the HMIS by periodic surveillance data, which is further linked and coordinated with data gathered by other organizations such as ZIHP (ITN coverage, drug resistance).
- Institute data collection based on surveillance in a few, specific sentinel sites on a longitudinal basis. If this is felt to be too costly or not manageable, then periodic, cross-sectional household surveys can be substituted.
- Ensure system for regular dissemination of results back to the district, from district to RHC and RHC to community. This would be improved if there were a ‘focal point person’ for monitoring and evaluation of malaria activities at each level.
- Consider setting up a system of ‘benchmarks’ or ‘minimum standard’ for reporting from districts, which the DHMT would need to meet in order to receive the necessary logistics. In addition, a Quality Control system should be in place, in order for the NMCC/CBoH to identify problems at DHMT level and take appropriate action with training, capacity building etc.
- Limited use of sensitivity tests for assessment of insecticide effectiveness, complemented with information from neighbouring countries and the region (through WHO), which would provide the necessary data for decision making.
- Use the EPI (30 x 7) cluster sampling method as described in section 3.3.9 in the assessment of ITN coverage and ITN KAP as part of a period evaluation system in selected sentinel sites.
- Ensure that the periodic DHS in Zambia includes a ‘malaria module’ to the overall basic survey design, with the necessary RBM indicators.

District/Community Level

- Ensure timely collection and regular reporting of HMIS data to central level.
- Ensure system for regular dissemination of results back to the district from the central level, from district to RHC and RHC to community. This would be improved if there was a ‘focal point person’ for monitoring and evaluation of malaria activities at each level.

5.11 Research

Central Level

- There is a need for a ‘research forum’ for prioritizing and leverage of funding for applied research on key areas, to answer key questions that arise (e.g. role of iron and vitamin A supplementation in malaria infection and parasitemia), and for disseminating and utilizing the research data.
- There also should be a system in place at the NMCC for the documentation of existing data from recent malaria research, as well as ongoing research within the region (such as from the Wellcome Trust Malaria Research Centre in Blantyre, Malawi).

5.12 Human Resources and Capacity Building

The key recommendations in the development of human resources and capacity building under RBM are:

Central Level

- Support the Human Resource Development and Capacity Building processes in the overall GRZ/MOH 5-year Health Plan.
- The formulation and training of a District ‘RBM Coordinating Committee’, which could likely be the District Development Committee, in selected districts over the next year, perhaps starting with the 12 ZIHP districts.
- Participatory Community Development specialist based at NMCC.

District/Community Level

- Provide training in participatory techniques for DDC and/or DHMT members so that they will be able to incorporate this into the RBM planning and implementation at the community level. This can be undertaken by the specialist recommended above who would be based at NMCC, and can make use of the existing NGOs in the districts who often have the necessary skills and capacity in participatory community development.

- Management training for the DDH, or the chair of the DDC, whichever group is chosen to be the district RBM coordinating body.
- Process for assessment of training needs for DHMT/DDC members.
- Focus efforts on the training of community health workers in integrated health management using the community-based IMCI approach, with the provision of drug kits.

6 Acknowledgements

Thanks are expressed to all those who provided the necessary information for the completion of this report and who spared precious time to meet with me. Special thanks are extended to those at the National Malaria Control Centre, in particular John Chimumbwa, and those at the Ministry of Health and Central Board of Health offices for their time and support in this process. Particular appreciation goes to Dr. Silwamba at CBoH and Mr. Malijani at MOH.

Finally, sincere thanks to the staff at UNICEF/Zambia for all the logistical arrangements and support during this consultancy period, in particular Anne Mwanza.

It is hoped that this report will provide useful information for all those involved in the planning process for the Roll Back Malaria programme in Zambia.

Annex 1 – Persons Contacted

Jayne Webster (Consultant – Malaria Consortium)
Dr. Doreen Mulenga (UNICEF Health Project Officer)
Mr. John Chimumbwa (Programme Manager – NMCC)
Dr. Fred Masaninga (Malariologist – WHO)
Mr. Anthony Daly (Health and Pop. Coordinator – DFID)
Ms. Priscilla Likwasi (Acting Executive Director – NFNC)
Ms. Rose Kabwe (Programme Officer – CMAZ)
Karen Sichinga (Project Officer – CMAZ)
Ms. Naomi Toyoshi (Project Formulation Advisor – JICA)
Mr. Vincent Musowe (Director, Planning and Development – MOH)
Ms. M. Siame (IMCI Coordinator – UCI)
Mr. Malijani (Deputy Permanent Secretary – MOH)
Dr. Steve Hodgins (Senior Technical Advisor – USAID)
Mr. Yann Derriennic (Health Finance Advisor - ZIHP)
Dana Tilson (Technical Advisor, Child Health – SFH/ZIHP)
Mr. Peter Eerens – Chief of Party (ZIHP SYS) – Policy, Planning and Systems Support
Dr. Nosa Orobato – Chief of Party (ZIHP SERV) – Service Delivery/NGO Strength.
Ms. Elizabeth Serlemitos – Chief of Party (ZIHP COMM) – Comm.& Partnership
Mr. Nils Gade – Chief of Party (ZIHP SOM) – Social Marketing
Dr. Dory Storms – Planning and Evaluation Consultant
Dr. Ellie Burleigh – ARCH, Malaria Advisor, NMCC
Dr. G. Silwamba (Director-General CBoH)

Annex 2 – Dates and Places Visited

Date	Activity
21/09/2000	Arrive Lusaka Briefing with Jayne Webster, Malaria Consultant
22/09/2000	UNICEF Office – Briefing with Dr. Doreen Mulenga NMCC Office – Meeting with Mr. John Chimumbwa WHO Lusaka – Meeting with Dr. Fred Masaninga
23/09/2000	Reviewing of reports
24/09/2000	Reviewing of reports
25/09/2000	Meeting with Mr. Tony Daly (DFID)
26/09/2000	Meeting with Ms. Priscilla Likwasi (NFNC)
27/09/2000	Meeting with Ms. Naomi Toyoshi (JICA)
28/09/2000	Attendance at ZIHP Chiefs of Party meeting Meeting with Rose Kabwe & Karen Sichinga (CMAZ)
29/02/2000	Meeting with Mr. Vincent Musowe (MOH) Malaria Working Group Meeting (NMCC) Meeting with Ms. M. Siame (IMCI/CBoH) Meeting with Dr. Steve Hodgins (USAID)
30/09/2000	Report writing
1/10/2000	Report writing
2/10/2000	Meeting with Dana Tilson (SFH) Meeting with Mr. Malijani (MOH) Meeting with Dr. G. Silwamba (CBoH)
3/10/2000	Meeting with Mr. Jann Derriennic (ZIHP) Meeting with Dr. Elizabeth Burleigh (ARCH, NMCC)
4/10/2000	Report writing
5/10/2000	Debriefing at UNICEF/Zambia Leave Lusaka

Annex 3 – Documents Reviewed

- 1 Zambia Malaria Situation Analysis (NMCC)
- 2 Zambia Roll Back Malaria Strategy (NMCC)
- 3 Map of major malaria/ITN programmes (UNICEF/Zambia)
- 4 Training in CBMPC: Resource Handbook for Health Centre Staff and CHWs (NMCC)
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Annex 4 – Logical Framework Analyses

1.ITNs

OBJECTIVE	ACTIVITIES	OUTPUT	OUTCOMES	INDICATORS p = process/outputs o = outcome
1. To establish effective Public-Private Partnerships for Malaria Control using ITNs	1.1. Establishment of a Malaria Working Group with full representation from the public and private sector.	1.1 Regular (monthly, quarterly) meetings of Working Group 1.2 Annual Planning and Review meeting of Working Group	1.1 Regular Working Group meeting attended by at least 75% of members	P Number of regular meetings with reports/minutes P Number of Annual meetings and annual partnership plan O % attendance at meetings
2. To raise awareness and create demand for ITNs and retreatment	2.1. Promote ITNs through IEC to increase awareness and demand through multiple media 2.2. Train health workers (MAs, VHWs) 2.3. Establish financing including: a) price that is affordable b) targeted subsidies (e.g vulnerable groups) c) credit, payment “in-kind” where feasible 2.4. Sell & distribute nets and insecticide through commercial outlets, at “market days”, “health days”, and house-to-house using volunteers	2.1 Increased demand for nets & insecticide 2.2 Increased affordability of nets & insecticide 2.3 Increased sale of nets & insecticide	2.1 ITN ownership increases among the population (60% by 2005)	P Changes in knowledge and attitude regarding purchase of nets P % of people who can afford nets P Consumer satisfaction P # health workers trained P # and frequency of "distribution days" (market days and health days) O # of nets sold O # retreatments sold O # of nets per household O % of household net ownership

OBJECTIVE	ACTIVITIES	OUTPUT	OUTCOMES	INDICATORS p = process/outputs o = outcome
3. To increase the proportion of children under five and pregnant mothers who are sleeping under a treated net by the end of the project	3.1. Promote proper ITN usage through Information Education Communication (IEC) campaign	3.1. Comprehensive IEC campaign Developed	3.1. Improved knowledge, attitudes & practice (KAP) of proper net usage, including: a) demand for nets b) correct net use c) nightly net use d) use by pregnant women and children under five, and e) regular proper retreatment	P Quantity of IEC materials P Frequency of communication P % of population exposed to IEC P Community/professional satisfaction O Changes in KAP, including: O % of people willing to buy nets O % of people using nets correctly O % of people using nets nightly O % of pregnant women using nets O % of children under 5 using nets O % of owners retreating regularly
4. To increase the proportion of nets that are being regularly and appropriately retreated with insecticide	4.1. Promote regular appropriate retreatment through IEC 4.2. Provide retreatment through various means including: - mass community dipping - house-to-house retreatment - commercial sale of individual treatment kits 4.3. Ensure careful handling of insecticide during retreatment and disposal 4.4 Monitoring of insecticide Effectiveness (regular net Bioassays and monitoring of	4.1. Increased demand for retreatment 4.2. Increased affordability of retreatment 4.3. Increased availability of retreatment 4.4. Safe retreatment and safe disposal 4.5 Effective insecticide in use at all times	4.1. Increased proportion of nets retreated on a regular basis 4.2. Appropriate net retreatment increases for households acquiring nets 4.3 Appropriate insecticide being used by net owners	P Change in awareness and willingness to retreat nets P # of retreatment days per community P Training on safe handling of insecticide provided p Consumer/provider satisfaction with the retreatment process O # of nets retreated O % of nets retreated O Effectiveness of retreatment O # of accidents using or disposing of insecticide

	vector resistance at sentinel sites)			
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2. Vector Control

OBJECTIVE	ACTIVITIES	OUTPUT	OUTCOMES	INDICATORS p = process/outputs o = outcome
1. To institute targeted and effective chemical control of vectors	1.1 Promotion and sale of ITNs and insecticide (see sect. 1) 1.2 Targeted residual spraying with approved and effective insecticide in designated locations and in epidemics 1.3 Selective application of appropriate and effective larvicide in identified sites 1.4 Capacity building of staff in ITNs, residual spraying and larviciding 1.5 Monitoring of sprayed and larvicided sites	1.1 ITNs and insecticide available 1.2 Identification of appropriate insecticide and larvicide for use 1.3 ID of appropriate locations for residual spraying and larviciding 1.4 ID of epidemics 1.5 80% of identified Appropriate areas received Residual Spraying and Larviciding 1.6 Measurement of vector density in treated areas 1.7 Staff identified and trained for vector control in each district	1.1 Increased ITN use (60% of HH) 1.2 Decrease in vector density in sprayed areas 1.3 Decrease in vector density in areas receiving larvicide 1.4 Knowledgeable and competent staff for vector control in each district	P # sites identified P # sites treated P # staff trained O % HH using ITNs O Vector Density in selected sites

OBJECTIVE	ACTIVITIES	OUTPUT	OUTCOMES	INDICATORS p = process/outputs o = outcome
2. To reduce breeding sites of the vector and access of the vector to buildings through environmental modification in selected locations	2.1 Drainage Maintenance 2.2 Filling of breeding sites 2.3 Installation of screens to windows, doors and eaves 2.4 IEC Campaign to raise awareness of appropriate environmental management	2.1 ID of selected sites for environmental management by District 2.2 Drainage areas maintained 2.3 Breeding sites filled 2.4 Screens installed	2.1 Reduction in breeding sites 2.2 Reduction in vector access to buildings/homes 2.3 Increased knowledge among communities members of need for environmental control	P # sites identified for environmental control measures P # sites where work is completed O Changes in community-level knowledge of vector control measures
3. To review, update and disseminate the relevant Public Health Acts to include ITNs and ensure appropriate, effective measures only are included	3.1 Review of PH Acts 3.2 Appropriate Policy development 3.3 Updating of PH Acts 3.4 Dissemination of revised information among all key stakeholders	3.1 Revised Public Health Acts	3.1 Improved Malaria Environmental Control - Related Public Health Knowledge among stakeholders	P # PH Acts reviewed P # PH Acts revised P # meetings for dissemination of information O Changes in knowledge among Stakeholders of effective and appropriate environmental control measures

8. Malaria and Nutrition

OBJECTIVE	ACTIVITIES	OUTPUT	OUTCOMES	INDICATORS p = process/output o = outcome i = impact
1. To integrate micronutrient supplementation in malaria prophylactic regimes for pregnant women.	1.1 Develop and disseminate guidelines for supplementing pregnant women with an appropriate micronutrient supplement. 1.2 Develop mechanisms to improve logistics for supplying both micronutrients and presumptive treatment for pregnant women. 1.3 Strengthen IEC on importance of micronutrient supplementation in pregnancy in relation to malaria control. 1.4 Train health workers	1.1 Appropriate multimicronutrient supplement identified for use in pregnancy. 1.2 Guidelines developed and disseminated. 1.3 Mechanism in place for procurement and supply of micronutrients and presumptive treatment. 1.4 IEC materials produced and disseminated. 1.5 Health workers trained	1.1 Pregnant women consuming micronutrients and micronutrient status improved 1.2 Micronutrients available at sites of antenatal care services 1.3 Knowledge and skill of health workers improved	P # health workers trained P Quantity of IEC materials P # educational sessions held P # supplements distributed P # and proportion of antenatal clinics with supplement stocks P procurement mechanism in place O Proportion of antenatal women receiving supplements O Change in KAP among health workers I Change in vitamin A, iron (and zinc) status among beneficiaries I Prevalence of anaemia and vitamin A deficiency

OBJECTIVE	ACTIVITIES	OUTPUT	OUTCOMES	INDICATORS p = process/outputs o = outcome
2. To integrate micronutrient supplementation into malaria prevention and control for young children	1.1 Research into effects of iron and vitamin A supplementation on malaria parasitemia in young children 1.2 Develop and disseminate guidelines for supplementing children with an appropriate micronutrient supplement. 1.3 Develop mechanisms to improve logistics for supplying micronutrients. 1.4 Strengthen IEC on importance of micronutrient supplementation in relation to malaria control. 1.5 Train health workers	1.1 Appropriate multimicronutrient supplement identified for use in young children 1.2 Guidelines developed and disseminated. 1.3 Mechanism in place for procurement and supply of micronutrients. 1.4 IEC materials produced and disseminated. 1.5 Health workers trained	1.1 Micronutrient status of young children improved 1.2 Micronutrients available at under-5 clinics 1.3 Knowledge and skill of health workers improved	P # health workers trained P Quantity of IEC materials P # educational sessions held P # supplements distributed P # and proportion of under-5 clinics with supplement stocks P procurement mechanism in place O Proportion of children receiving supplements O Change in KAP among health workers I Change in vitamin A, iron (and zinc) status among beneficiaries I Prevalence of anaemia and vitamin A deficiency
3. To improve dietary intake of micronutrients in women and children	3.1 Develop and disseminate guidelines for food-based interventions to improve micronutrient status 3.2 Promote use of guidelines for women and children 3.3 Promote consumption of micronutrient fortified foods	3.1 Guidelines developed and disseminated 3.2 Guidelines in use 3.3 Fortified foods consumed by target group	3.1 Micronutrient-rich foods consumed by women and children 3.2 Improved micronutrient status of women and children	P Guidelines available at service delivery points O Proportion of women and children consuming adequate micronutrient-rich foods O Prevalence of anaemia and vitamin A deficiency

OBJECTIVE	ACTIVITIES	OUTPUT	OUTCOMES	INDICATORS p = process/outputs o = outcome
4. To integrate dietary management and micronutrient supplementation with malaria case management	<p>4.1 Research on the effects of micronutrient supplementation in malaria case management</p> <p>4.2 Develop and disseminate protocols for dietary interventions in malaria case management</p> <p>4.3 Develop and disseminate guidelines on micronutrient supplementation in malaria case management</p> <p>4.4 Develop appropriate IEC materials</p> <p>4.5 Integrate training on dietary interventions and micronutrient supplementation with malaria case management for all levels of health providers</p>	<p>4.1 Guidelines developed</p> <p>4.2 Guidelines in use by health workers</p> <p>4.3 IEC materials produced</p> <p>4.4 Health workers trained</p>	Reduction in malaria case fatality rate	<p>P Guidelines available at service delivery points</p> <p>P # IEC materials produced</p> <p>P # health workers trained</p> <p>O Change in KAP among health workers</p> <p>I Change in malaria case fatality rate among target group</p>
5. To monitor implementation of nutrition interventions within the malaria prevention and control programme	<p>5.1 Identification of appropriate nutrition indicators</p> <p>5.2 Inclusion of nutrition indicators in HMIS</p> <p>5.3 Monitoring and supervisory visits to the field</p>	<p>5.1 Indicators identified</p> <p>5.2 Indicators included in HMIS</p> <p>5.3 HMIS in use</p> <p>5.4 Regular supervisory visits</p>	Integrated system of reporting for malaria and nutrition indicators	<p>P # indicators identified and included in HMIS</p> <p>P # supervisory visits</p> <p>O Proportion of units and DHMTs regularly submitting HMIS forms</p>

OBJECTIVE	ACTIVITIES	OUTPUT	OUTCOMES	INDICATORS p = process/outputs o = outcome
<p>6. To increase the proportion of mothers with children sleeping under nets who are regularly attending for net retreatment <u>and</u> providing supplementation to their children.</p>	<p>6.1 Promote and increase awareness of ITNs, retreatment and micronutrients and their respective roles in morbidity reduction</p> <p>6.2 Distribution of ITNs, retreatment kits and micronutrients at regular distribution points (market days, health days and clinics)</p> <p>6.3 ID and Follow-up of net owners at household level</p>	<p>6.1 Increased demand for ITNs, retreatment and micronutrients among net owners</p>	<p>6.1 Increased rates of retreatment and micronutrient use among households owning nets</p>	<p>P Changes in knowledge and attitudes regarding net retreatment and micronutrient use</p> <p>O Proportion of children under who are sleeping under a net that has been treated within the past 6 mo.</p> <p>O Proportion of children under 5 sleeping under treated nets who receive regular micronutrient supplementation</p>

OBJECTIVE	ACTIVITIES	OUTPUT	OUTCOMES	INDICATORS p = process/outputs o = outcome I = impact
<p>7. To develop a model for the sustainable integration of vitamin A (micronutrient) supplementation and net retreatment</p>	<p>7.1 Promote overall community awareness of VA, ITNs and importance of retreatment 7.2 Liaise with partners to ensure compatibility, practicality, and sustainability of project 7.3 Balance subsidy affordability with sustainability 7.4 Increase system capacity through health worker, TBA and CHW training 7.5 Establish supply, procurement and distribution system that is feasible, convenient and sustainable including: a) supplier logistics b) distribution logistics c) distribution training 7.6 Develop a "Best Practices Manual" for the project which includes: a) Training & Supervision of various cadres of health workers b) IEC & Promotion c) Procurement & Distribution d) Monitoring & Evaluation</p>	<p>7.1 Increased proportion of population become aware of micronutrients, ITNs and importance of retreatment 7.2 Quarterly meetings with partners 7.3 Recover at least 90% of the costs of nets & insecticide 7.4 Health workers TBAs and CHWs trained 7.5 "Best Practices Manual" produced and circulated</p>	<p>7.1 Model of, and supports for sustainability of, an integrated project are established</p>	<p>P Change in overall community knowledge and awareness P # of meetings with partners P % of subsidy on nets & retreatment P % total costs recovered P # of workers trained O Assessment by partners of system sustainability O Number of Best Practices Manuals produced and Circulated I Integrated project replicated in other areas and by other organizations</p>