

Scaling up malaria interventions – A new strategy to meet the MDG

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Scaling up malaria interventions. Integrating free distribution of long lasting insecticide treated mosquito nets during vaccination campaigns. A new strategy to meet the millennium development goal.

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– Essay –

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Abstract Objective: To look at the Red Cross and the Red Crescent societies integrated campaigns between 2002 and 2006 with free distribution of insecticide treated nets (ITN) that have taken place and its contribution to the Millennium Development Goals(MDG) number 6 and the Abuja target. Method: Review of surveys, evaluations and reports from the International Federation of Red Cross and Red Crescent integrated campaigns. Published articles up to 2007 have been accessed from electronic databases Medline, PubMed, the Cochrane Library and website`s from WHO, UNICEF, GFATM , and related articles available from international organisations web sites in addition to informal discussions and meetings with key stakeholders. Results: The integrated vaccination and free distribution of long lasting insecticidal nets (LLINs) achieved a rapid, high and equal LLIN coverage among all wealth quintiles. The MDG and Abuja target for ITN coverage at household level were reached within a week giving a unique opportunity for a significant reduction in malaria incidences, morbidity and mortality. The ITN possession remained higher than utilisation, but utilisation increased if a follow up visit, ensuring nets being hung and properly used, had taken place at household level post campaign. Conclusion: Large scale free distribution of LLINs bridge the equity gap between poor and rich and increased the use rate among children under five years and pregnant women. The low utilisation versus possession remains a challenge and thus a “minimum standard” of a two phased strategy is recommend to reach maximum impact and the MDG; Phase one preparing for pre campaign data, logistical planning and distribution while phase two should focus on a post campaign Keep Up program providing health education at household level to ensure proper net hanging and use.				
Key words Malaria, eradication strategy, integrated campaigns, insecticide treated nets, vaccination,				

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1.0 INTRODUCTION

Public health relates to a person's individual health or the health status amongst a population. It is about what one can do to prevent potential health risk and to improve a persons or a population health situation, by giving them tools and knowledge to cope within the resources available.

"One of the collective efforts organised by society, to prevent premature death, illness, injury and disability and to promote the population's health".

Beaglehole R. and Bonita R. (1)

Both the Alma Ata declaration from 1978 (2) and later the Ottawa declaration from 1986, emphasise on the responsibility of governments and political commitment to provide public health and primary care in addition to the importance of peoples participation in being responsible for their own and their communities good health. This approach was later re-emphasised and further elaborated on in the "Bangkok Charter for health promotion in a globalized world" 2005 (3).

To support and strengthen the work and the coordinated approach to fighting malaria, the Roll Back Malaria (RMB) Partnership was launched in 1998 by the World Health Organisation (WHO), the United Nations Children's Fund (UNICEF), the United Nations Development Programme (UNDP) and the World Bank (WB) . The vision is to achieve the malaria related Millennium Development Goal (MDG) number 6, target 8 by 2015.

In spite of being a preventable disease, malaria remains a major public health challenge taking thousands of lives every day. New tools like Artemisinin based combination therapy (ACTs), rapid diagnostic tests and long lasting insecticidal nets are becoming available on the market but out of reach for the poorest and high risk population.

Going to scale with health programming and reaching the majority rather than a few has been the strategy for disease eradication programs like small pox and polio, HIV/Aids and tuberculosis for many years. Already in the early 1960s, Halfdan Mahler advocated for and was instrumental in designing national TB programs in developing countries claiming "any sporadic effort in tuberculosis, however spectacular, will be wasteful; and it is wholly unrealistic to propose crash programmes with the objective of eliminating TB within a ten-year period". The programmes should be planned within the resources available and feasible to reach the many (4). Likewise, the global polio eradication program has demonstrated that even in resource poor settings, establishing a surveillance system with rapid detection and response is possible. Globally polio has decreased with more than 99% since 1988. As a result of the global effort only four out of 125 polio endemic countries is remaining (5). In recent years we have seen an interest to scaling up also other major health challenges like measles and malaria and thus achieve a significant reduction on the morbidity and mortality rates.

In 2000 the American Red Cross initiated the global measles partnership to eliminate at that time, one of the biggest killer diseases of children in Africa (6). By scaling up measles vaccination campaigns, the measles mortality dropped by an impressive 75% in

Africa alone and more than 60% globally, an unprecedented success over the past six years, reaching the MDG four years early (7).

The rapid decrease of the measles mortality after scaling up, providing universal access to and reaching high measles vaccination coverage, inspired the global measles partnership to see if this approach could also work for insecticidal treated nets (ITN) distributions to children under five and pregnant women. The longer term vision is to replicate the positive results in decreasing measles mortality to a similar reduction for malaria amongst the high risk groups by ensuring a high ownership of ITN at household level.

To date there is few reliable data on the global mosquito net coverage. General estimates indicate that coverage of any type of mosquito nets in Africa varies between six and 10% at country level (8). However, the majority of nets available globally have been sold either on the private market or from health centres and antenatal clinics for a subsidised price. Most of the mosquito nets that have been available are nets that need to be treated regularly with insecticide to ensure adequate protection. According to the WHO less than 10% of mosquito nets available in Africa are being re-treated and therefore has limited public health impact as these nets does not provide any effective vector control. The combination of selling and using nets that is not long lasting may be a reason that high coverage of ITNs has not yet been possible to achieve. Also, the majority of the mosquito nets are accessed by people who can afford to purchase them, further add to increasing the equity gap between the rich and poor in accessing life saving commodities.

The new generation of nets, the Long Lasting Insecticidal Net, (LLIN) which is used in campaigns and distributed free of charge provide long term protection for three to five years. However, the new generation of nets is costly and usually not available for the poorest.

The main objective with free LLIN distribution is to achieve a rapid high and equal coverage of ITNs at household level. Secondly it is important to follow up on utilisation of the nets post campaign, thus a new concept the "Keep Up program" (9) has been developed and implemented. The aim of a Keep Up program is to ensure that nets are hung and properly used by providing correct information and health education at household level. These activities are either integrated into ongoing programs or used an entry point to develop and expand malaria prevention activities at community level, including regular visits at household level implemented by community or Red Cross volunteers. In addition to or instead of launching a Keep Up program, a shorter "Hang UP" campaign can follow the mass distribution. A Hang Up campaign is a short term intervention over a week, where every household with a campaign net is receiving a "one time" house hold visit immediately after the distribution to ensure that the net has been hung.

Thirdly, to follow up of the "Three N`s" with access to an ITN or LLIN in the aftermath of the mass distributions.

1. Newcomers
2. Newborns
3. Newly pregnant

WHO has identified two main high risk groups: Those with little or no immunity, mainly children under the age of five years (U5) and pregnant women who have temporarily impaired immunity during pregnancy. These two groups have also been prioritised during the integrated large scale LLIN distributions.

In spite of the devastating statistic, progress and positive development in malaria has been recorded in recent years. It is indeed possible to successfully address public health challenges also in poor countries when predictable and adequate funding, donor assistance and strong political leadership are in place. In Brazil one was able to eliminate malaria from most of the country in the late 1970s much due to an increased use of indoor residual spraying with insecticides. However, the problem continued to exist in the Amazon Basin, with high malaria prevalence and fatality rates. With financial support from the World Bank (WB) the Amazon Basin Malaria Project was set up to help prevent malaria from spreading into uninfected areas, and to increase the capacity of the health authorities to deal with the malaria problem. By a combination of improved case finding and early treatment using new anti malarial drugs, a substantial reduction of malaria cases and death averted was achieved. *P. falciparum* was reduced from 47% to 29% with an estimated 1.8 million cases and 230,000 deaths averted by the program that lasted for seven years (10).

Increasing access to and high coverage of ITNs can also act as a vector control, and contribute to a decline in malaria cases. To achieve rapid high ITN coverage, mass distributions of LLINs integrated with measles vaccination campaigns was tested out in Ghana and Zambia. The year after, the first countrywide integrated vaccination and LLIN distribution campaign took place in Togo, providing free LLINs to children under five and pregnant women. The three projects gave indications that it was possible to reach the Abuja target for LLIN coverage bridging the equity gap between the poorest and richest quintile (11). This approach has since 2004 been replicated in a number of other countries.

These mass distributions may have been the single most important intervention in their respective countries ensuring a rapid and high coverage of long lasting insecticide treated nets at household level with a later reduction in the malaria morbidity and mortality.

2.0 SCALING UP MALARIA INTERVENTIONS

Today we are facing increasing and new public health challenges. Malaria is taking over as the leading cause of death among children under the age of five, ahead of measles, HIV/Aids and tuberculosis in Africa South of Sahara, and is equally a risk for pregnant women living in endemic areas (12). Every 30 second a child dies because of malaria. It has been estimated that malaria alone has lowered growth in African countries with as much as 1,3% per year in countries with the highest malaria burden. Globally, 80% of the estimated one million malaria deaths annually occur in Africa south of Sahara (13), which also has the lowest coverage of professional health workers (14). National health programs in poor countries are often limited in their outreach, benefiting urban populations rather than the “hard to reach” and richer rather than the poor. This is unnecessary as malaria can be prevented if those at risk have correct knowledge, access to an ITN and to health services for treatment and medicine when needed.

In 2000 African leaders met in Abuja Nigeria, which lead to the Abuja Declaration, committing to control malaria within the year 2015 (15). The Abuja target states that:

- At least 60% of those suffering from malaria should be able to access and use correct affordable and appropriate treatment within 24 hours of the onset of symptoms.
- At least 60% of those at risk of malaria, particular pregnant women and children under five years of age, should benefit from suitable personal and community protective measures such as ITNs.
- At least 60% of all pregnant women who are at risk of malaria, especially those under their first pregnancies, should receive intermittent preventive treatment (IPT).

The Abuja targets correspond with the Millennium Development Goal (MDG) number 6 s: “Combat HIV/AIDS, malaria and other diseases” target 8: “Malaria should be halted by 2015 and begun reverse the incidence of malaria and other major diseases”. Roll Back Malaria has increased the target of ITN coverage from 60% to 80%.

The number of malaria endemic countries has been decreasing over the past 50 -60 years, but still 107 countries or territories are reporting a malaria risk. Close to 3, 2 billion people are at risk of malaria globally today and an estimated 350 – 500 million clinical cases occurred annually (16).

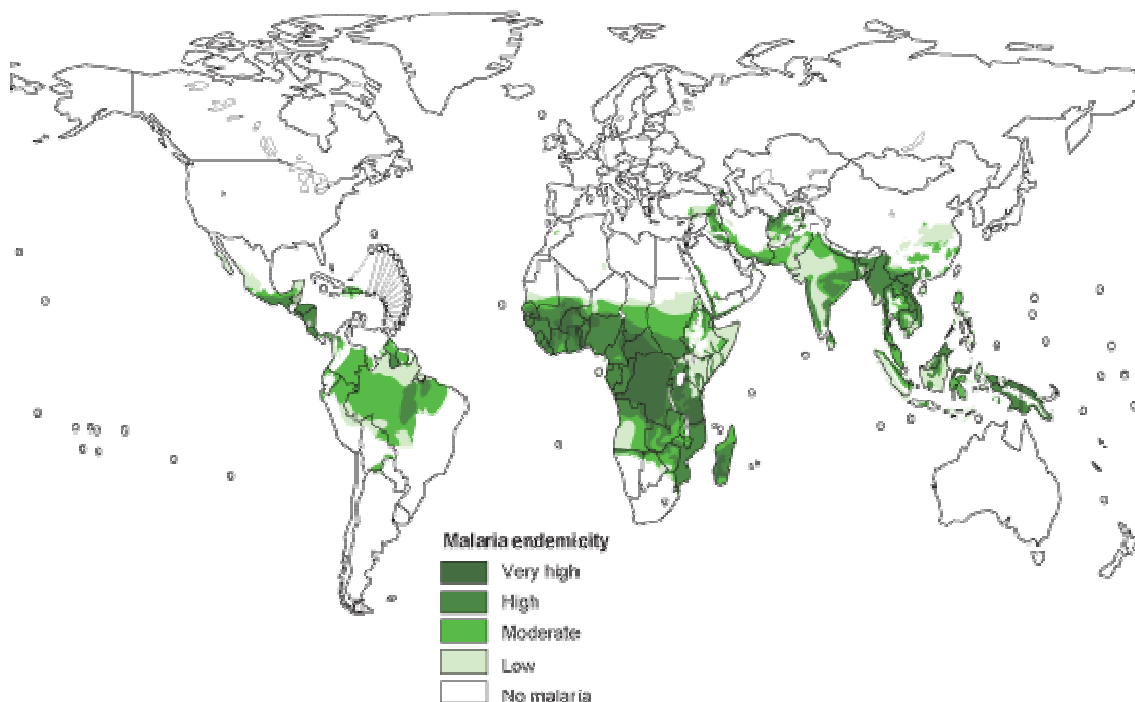


Figure 1 Map of global distribution of malaria transmission risk 2003 (16)

Lately malaria has also occurred in regions that previously has been malaria free areas and is now transmitted in much higher altitudes than before. Kenya is only one of several countries experiencing new challenges in relation to malaria prevention amongst previously none exposed populations. The spread of malaria to new areas is related to the above mentioned factor but may have been enhanced by migration due to poverty, conflict or climate. To further complicate matters, drug resistance has become widespread and newer more effective drugs like ACT are available but still too expensive for wide scale use. Base on this prevention is the most effective option and high coverage of LLIN is an important approach.

Climate change is upsetting normal temperature patterns and may be associated with a changing and longer malaria season as well as expansion of the “malaria geographical areas. It can also have positive effects. It is suggested that while Central Asia may experience an increase in malaria, Central America and places around the Amazon basin could see a reduction in new cases due to fewer rainfalls. In the developed rich part of the world climate change could in the future lead to a more suitable environment for the Anopheline mosquito, but because of these countries capacity to respond to possible malaria outbreaks the risk of having a malaria endemic is not expected. In places where exposure of malaria infections and thus requiring natural immunity has not taken place during childhood, older age groups will remain at high risk for malaria disease (17)

Malaria is caused by the Anopeline mosquitoes carrying four different types of the parasite that infects humans and can result is various forms of malaria:

- 1) Plasmodium falciparum.
- 2) Plasmodium vivax.
- 3) Plasmodium malariae.
- 4) Plasmodium ovale.

The P.falciparum causes the most severe type of malaria resulting in most deaths due to the disease. Amongst the more than 40 species of mosquitoes that acts as malaria parasite vectors, the Anophelses gambia is the most common. Mosquitoes that are carriers of the malaria parasite usually bites during the night.

The vast majority of malaria cases is found in developing countries, mostly in Africa South of Sahara, and is associated with factors like poverty, poor health, reduced immunity and untreated illnesses. Poor people often do not have access to health services for intermittent preventive treatment (IPT), early diagnosis and treatment of malaria. Nor do they have access to personal protection from an insecticide treated net. Combined with poor housing facilities, poor hygiene and limited education, the poorest and most vulnerable will have a “double burden” and be at higher risk than those living in the urban areas and better living conditions.

The increasing inequalities between rich and poor, and the environmental changes like climate change as we see it today, are particularly relevant for the fight against malaria. As it is described above, it may contribute to a spread of malaria endemic areas; where older age groups will be at higher risk resulting in an increased demand for health services where resources already are overstretched.

The demand for malaria preventive and curative services are an almost impossible task for the poorest countries to address when there is a critical lack of trained health professionals, poor health infrastructure and with up to 80% of the population living in rural areas. In combination with limited government budgets for health programming, it further increases the equity gap between rich and the very poor, for those who can afford to pay for travel, consultations and treatment and those who cannot. A study on the malaria burden among children in Togo showed that 62,2% of the children were parasitemic and that one of five children were moderately to severe anaemic. 70% of children under the age of five years that was part of the survey reported fever, but only 23,1% of the children sought treatment at a health facility. While as many as 41,8% had been treated for malaria the previous 2 weeks, less than 50% had actually got this treatment through a health facility(18).

Malaria is a disease that can be prevented at community and household level. To ensure success in this huge task to reduce and/or eliminate malaria one can not work alone. Several partners and other key stakeholders have to collaborate. This includes governments, global donors as the World Bank , the Global Funds for Aids Tuberculosis and Malaria (GFATM), the private sector, international and national organisations etc. Crucial factors are sound local and global partnerships with a joint commitment to develop and implement the national malaria program strategy adapted to the local environment and challenges. Involving the civil society and establish a link between the formal and informal health service delivery system, has been necessary to carry out the large scale integrated campaigns. Governments in resource poor settings need partners if the aim is to access the whole population and to increase the ITN coverage. International organisations as well as local small grass root and faith based organisations with an already established networks of volunteers that live and work within the communities itself, plays an important role in reaching the poorest and the “hard to reach”. They can carry out intensive social mobilisation prior to the integrated vaccination and LLIN distribution campaigns, as well as giving correct information and follow up that nets are being hung and properly used after the distributions. Equally important will be to facilitate for behaviour change and create a demand for LLINs in the communities. When properly trained, volunteers and community workers can also facilitate access or provide first line malaria treatment at local level and thus limit the severe consequences of malaria.

Until a vaccine against malaria is available, the best protection is to avoid mosquito bites. An insecticide treated net protects not only the person sleeping under it, but also those that rest close. If the ITN is properly used it can give almost complete protection from malaria. A high coverage of LLIN at household level will not only increase and improve the protection of the whole family but also act as a vector control where it is hung. However, these nets are out of reach for most people and free LLIN distribution will help bridging the equity gap between the rich and poor.

From a cultural perspective one may find a higher net usage among men than among women and children in many African countries. This can be explained by the difference of status between men and women in the family. The man, being the head of the household, is considered as more important than the wife or the child. He will often be the person who gets access to the first mosquito net that enters the household, leaving the pregnant women or the newborn child without protection. A follow up visit at household level where proper information and health education is provided on hanging and proper use of the nets can address and consequently change behaviour.

3.0 PURPOSE

The integrated distribution strategy is aiming at achieving a countrywide rapid high and equal coverage of insecticide treated long lasting mosquito nets (LLIN) reaching also high risk groups. This high coverage is expected to lead to a minimised transition of the parasite and thus also a decrease in malaria mortality and morbidity among the target population. This study seeks to look at the Red Cross and the Red Crescent societies integrated campaigns between 2002 and 2006 where free distribution of insecticide treated nets that have taken place and its contribution to the Millennium Development Goals (MDG) and the Abuja target.

4.0 METHODOLOGY

This essay describes a new approach to malaria prevention aiming at meeting the Millennium Development Goal number 6, target 8 by scaling up free distribution of insecticide treated long lasting nets integrated into other health interventions. Since large scale LLIN distributions have only taken place after December 2004, little has been documented on the effect and potential impact of these interventions. The information and data has been gathered using the following methods: Country visits, conferences, informal meetings and discussions with partners and key stakeholders involved in the integrated vaccination and malaria campaigns, websites and literature search from data bases.

More than 800 published articles from 2001 to 2007 were identified from different electronic databases like Medline, PubMed, the Cochrane Library using malaria, eradication strategy, integrated campaigns, insecticide treated nets and vaccination as key search words. 23 of these articles were selected for further reading and finally 2 were used as references. The remaining number of articles has been accessed from other sources like work related networks and colleagues.

Articles were selected for further reading if addressing the following topics:

- Integrated vaccination and ITN distribution campaigns.
- Large scale ITN distributions and ITN use.
- ITNs impact on malaria mortality and morbidity.
- Integration of malaria preventive measure with other health interventions.
- Vaccination and eradication strategies.
- Equity.

The final selection was done after reading through the summary and or the whole article. Special attention for selection was done if the article addressing and describing the malaria situation in any of the countries where the Red Cross and Red Crescent had been implementing large scale LLIN distributions.

Among the chosen articles, additional material was identified using the respective reference lists. Newly released or draft reports, evaluations and articles that were

circulated among the global measles malaria partnership was also included based on the above mentioned criteria.

Information like regional reports, policies and guidelines have been gathered from WHO, UNICEF, RBM, GFATM and other relevant organisations websites as well as web based news links like “malaria in the news”.

The published data, preliminary findings and unpublished data from the integrated LLIN campaigns have been gathered or made available through work related networks as health advisor in the Norwegian Red Cross international department, Oslo, Norway and later as the focal point for the global malaria program at the International Federation of the Red Cross and the Red Crescent national societies (IFRC) Secretariat, Geneva, Switzerland. In these positions part of the work responsibilities has been to contribute to initiating, develop and support the Federation`s global malaria program.

The baseline surveys and post campaigns evaluations describes the Red Cross and Red Crescent integrated vaccination and malaria campaigns that have taken place between 2002 and 2007. These studies have been carried out by the Centre of Disease Control and Prevention (CDC) in Atlanta, USA and “Datadyne”, a private consultancy firm, and funded by a number of partners. All of the surveys and evaluations have been thoroughly planned by the surveyors in cooperation with the respective Ministries of Health, and carried out using scientifically sound methods with the aim to later publish the findings. The selections of survey methods, data collection and the data analysis have been under the responsibility of CDC and Datadyne. The findings (preliminary and final) have then been made available for the IFRC as well as the global measles/malaria partnership.

Some of the data from the integrated mass LLIN distribution campaigns in Zambia, Ghana, Togo and Niger have already been published as articles in different scientific journals. In addition the unpublished data from the integrated mass LLIN distribution campaigns in Togo, Niger, Mozambique, Sierra Leone and Kenya have also been added. The post campaign data have been collected approximately one month, nine months and 18 months post distribution. The Red Cross and Red Crescent respective national societies have been actively involved in activities before, during and post campaign in all of these countries.

The “non scientific” data, describing net utilisation and nets being hung in the households post campaign, have been collected and reported on by Red Cross and Red Crescent national societies in Togo, Mozambique, Sierra Leone and Niger. Data selected have been limited to ITN coverage and hanging at household level, ITN use among children U5 and pregnant women in households that received a post campaign follow up visit. The reason for using these data is to describe trends in ITN utilisation in the aftermath of the mass distributions in relation to a household visit. These data are part of the quarterly Keep-Up program reports to the IFRC, using a standardised reporting format for ITN utilisation. The implementation of the Keep Up programs are overseen by the national health coordinators, all of them with public health education. No additional similar data was identified from other parts of the countries where the integrated LLIN distribution campaigns had taken place but where a Keep-Up program was not implemented, beside those data collected in relation to the CDC evaluations, and has not been possible to access for possible comparison.

Additional factors that may impact the feasibility and success of the integrated mass LLIN distributions in a country like “net culture and demand”, cultural aspects, gender issues, malaria knowledge and behaviour, access to community based treatment and funding for national malaria programming, have not been included or analysed in this essay.

4.1 Ethical considerations

Data that can be directly linked to any individual have not been used in this thesis. The risk of being biased when presenting the finding from the various baseline studies and evaluation of the mass LLIN distributions is not considered relevant as I have not been directly involved in data collection or in the analysis of the findings and have therefore had no influence on the outcome of these reports.

5.0 FINDINGS

5.1 Large scale distribution of insecticide treated long lasting nets 2002 – 2007

The free distribution of long lasting insecticide treated nets, integrated in vaccination campaigns or with routine immunisation programs have escalated rapidly since the first pilot distribution took place in one district in Ghana 2002, and the world’s first countrywide distribution in Togo, December 2004.

The large scale distributions led to a rapid high and equal coverage with a minimum of at least one ITN in households with children under the age of five years.

These successful mass distributions have increased the number of requests from several countries to receive support for similar campaigns, increasing the national ITN coverage, clearly indicating the importance the WHO and Ministries of Health (MoH) give to the global measles and malaria partnership and the strategy to rapidly achieve high LLIN coverage. Until now it has not been possible to meet those request because of lack of funding, limited global production capacity of LLINs and experienced personal for planning and implementation. Thus only one or two countywide integrated campaigns have been implemented per year.

The table below give an overview of countries and programs where insecticide treated nets has been integrated with other health programs from 2002 until end of 2006 and where the Red Cross and Red Crescent have been involved in making LLINs available as well as carrying out the social mobilisation pre and post campaign.

Table 1. Integrated distribution of LLINs with other health interventions 2002-2007

Year	Countries	Integrated Health Interventions	Coverage	Reason	Ref.
2002	Ghana	LLIN, Measles vaccination campaign	Larwa district	Pilot	11 19
2003	Zambia	LLIN, Measles vaccination campaign	Kaputa, Chilubi, Mambwe, Nyimba Kalulushi districts	Proof of concept	20 21
2004	Togo	LLIN, Measles, Polio vaccination campaign Vit.A, de-worm	Nationwide	Going to scale	22 23 24
2005	Niger	LLIN, Polio vaccination campaign	Nationwide	Showing impact	25 26 27
2005	Mozambique	LLIN, Post measles vaccination campaign	Sofala, Manica provinces		28
2006	Kenya	LLIN, Measles vaccination campaign	Nationwide		29 30
2006	Sierra Leone	LLIN, Measles vaccination campaign	Nationwide		31 32
2006	Malawi	LLIN, EPI	Mwanza, Chiradzulu districts	Pilot	
2007	Madagascar	LLIN, measles	Selected districts		
2007	Mali	LLIN, measles	Nationwide		
2007	Ghana	LLIN, polio	Nationwide		

5.2 Reaching the MDG and the Abuja target for ITN ownership and coverage

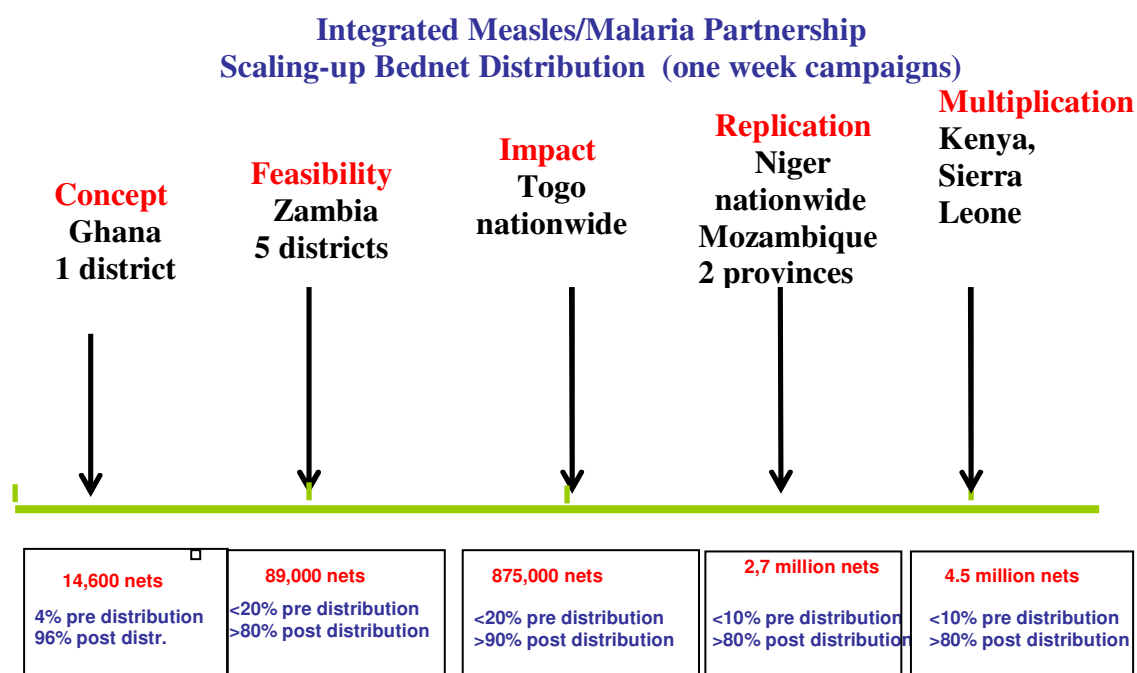
The integrated LLIN mass distribution strategy with the objective to meet the MDG and Abuja target by achieving rapid and high coverage of mosquito nets to more than 60% at household level, is a new approach and different delivery strategies have been tested out in the various campaigns.

- Distribution of nets at the vaccination posts during a measles vaccination campaign (Ghana, Zambia, Togo, Sierra Leone, Kenya).
- Distribution of nets using a voucher system (Mozambique, Niger).
- Distribution of nets during a polio vaccination campaign (Niger).
- Distribution of nets through routine a vaccination scheme (Malawi).

Though the malaria risk is highest in rural areas, the overall ITN coverage is higher in urban areas compared to the rural parts. Before the campaigns started, findings indicated that the ITN ownership among rural households could be as much as two to three times lower compared to households in cities. Prior to the piloted integrated distribution in Zambia in 2003 the net ownership among the richer part of the population was 50.7%. Amongst the poorest quintile in the rural districts, the ownership prior to the distribution was only 16.7% (19). Reasons for the low coverage of ITNs in the high risk rural areas can be because of lack of access to distribution sites like health centres or antenatal clinics, limited income and therefore other priorities for household spending. Other reasons may be lack of sufficient funding at global and national level to enable for LLINs to be sold for subsidised prices, no demand or lack of political will to include LLINs in the budget for the national malaria programs. Low attendance during national re-treatment campaigns is also one factor that contributes to low ITN coverage.

The LLINs have been available on the market for several years but have not widely distributed in Africa before. One of the main reasons for this is that these nets are expensive compared to regular nets. The large scale free distribution with a “campaign approach” proved that a high and equal coverage of LLIN among all households meeting the Abuja target can be reached during a short time of period.

Table 2 Reaching rapid high and equal coverage of insecticide treated long lasting mosquito nets



The table above describe the net coverage before and after the LLIN distribution. The Abuja target on net coverage more than 60% amongst households with a child under the age of five years was reached during one week distribution campaigns.

5.3 Reaching the MDG and Abuja target for pregnant women and children under five protected by an ITN

After a survey including 34 countries, UNICEF and WHO estimated in 2001 that only 3% of children under the age of 5 years (U5) had access to and used an insecticide treated net. In the Africa Malaria Report 2003, the use rate of nets is reported to be as low as 2% after a few new countries were included in a similar comparative survey (13). High coverage of nets in itself is not sufficient as a single strategy to prevent malaria. This will only happen if the nets are being hung and properly used.

Data from the evaluations that has taken place after the large scale integrated vaccination and free LLIN distributions, indicates that a direct follow up visit at household and community level after the distribution is an important factor to increase ITN utilisation among children under five and pregnant women and that usage will increase over time.

Table 3 Net hanging at household level after the integrated LLIN distribution

% of nets hanging	Togo 2004	Mozambique 2005*	Niger 2005	Kenya 2006**	Sierra Leone 2006***
Pre Campaign	NA	44.8%	NA	41.9%	NA
One month post	36.2%	86.8%	20.3%	NA	39.5%
Nine months post	45.7%	NA	79.3%	NA	53.4%
RC districts 18 month post.	93.2%	NA	85.4%	NA	91.5%

NA: Not Applicable, data for this period is not available.

* The results is representing the average combining the findings in Sofala and Manica province in Mozambique

** In Kenya there were major regional differences. It was also differences in hanging between household that had a regular net and households with an ITN which had a higher hanging rate. The data presented are preliminary and thus only indicative.

*** In Sierra Leone preliminary result from the one year post campaign survey October/November 2007.

The number of nets being hung is lower than the ownership, but higher than the pre-campaign findings. This may indicate that increased coverage can lead to an increase in the overall number of nets being hung at household level. In Sierra Leone amongst households that owned any kind of net, 59.5% had the net hung. In those households that owned a long lasting insecticide treated net, 91.5% had the net hanging the previous night. This is a difference in net hanging of 32%, depending on what kind of mosquito net that is present in the house. The total number of nets that were hung increased over time. This increase in net hanging was independent of whether a short term “Hang-Up”

campaign or if a longer term Keep-Up programs had taken place after the integrated LLIN distribution.

Like for net hanging, the usage of the LLIN also increased over time. In Ghana the use of an ITN among children under the age of five years rose from 4.1% to 65.4% reaching the Abuja target after the initial distribution of a free LLIN (3). Three years later a second post campaign survey was done to assess coverage, ownership and usage of ITNs. The coverage of any nets remained high, totalling 95.6% and the ITN coverage was 73.9%. For usage, 72.6% of children under five slept under any type of net and 59.6% slept under an ITN. The survey took place during the dry season and can explain why many nets had not been retreated and therefore the relatively low ITN use.

Table 4 Number of children under five sleeping under an ITN the night before:

U5	Togo 2004*	Mozambique 2005	Niger 2005**	Kenya 2006***	Sierra Leone 2006****
Pre Campaign	NA	NA	NA	8.0%	10.3%
One month post U5	43.5%	60.4%	15.4%	51.7%	51.0%
Nine month post U5	53.6%	NA	54.3%	81.0%	59.5%
RC districts Keep Up	84.4%	NA	76.5%	NA	91.5%

NA: Not Applicable, data for this period is not available

* Togo, Data from Red Cross districts 18 months post campaign

** Niger, Red Cross data after the “Hang Up” campaign August 2006.

**** Kenya, preliminary data from the CDC survey one month post campaign indicated a sleeping rate of 51.7% while a cohort from 5 districts in Kenya 4-5 months post campaign indicate an increase to 81%. The pre campaign number is based on the average among all wealth quintiles from the baseline date.

**** Sierra Leone 12 month post campaign preliminary data

Like for net hanging, the ITN usage increased over time after the integrated campaigns. However, utilisation remained lower than ownership. In Ghana the use of ITNs among children under five rose from 4.1% to 65.4% surpassing the Abuja target. Similarly in Zambia, the eight weeks post distribution survey showed that 60-90% of children had received a net and 40-60% slept under it the night before.

Table 5 Number of pregnant women sleeping under an insecticide treated net the night before

Pregnant women	Togo 2004	Mozambique 2005*	Niger 2005	Kenya 2006**	Sierra Leone 2006***
Pre Campaign	NA	NA	NA	NA	12.5%
One month post.	35.8%	39.0%	31.0%	56.7%	NA
Nine month post	44.8%	NA	88.9%	NA	60.5%
RC districts Keep Up	37.6%	NA	NA	NA	NA

NA: Not Applicable, data for this period is not available.

* Data from Mozambique reflects the findings 2 months post campaign

** Data from Kenya re preliminary data from the one month post campaign survey

*** Sierra Leone one year post campaign preliminary data.

A difference in the sleeping pattern was observed among pregnant women in Kenya after the integrated LLIN distribution. Fewer pregnant women in households with any kind of net used a mosquito net during the night compared to those women who had access to an ITN.

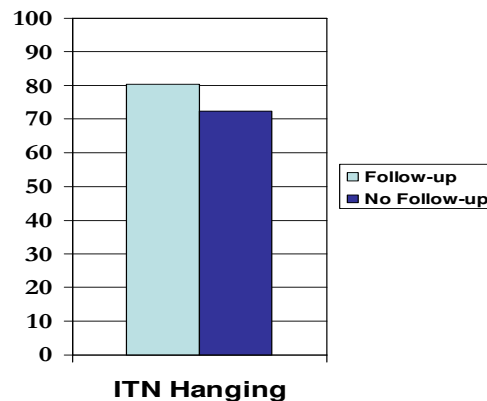
5.4 Impact of a direct household visit post campaign

Previously it has been little concern about finding proof whether a direct visit at household level will impact the usage of nets among the target group. However, recent findings from those countries where it has been possible to monitor the difference in net hanging and the actual use linked to post campaign follow up indicated that a post distribution follow up visit has a positive effect on net hanging and usage. Available data from Togo, Sierra Leone and Kenya indicates there is an increase in nets being hung and used over time and that household with an ITN is more likely to have children and pregnant women sleeping under them at night. It can appear that there is a relation between possession of an insecticide treated net, a household visit after mass LLIN distribution and proper use.

The table below compare net hanging between households that received a direct follow up at household level and those who received information at community level post distribution in Togo.

Table 6. Net hanging related to a direct follow up visit at household level, one month post campaign in Togo. CDC, January 2005.

- A follow-up visit to households that own at least one net increases the likelihood that the net will be hung.
- $p=.0004$



In Sierra Leone the preliminary data one year post campaign survey indicated that when a direct household visit was combined with malaria information increased the tendency of having the net hung and used. In 75.5% of the households that had received a visit post campaign had the nets hung contrary to 48.1% of the households that did not receive any follow up. Also the user-rate among the children U5 was higher. 73.5% of children in household where a household visit had been conducted slept under the net the night before whereas 51.0% of the children U5 living in household that did not receive a post campaign follow up visit had slept under the net the night before. This is a difference of 22.5%. The volunteers visit to the homes after the mass distribution appears to be an important contribution in reaching the objective of 80% ITN utilization.

5.5 Reaching Equity

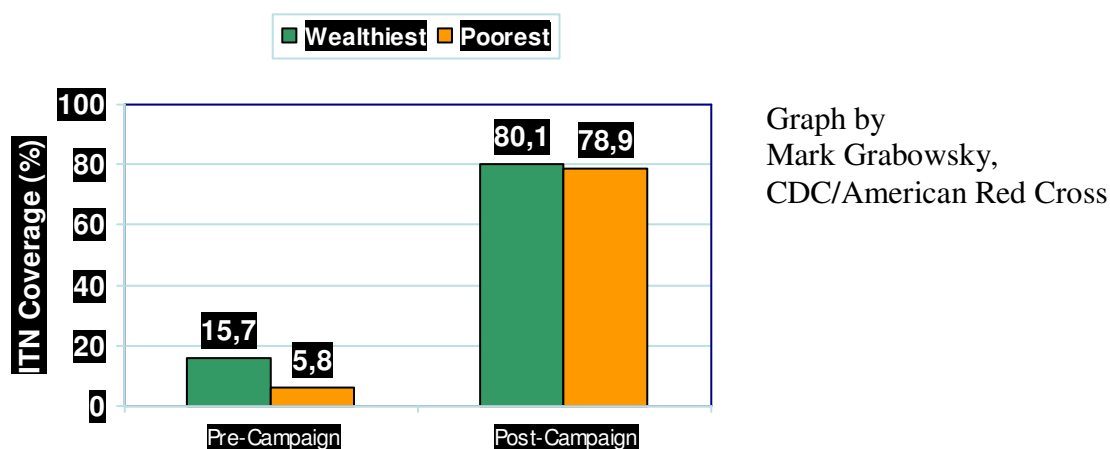
One of the objectives with the integrated campaigns is to achieve high and equal coverage among all wealth quintiles. It was thus decided that nets should be given free of charge. The policy was one LLIN per household that had a child under five years old. In households with more than three children, two nets were given. There were multiple reasons why this strategy was chosen:

1. The nets were spacious enough to cover more than one person (family size nets).
2. The mothers usually sleep together with a child that is still breastfeeding.
3. Children of the same household share sleeping space.
4. Many households in rural Africa often consist of huts that can not accommodate more than one net being hung at the time.

The exception from this approach was the integrated campaign in Togo where the MoH chose to give one net per child, independent of whether these nets could be used or not.

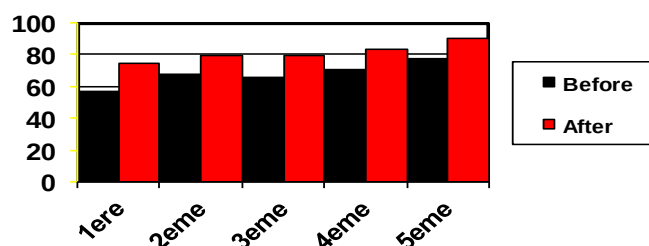
The large scale integrated campaigns achieved equity in LLIN coverage and ownership among all wealth quintiles and in every country. The free LLIN distributions in Zambia, Ghana, Togo, Mozambique, Niger, Kenya and Sierra Leone rapidly eliminated the gap between those who could afford to buy a subsidized net and those who could not. In Ghana the poorest quintile reported a ten times increase in household ownership after the campaign, and the coverage among all household with ITNs rose from 4.4% to 94.4% one month post campaign in one district. In addition, the use of the ITN amongst children under the age of five years rose from 4.1% to 65.4% reaching the Abuja target.

Table 7 – Net ownership one month post campaign Ghana 2002.



Like the pilot in Ghana, a rapid increase of coverage and ownership among all quintiles were also reached in Zambia the year after. Among the richest quintile the ownership increased with 35.6% reaching 86.3%. Among the poorest quintile in the rural districts, the ownership increased with as much as 64.4% reaching 81.1% post campaign. In the community baseline survey in Togo, September 2004 two months before the campaign the ownership of nets at household level was between 5% and 10%. Fewer than 10% of these were insecticide treated. The national coverage survey one month post campaign reported an increase to 93.2% coverage of LLIN among eligible children. The overall household ownership of any type net rapidly increased from between 5%-10% to 67.2 % among all households and to 93.7% among households with children under five. Among the 93.7% households that received LLINs during the campaign, 83.9% still retained their LLINs at the time of the survey. Also in complicated settings with non existent infrastructure like in Niger, equity in ITN ownership countrywide was achieved between the rich and poor.

Table 8: Equity in LLIN net ownership, Niger one month post campaign.



POOREST

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Table 8 show the ITN ownership among the different wealth quintiles before and after the mass distribution, where the 1st quintile represent the poorest part of the population and the 5th quintile represents the richest.

Also in Sierra Leone the equity gap between rich and poor was bridged. One year after the distribution 96.9% still retained the net and equity ratio between the poorest and richest part of the population was 0,94.

In 2000 Kenya the MoH introduced a strategy to increase ITN coverage to 60% by 2005 through two approaches, one being the private sector social marketing the other free distribution children under five and pregnant women. From 2004 -2005 an increase of net ownership went from 24.5% to 46.3% with 58% of the children sleeping under a net from this source. These were mainly subsidised nets. After the large scale free distribution the ownership increased to 79.3% and 81% of the children slept under and ITN. The ownership rose from 2.9% to 17.5% with access to subsidised nets among the poorest and to 66.3% with the free distributions. Among the least poor the Abuja target was also met only after the large scale free distribution with an increase from 15.5 % to 37.9 % with the availability of subsidised nets to 66.6 % after the free distribution.

In Sofala and Manica provinces in Mozambique one did not achieve the same level of equity after the distribution as in the other countries. It was also a significant difference between the two provinces. In Manica province the equity ratio between the rich and poor increased from 0.1% to 0.5% while in Sofala province the equity ratio for ITN ownership was 0.71% before the distribution increased to 0.92% post campaign.

Though the results were moderate in Mozambique, integrated large scale free distributions of LLIN appears to not only bridge the equity gap between rich and poor, but also to provide a substantial contribution to reach the Abuja target and the MDG.

5.6 Impact on malaria incidents, mortality and morbidity

Scaling up distributions of ITNs to achieve a rapid high coverage is a cost effective and life saving approach that can contribute to reach the Millennium Development Goal.

The Red Cross and Red Crescent integrated free LLIN distributions campaigns have since 2002 distributed close to eight million nets in Africa since the first pilot in 2002. Using the Cochrane estimate that one ITN prevent 5.5 deaths per 1000/child year of use and then adjust this number for a use rate of 75%, the campaigns have averted 167 274 deaths of children under five. In Kenya alone the reduction of malaria related deaths was reported to 44% after the mass free distribution (29). In addition to the numbers above, integrated mass LLIN distributions have been carried out in Madagascar, Mali and Ghana end of 2007 increasing the total number of LLIN distributed and thus increased number of death averted than what is being reported here.

Table 9. Overview of LLIN distributed and deaths averted in Red Cross and Red Crescent integrated campaigns

Year	Country	No of LLINs	Death averted
2002	Ghana	14 600	307
2003	Zambia	89 000	1 869
2004	Togo	875 000	18 375
2005	Niger	2 300 000	48 300
2005	Mozambique	400 000	8 415
2006	Kenya	3 400 000	71 528
2006	Sierra Leone	880 000	18 480
TOTAL		7 985 600	167 274

6.0 DISCUSSION

6.1 Achieving rapid high countrywide coverage

The intensive effort with mass integrated distribution of millions of nets countrywide during one week enabled the countries to reach the MDG and surpass Abuja target for ITN coverage, going from an average coverage of less than 10% to between 80% – 90%.

There were no obvious differences in post campaign LLIN coverage rate based on which kind of health intervention that was chosen to “piggy back” and integrate the LLIN distribution.

In Ghana and Zambia ITNs were distributed during a measles vaccination campaign while in Togo, both measles, polio, vitamin A and de-worming was included in the integrated LLIN distribution. In Niger the distribution was integrated with polio vaccination, using vouchers as a mean of verification of who was eligible for a net. The voucher based approach was also used in the province wide distribution in Mozambique during a measles vaccination campaign. Though it was reported that the vouchers created more work and some problems in the distributions because they were lost, all of integrated campaigns surpassed the Abuja target. The retention of nets was also high one year after the campaigns. Follow up surveys have also showed that the nets were not sold despite of the extreme poverty among many of the campaign target households. Five months post campaign only 2.2% of the nets were reported sold in Ghana, concurring with similar findings in Zambia and Togo. Also in Sierra Leone 96.9% retained their nets indicating that the ITN coverage remained high also long after the actual distribution.

The distributions were planned and facilitated so that everyone would have access to the distribution and vaccination post by setting up additional distribution posts closer to the communities. This was important so that the most remote populations, who normally do not have access to health centres and health posts, also could be reached.

Scepticism has been raised towards free distributions versus selling the nets for an “affordable price” increasing the feel of ownership to the LLIN. This argument contradict itself as the poorest, who are at highest risk and often live in very remote places with no easy access to health facilities or commercial centres, will never be able to afford even a highly subsidised net. The Kenya MoH tried this approach by introducing a new malaria strategy aiming at increasing the general ITN coverage and ownership by introducing heavily subsidised ITNs. Though the ITN coverage rose from 7.1% in 2004 to 23.5% in 2006, the target of ITN coverage for 60% was only reached after the mass LLIN distribution campaign, where the coverage rapidly increased to 67.3% (33)

Whether this high coverage is also possible to reach within a longer timeframe by integrating LLIN distribution through a routine program is still not clear. Data from the pilot project in Malawi does not yet provide sufficient information to conclude whether

LLIN distribution via routine health services from established antenatal clinics will achieve the same high coverage within a year, as a campaign approach can reach within a week. However, it is reason to believe that unless free ITN access for the most vulnerable is facilitated, it is not likely that a similar high coverage will be reached in rural areas and among the poorest households.

It is because of the free LLINs distribution that a rapid high and equal coverage have been achieved in those countries that have carried out large scale integrated LLIN campaigns. This strategy is also supported by WHO that recommends free distribution of nets in their new guideline for ITN distribution because access to an insecticide treated net should not be determined whether you are rich or poor (34).

The free and large scale distributions that has been carried out by the Red Cross and Red Crescent and partners seems to be the most effective and feasible strategy today in ensuring rapid high and equal coverage of ITNs at household level, a pre requisition to achieve the MDG on seriously reducing malaria morbidity and mortality.

6.2 ITN utilisation and potential impact by going to scale

The World Malaria report 2005 indicates that there is wide variation between regions and continents in the proportion of nets being re-treated. In Asia one can find higher re-treatment rates than in Africa (16). Within Africa, the East African countries seem to have a higher proportion of re-treatment than in the rest of the continent. The report also shows an increase of re-treatment from 2000 to 2003 which is consistent with the NetMark survey from 2004 “Awareness, Ownership and use of mosquito nets in Nigeria, Senegal, Zambia and Ethiopia” (35), but still re-treatment of mosquito nets remains low in Africa today and thus a high national coverage of ITN will therefore not reflect the real ITN coverage.

By distributing only the long lasting nets as a “minimum standard” during the integrated vaccination and LLIN campaigns one has contributed not only to a rapid high ITN coverage but also to a longer term effective protection for those who use them. The WHO has acknowledge the importance of the long term effect these nets give and recommend distribution of LLINs in their position paper on insecticide treated mosquito nets (34,36).

High coverage of LLINs does not necessarily reflect the number of nets being hung or properly used, though ITN ownership may motivate to an increased utilisation. Immediately post distribution the utilisation increased significantly among pregnant women and children under five, though ownership remained higher than utilisation. It was also observed a positive development over time with the number of nets being hung and used increased steadily in areas where continued follow up at household level had taken place.

Data from the Keep-Up programs indicates, that by continuing to follow up with malaria preventive education at household level, can contribute significantly to reaching the Abuja target and MDG. In Togo the number of children under five rose steadily over 18 months from 43.5% one month post campaign to 53.6% and nine months later

to an impressive 84.4%. The gradual increase in children sleeping under the net was also noted in Niger, Kenya and Sierra Leone. In Mozambique the only data available is one month post campaign but with impressive 60.4% of the children sleeping under the net. High coverage is directly linked with deaths averted, and the positive increase in sleeping rates suggest that a 75% utilisation rate is indeed possible if there is a commitment to continue funding the community based health promotion and prevention activities post campaign.

Because of the limited data available today it can not be verified at this stage, whether the link between utilisation and a home visits is specifically for the Red Cross district or if the same development also took place in other districts where different organisations are conducting home visits, or if the ownership of an ITN by itself motivates for an increase use over time. The comparative data from Sierra Leone clearly indicate that there is a correlation between direct visit at household level and the likelihood of having the net hung and used. Similar conclusion was also done one month post campaign in Togo, but there is still a need to further study and verify these findings from other similar programs.

Studies from Western Kenya and Eritrea looking at ITN use and adherence to net use among children U5, further supports this observation. In Eritrea the likelihood of having a child using the net more than doubled where the population had correct knowledge of malaria. They were also more likely and willing to use the net during the peak of the malaria season. (37,38). During the study in Kenya the use rate was 65.9% in the first phase of the study, reaching 82.5% in the second phase. Explanations for the low use was that older members of the household accessed the nets or that the nuisance of mosquitoes were lower in the dry hot season. They also found that a number of nets were not hung during the peak of the malaria season (39). The three year post campaign study from Ghana in 2005 conclude that while a “Keep-Up” strategy for continued distribution can sustain the high ITN coverage, assuring proper use of the nets still remains a challenge (18) and thus enforcing the findings of increased use of time from the integrated campaign countries leading.

Applying the Cochrane estimate that ITNs prevent 5.5 deaths per 2000/child years of use, and adjust this for 75% net usage rate, the eight million LLINs distributed through the global Red Cross campaigns have averted 167,274 deaths among children under five. In cases where the user rate remains low, the risk will be that the impact will be limited. With the estimated average user rate post campaign among children U5 for Togo, Mozambique, Niger, Kenya and Togo of 62% and not the assumed 75%, the life saved of children under five is reduced by 21 745. In countries like Niger where the user rate was reported as low as 15.4% one month post distribution, this will have dramatic consequences for the potential death averted of children at high risk.

The Global Fund estimated that 27,680,000 ITN have been distributed in Africa since 2002 until October 2006 averting 601,218 deaths (40). The majority of these nets are regular nets and thus the ITN “status” may be short. If in addition one can not guarantee a user rate of 75% the impact on morbidity and mortality is most likely limited, and one have to seriously question if ITN / LLIN distributions used as a “single strategy” contributes to any significant change to the fight against malaria.

For pregnant women the benefit of sleeping under an ITN is also well document. A study based on systematic review of randomized trials looking at ITN effect on

prevention of malaria in pregnancy support this statement. The review team found that ITN use had a beneficial impact on pregnancy outcome for women living in malaria endemic countries in Africa. A similar study among women in Thailand found no reduction of clinical malaria. However one did find a reduction in anaemia and foetal loss which indicated a need for further investigations and research of the potential benefits of ITN use amongst pregnant women outside Africa (41). Though the number of pregnant women sleeping under the campaign net increased over time, it was not the same positive development as was observed among the children U5. One did however find a difference of use among pregnant women that had had access to an ITN and pregnant women who had access to any kind of net if they slept under the net during the night in Kenya of 20.4% giving indication that a “good quality effective” net is a motivation. The reason for the slower increase in usage among pregnant when compared to children can be multiple and need further investigations on reasons for using a net and priority of nets within the household.

Rapid high countrywide ITN coverage has demonstrated that it is possible to achieve the Abuja target. The reduction of malaria cases by 44% in two years in Kenya gives good hope to also reach the MDG by a 50% reduction in malaria mortality by 2015. This can however only be achieved if resources are made available for longer term follow up after distribution and financial resources, political commitment are in place.

6.3 Integrated approach to LLIN distribution

Data from the integrated vaccination and malaria campaigns suggest that when free mass distribution of insecticide treated nets is paired with vaccination campaigns, a rapid increase in ITN coverage and ownership was achieved and thus could contribute to seriously reducing malaria morbidity and mortality.

By integrating several health interventions, in particular where huge logistical and co-ordination challenges are faced and there is an increased demand for personnel, integrating intervention and sharing human resources and costs can have huge advantages. The risk may be that by adding on new interventions, focus can be taken away from the initial program. Integrating the LLIN into the measles vaccination campaign was therefore a brave move, as the measles partnership was still in a phase of learning lessons from the scaled up approach and could risk hampering the positive development in reaching high measles vaccination coverage.

There were not observed any negative effects on vaccination coverage in any of the integrated vaccination and free LLIN distributions. This was independent of whether the LLIN distribution was integrated in polio or a measles campaign. In Zambia the link between net distribution and a measles vaccination campaign proved to be a feasible and cost effective strategy (19). In some cases, like in Togo, Mozambique and Niger, the attendance of mothers with children eligible for vaccination and an LLIN was reported to be higher than expected due to influx from neighbouring district and boarder areas.

In Malawi, free LLINs distribution was integrated into routine programs for pregnant women and fully vaccinated children as a one year pilot. The objective was to increase

attendance to antenatal clinics and increase the routine vaccination coverage by distributing a free LLIN as an incentive. Data from this pilot project is still not available. The feedback from the two districts that implemented the pilot project was however so encouraging that the Malawi MoH decided to change the national malaria policy from selling insecticide treated nets for a subsidised price at selected places like antenatal clinics, to free distribution to all pregnant women and fully vaccinated children. Also in Tanzania the routine vaccination program was utilised as the entry point for intermittent treatment to children as malaria prevention indicating that a significant improvement in preventing severe malaria (42).

Integrating ITN distribution as a malaria prevention intervention is also a feasible approach using other health programs like for example filiarisis eradication program and should not be limited only to vaccination campaigns or routine EPI. David Molyneux and Vinad Nantulya suggest a “pro poor strategy” where bed nets distribution is linked to other disease control programs, reaching the hard to reach communities (43). On the other hand they also argue that integrating distribution or selling nets through health facilities is not recommended because many women do not access antenatal services during pregnancy. Another reason is that the poorest part of the population can not afford to buy an ITN even for a subsidised price. This corresponds well with the experiences from the Red Cross and Red Crescent integrated free LLIN distribution campaigns. Unless additional distribution points had been established together with intensive social mobilisation from volunteers at community level, it would not have been possible to reach LLIN coverage of more than 80% -90% as well as equity between the rich and poor. This approach was criticised by Monique Van Dormael who argues that integration of several health interventions would give another bureaucratic burden that could deteriorate the accessibility and acceptability of health services and the programs. She also emphasised that linkages between programs should be in the hands of health professionals rather than village health workers (44).

There is however no evidence from the large scale integrated vaccination and LLIN distribution campaigns that support this view. On the contrary, several positive “side effects” like increased resources to programming, disease surveillance, training of personnel and better cooperation and co-ordination between partners and colleagues may be a result of well planned integration of health interventions.

6.4 Partnerships

The International Federations campaigns has only been possible because key stakeholders like WHO, GFTAM, private sector, MoH and civil society organisations have been working closely together with a common goal. The partnership is informal with not written agreements or memorandum of understanding.

Essential Programme Inputs - Public Health

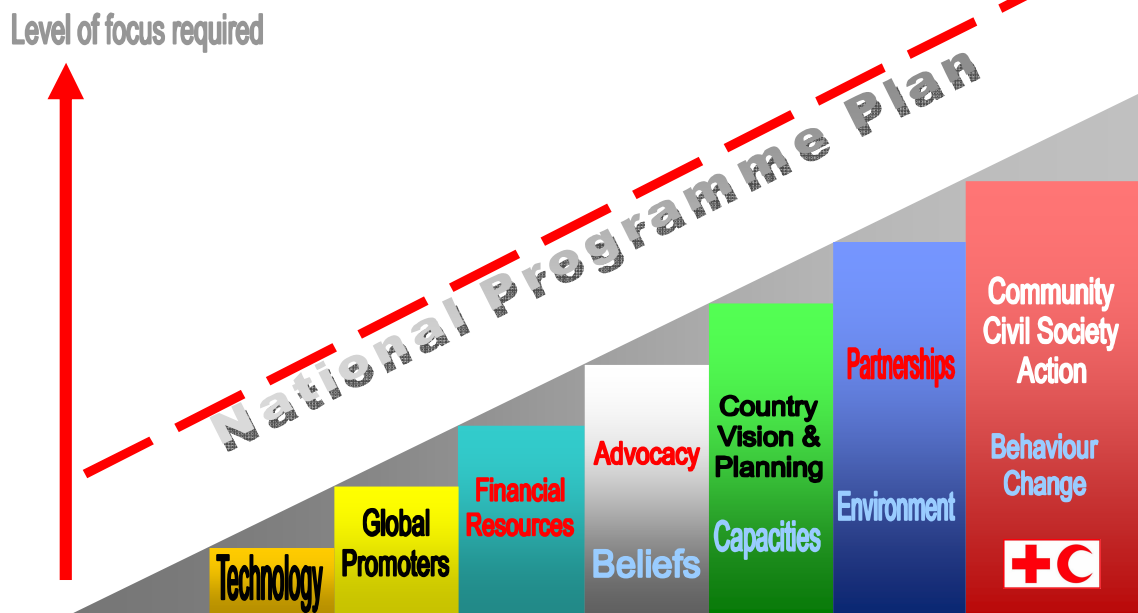


Figure 2. Partners different input in a community based health prevention programming

By arranging weekly Wednesday's calls all partners can discuss together on the progress and limitations in the planning, implantation and the results of ongoing and of previous interventions. Those who participate have something to "bring to the table" either by their own specific competence or as a representative of a partner organisation involved in the campaign. These discussions influence and contribute to strengthening and improving the global malaria program over time. By having a fixed time, day and conference centre, it has been possible for anyone to join and also bring "specialists" on a ad hoc basis to add more "in depth" information on a country, topic etc. whenever needed.

Where the partnership has not yet been very successful is to scale up and coordinate key interventions like the Keep Up programs post campaign. The partnership weekly call is a unique opportunity for advocacy towards governments, RBM etc. and get access to increased funding for a coordinated national follow up of net utilisation. Lack of sufficient funding was a reason for criticising towards Roll Back Malaria claiming that its strategy has failed (45). Much of this responsibility lies with the respective governments and MoH, but by putting forward the concerns to a wider audience, an increased awareness and interest for the problem is raised, increased pressure can be put to those responsible and a process to find solutions can be start.

The weekly calls have been instrumental not only by ensuring maximum coordination and success of the huge task the campaigns planning and implementation in itself is, but also by strengthening the cooperation between governments, organisations, civil society and private sectors. This can lead to future changes in national and global priorities and policies

6.5 Lessons learnt from mass integrated LLIN distributions

The integrated campaigns with distribution of LLINs together with measles vaccination campaigns proved to be a feasible and cost effective strategy. However, the aim of ITN is to protect all children less than five years while measles vaccination only target children from nine to 59 months. This left a gap in ITN protection of children from zero to nine months which had to be addressed during the vaccination campaigns. By integrating LLIN distribution into polio vaccination campaigns this problem was eliminated and could thus be seen as a more favourable strategy.

In the early stage of the large scale campaigns, there was a shortage in production capacity compared to demand and need if mass distribution should reach ITN coverage of more than 60%. It was thus decided to limit the number of nets per household to one net per family with a pregnant women or child under the age of five, with a maximum two nets in households with more than three children rather than one net per child. In Togo where the MoH decided to go for “one net per child” strategy, more nets were distributed to each household than could be utilised due to the limited space. This is an unfortunate waste of resources. It also contributed to exhaust the stock of LLINs that could have been distributed post campaign and thus maintained the high coverage in the aftermath of the large scale distribution. As the LLIN production capacity increases and nets are more readily available, a more feasible strategy could be to distribute nets based on the number of sleeping spaces in the household rather on the number of children under five.

By focusing on pregnant women and children less than five has increased utilisation and protection of this target specific group but eliminated other vulnerable and high risk groups for accessing the positive effects of the LLIN.

Also by changing the policy from subsidised nets, available for all to free distribution to a few like in Malawi, put additional responsibility on the governments to bridge the potential increased equity gap among the most vulnerable to access a net for an affordable price. This may have a negative impact on a large group of people also at high risk of malaria. It is mainly the elderly, chronically ill and people living HIV/Aids and refugees or internal displaced people (IDP).

In emergencies, refugees or IDPs coming from a non malaria endemic area to an endemic area, they will not have acquired any immunity and may be at very high risk of malaria with severe consequences. By providing them with LLINs at arrival, effective malaria protection have ensured also in complex situations.

Few attempts have been done to scale up LLIN distribution with other programs that may be more feasible to link malaria prevention than vaccination. The potential synergy effect of combining a Keep Up program with routine distributing integrated with other community based health programs has not yet been fully explored.

The value added of integrating health interventions when executing campaigns have been highly appreciated, but the success in reducing malaria mortality by half can only be achieved by ensuring high and correct ITN use over time. Over the years this aspect has got increasing focus and interest but is only implemented to a limited scale and only when additional resources are made available. Increased advocacy and pressure on

governments from the global partnership could play an important role in accessing the needed funding that could be further explored. This could possibly also open up for a more holistic approach and strengthen national programs by including access to early diagnosis and treatment.

The large scale free distribution is still in its “early phase” and need to be further developed and improved to reach the MDG and contribute to a decline in malaria mortality and morbidity.

6.6 Methods and ethical considerations

In this study a number of different methods ranging from literature survey, conferences, meetings and country visits, have been used to access relevant information and published articles. Unpublished and published reports from baseline studies, evaluations as well articles circulated by the global measles/malaria partnership, have also been included as reference material.

Only very few articles identified through the literature survey, or accessed through the global network were finally chosen based on strict selection criteria. This has been a limiting factor when discussing the positive and possible negative effects of the findings in this report. By including articles addressing key issues like equity, high coverage, net culture and bed net use amongst the target population, describing situations from other countries, might have given a broader view on more in depth understanding of the issues and supported and strengthened the discussion and conclusion. On the other hand, this thesis is describing new approach to malaria prevention achieving rapid high ITN coverage where the nets have been distributed free of charge. These interventions can therefore not easily be compared to other large scale distributions where nets have been sold for low cost. Because of the limited number of published articles from the free mass free distribution of LLINs it is a need to continue to follow up with in depth studies and evaluations to verify, support and add to the data available today.

Data from the baseline studies, post distribution evaluations that have been carried out on behalf of the global measles/malaria partnership or by donors to the programs, have all been planned and carried out by independent public health researchers who are experts in their respective field of work. The quality of the data is therefore considered sufficient and unbiased without further need of quality check before including the findings in this report.

To be able to look at trends in ITN utilisation at household level after the mass LLIN distributions, it has been necessary to use data collected by volunteers implementing community based health programs. These data are not statistically significant but the only source of information made available from the selected countries that describe the changes and other contributing factors to increased net utilisation. The data related to ITN use that have been collected by these volunteers have been similar in all Red Cross and Red Crescent Keep-Up programs:

- Number of nets being hung in the house.
- Number of U5 sleeping under an ITN.
- Number of pregnant women sleeping under an ITN.

Because the post distribution Keep-Up programs are implemented based on a similar concept (9), these data also provide a possibility to compare differences and similarities amongst all countries described in this report. However, as none of these programs have been implemented countrywide and data from other organisations that may implement similar activities at community level has not been made available, it has been impossible to give a better and more in depth insight in other key factors or interventions that may contribute to an increased use of mosquito nets after mass free distributions in the respective countries.

The information gathered from the field visits and the weekly telephone conferences is mostly verbal information from key stakeholders. However, though some of this information may be “selective” when discussing with a donor, the meeting with health authorise and implementing partners have been considered a valuable and valid source of information. Likewise is the information coming directly from the field during the planning and implementation phase of the large scale distributions and discussed during the weekly conference calls.

Other factors that may impact the feasibility and success of integrated mass LLIN distributions like “net culture and demand” in a country, cultural aspects, gender issues and funding for malaria programming, all important factors for increasing ITN use, have not been included or analysed. The various distribution strategies using direct distribution versus voucher based approach, stand alone versus integrated distributions and distribution during campaign versus distribution through routine programs have only briefly been touch upon as all of these issues need to be studied more in depth than what seems to be the current situation.

My own personal involvement in several of the integrated campaigns and Keep-Up programs, either as donor or in the planning and implementation process, have to some extent influenced my opinion of “what works and what does not work”, as well as what seems to be gaps and limitations in the mass distribution programs described. However, as I have not taken part in or had any influence on neither the data collection nor the analysis of these findings from baseline studies and evaluations leading up to my conclusion, data from these studies is considered to be unbiased. In spite of the strong indications from the independent data collected and presented, the conclusion and in particular the strong recommendation of the need to follow up with post campaign Keep-Up programs, may be considered being biased.

7.0 AREAS OF FURTHER INVESTIGATIONS

The large scale integrated free LLIN distribution is a new strategy and approach to meet the MDGs. This “scaled up” approach has so far been limited to the target population. Benefiting and ensuring high utilisation by those at highest risk remains a challenge. Likewise, the new technology of the long term effect of the nets with potential positive or negative long term effect is currently not well documented. Further investigations and documentation on how to maximise the potential impact and synergy effect with other health programs are needed.

- Strengths and weaknesses in delivery strategies linked to rapid high coverage by integrating LLIN distribution in vaccination campaign versus routine EPI.
- The feasibility of integrating large scale LLIN distribution and malaria prevention in other health programs assisting other high risk groups like people living with HIV/AIDs, refugee populations etc, to achieve a positive synergy effects.
- Collect further information and data of potential increased efficacy when LLIN is combined with other malaria interventions like indoor residual spraying.
- To look at potential long term negative impacts of “one time” mass distributions.
- Further investigations and follow up on net durability and possible development of resistance to LLINs.
- To further assess the effectiveness of community-based health information interventions carried out by volunteers and the value added of post campaign Keep Up programs. Identify factors that influence ownership, retention, and use and key knowledge and practices among community members.

8.0 CONCLUSION

Scaling up free LLIN distributions, integrated with vaccination campaigns is an effective and feasible strategy to achieve rapid high and equal ITN coverage among all wealth quintiles. Provided that 75% of nets are hung and used, these campaigns can contribute significantly in reducing malaria related morbidity and mortality. By distributing LLIN as a minimum standard, the need for regular re-treatment of the nets has been eliminated.

The mass free LLIN distributions have surpassed the Abuja target for ITN coverage in those countries where the Red Cross and Red Crescent campaigns have taken place and made an important step forward towards the MDG 6 goal 8 and opened up for new innovative approaches to seriously scale up malaria preventive efforts.

In spite of the rapid high coverage the utilisation remained lower than possession. Utilisation increased over time when the distribution was followed up by a household visit post campaign. These follow up visits have been crucial in making a significant contribution to achieving the Abuja target for children under five and pregnant women being protected by an ITN. To achieve maximum impact of the mass LLIN distributions, a minimum standard of a two phased approach is recommended. Phase

one focus on distribution and phase two ensure follow up at household level, providing correct information and ensure proper utilisation and that nets are hung over time.

Integrating LLIN distribution with other health intervention have a positive synergy effects also for other programs by bringing in additional money, human resources, equipment and supplies that have positive side effects like training, education, improved management skills, disease surveillance etc.

The integrated campaigns have been limited in focusing only on under fives and pregnant women. This is unfortunate as other high risk groups in the society, like chronically ill, the very poor and people living with HIV/Aids, have been excluded from the positive health impact and quality of life the LLIN can provide for another very vulnerable group.

The partnership approach, sufficient long term funding and political commitment has been essential for the successful results.

Although malaria is a preventable disease, it still accounts for close to a million deaths every year, most of them are children under five years and pregnant women in sub-Saharan Africa. The integrated large scale distribution campaigns, where ITNs are distributed free of charge, gives us hope that it may be possible to meet the Millennium Development Goals and the Abuja target. If one can ensure that nets are being hung and used, these integrated campaigns can contribute to seriously reducing malaria morbidity and mortality.

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10.0 REFERENCES

1. Beaglehole R and Bonita R. Public Health at the Crossroads, Cambridge University Press, 1997.
2. Declaration of Alma Ata, International conference on Primary Health Care, Alma Ata, 1978, Alma Ata, USSR.
3. The Bangkok Charter for Health Promotion in a Globalized World, 6th global conference on Health Promotion, 2005. Bangkok, Thailand.
4. Uplekar M, Raviglione M. The "vertical-horizontal" debates: time for the pendulum to rest (in peace?). Bulletin of the World Health Organisation, 2007; 85, 5.
Available from:
URL:<http://www.who.int/bulletin/volumes/85/5/07-041756/en/index.html>
5. The World Health Organisation. Fact sheet 114. Geneva: World Health Organisation; 2008.
6. <http://www.measlesinitiative.org/>
7. World Health Organisation. Executive Board, 122nd session, Global immunization strategy, Report by the Secretariat. World Health Organisation; September 2007.
8. The World Health Organisation and UNICEF. Malaria control and immunization, a sound partnership with great potential. Geneva: World Health Organisation; 2004.
9. The Red Cross and Red Crescent, Malaria Keep Up programme, Concept paper. Geneva: The International Federation of the Red Cross and Red Crescent; 2006.
10. Levine R. Case Studies in Global Health millions saved, Jones and Barlett Publisher; 2007.
11. Grabowsky M, Nobiya T, Ahun M, Donna R, Lengor M, Zimmerman D, et al. Distributing insecticide treated bednets during measles vaccination: a low cost means to achieving high and equitable coverage. Bulletin of the World Health Organisation, 2005; 83 (3): 195-201.
12. World Health Report, Shaping the future. Geneva: World Health Organisation; 2003.
13. World Health Organisation and UNICEF. Africa Malaria Report 2003. Geneva: World Health Organisation and UNICEF; 2003. Available from:
URL:<http://www.rbm.who.int/amd2003/amr2003/>
14. World Health Report, Working together for health. Geneva: World Health Organisation, 2006.
15. World Health Organisation. Available from:
URL:<http://www.who.int/tdr/publications/>
16. World Health Organisation and UNICEF. World malaria report 2005. Geneva: World Health Organisation; 2005.
17. Confalonien U, Menne B, Akhtar R., Ebi K.L, Hauengue M, Kovats R.S, Revich B, and Woodward A, 2007: Human Health, Climate Change 2007: Impacts, Adaptation and Vulnerability, Contribution of working group II to the Fourth Assessment Report to the Intergovernmental Panel on Climate Change, Parry M.L, Canzini O.F, Paluhkof J.P, van der Linden P.J, and Hanson C.E, Cambridge: Cambridge University Press, UK, 2007; 391-431.
18. Eliades M.J, Wolkon A, Moragh K, Ameydo S. B, Crawford D, Sodahlon Y, et al. Burden of malaria at community level in children less than 5 years of age in Togo. Am.J. Trop.med.Hyg. 2006; 75(4): 622-629.

19. Grabowsky M, Nobiya T, Selanikio J. Sustained high coverage of insecticide-treated bednets through combined Catch-up and Keep-up strategies. *Trop.Med.Int. Health*, 2007; 12: 815-822.
20. Grabowsky M, Farrel N, Hawley W, Chimumbwa J, Hoyer S, Wolkon A, Selanikio J. Integrating insecticide-treated bednets into a measles vaccination campaign achieves high, rapid and equitable coverage with direct and voucher based methods. *Tropical Medicine and International Health*, 2005;10(11): 1151-1160.
21. UNICEF, IFRC. Integrated approach to morbidity and mortality reduction in Zambia-measles, ITN and bed net re-treatment campaigns, Final report. UNICEF, IFRC; September 2004.
22. Center for Disease Control and Prevention. One month post campaign evaluation. Togo: Center for Disease Control and Prevention; February 2005.
23. Center for Disease Control and Prevention, Liverpool school of tropical medicine. Preliminary report on the Togo nine month post evaluation. Center for Disease Control and Prevention, Liverpool school of tropical medicine; September-October 2005.
24. Liverpool school of tropical medicine and partners. Baseline preliminary report for the integrated campaign. Liverpool school of tropical medicine and partners; September-December 2004.
25. Centers for Disease Control and Prevention, Niger MoH, IFRC, CERMES and UNICEF. Community Based Cross Sectional survey, 2005 Niger ITN/polio campaign one month post campaign. Centers for Disease Control and Prevention, Niger MoH, IFRC, CERMES and UNICEF; March 2006.
26. IFRC. Final Report. National education campaign of mothers in the utilisation of mosquito nets. IFRC; August 2006.
27. Osman I, Issif S, Lama M, Roy J, Hoyer S. Distribution of Insecticide Treated Bednets during a polio Immunization campaign, Niger, 2005. *MMWR* 2006;55:913-16.
28. Center for Disease Control and Prevention, Mozambique MoH. Preliminary Report on the Evaluation of Free Bednet Distribution via vouchers in Sofala and Manica Provinces. Center for Disease Control and Prevention, Mozambique MoH; March 2006.
29. IRIN. Use of treated nets reduces child malaria deaths. Kenya: IRIN; 17 September 2007.
30. Center for Disease Control and Prevention. The Kenya ITN distribution evaluation survey, preliminary data. Center for Disease Control and Prevention; 2006.
31. Datadyne, IFRC. National integrated child survival campaign follow up, six weeks post campaign. Preliminary report. Datadyne, IFRC; November 2006.
32. Center of Disease Control and Prevention, IFRC, MoH and partners. Evaluation of the Sierra Leone integrated LLIN campaign, Preliminary report. Center of Disease Control and Prevention, IFRC, MoH and partners; October-November 2007.
33. Noor A. M, Amin A.A, Akhwale W.S, Snow R.W. Increasing coverage and decreasing inequity in Insecticide-Treated Bed Net Use among rural Kenyan children. *PLOS Medicine*, 2007; 4,(8): 1341-1348.
34. World Health Organisation. Guidelines of ITN distribution. Geneva: World Health Organisation; 2007.
35. Netmark. Awareness, ownership and use of mosquito nets in Nigeria Senegal, Zambia, Ghana and Ethiopia. Cross-country results; Netmark surveys 2004.
36. World Health Organisation. New guidance on insecticide-treated mosquito nets. Geneva: World Health Organisation; August 2007.

37. Lindblade K. A, Eisele T. P, Gimning J. E, Alaii J.A, Odhiambo F, O. ter Kuile F, et al. "Sustainability of Reduction in Malaria Transmission and Infant mortality in Western Kenya With use of insecticide treated bed nets". JAMA 2004; (21): 2571-2580.
38. MacIntyre K, Keating J, Obladt Y.B, Zerom M, Sosler S, Ghebermeskel T, Eisele T. Rolling out insecticide treated nets in Eritrea: examining the determinants of possession and use in malarious zones during the rainy season. Tropical Medicine and International Health, 2006; 11(6): 824-833.
39. Korenromp E.L, Mille J.R, Cibulskis R.E, et al. Monitoring mosquito net coverage for malaria control in Africa: possession vs. use by children under 5 years. Tropical Medicine and International Health, 2003; 8 (8): 693-703.
40. The Global Fund. Update on integrated mass distribution of Insecticide Treated nets. The Global Fund (Internal note to the measles/malaria partnership calls); October 2006.
41. Gamble C, Ekwaru P. J, Garner P, O ter Kuile F. Insecticide treated nets for the prevention of malaria in pregnancy: A systematic review of randomised controlled trials, PLoS Medical, 2007; 4 (3): 0506-0515.
42. Schellenberg D, Menendez C, Kahigwa E, Aponte J, Vida J. L, Tanner M, Mshinda H, Alonso P. Intermittent treatment for malaria and anaemia control at times of routine vaccination in Tanzanian infants: a randomised, placebo-controlled trial. The Lancet 2001; 357(9267): 1471-77.
43. Molyneux D.H, Nantulya V.M. Linking disease control program in rural Africa: a pro-poor strategy to reach Abuja targets and millennium development goals. BMJ, 2004; 328 (1): 1129-1132.
44. Van Dornael M. Health control are badly needed to control malaria. BMJ, (rapid responses) 2004; 328: 7448, 1129-1132.
45. Yamey G. Roll back malaria; a failing global health campaign. (Editorial) BMJ, 2004; 328:1086-87.
46. Dalland, O. Metode og oppgaveskriving. Universitetsforlaget AS, 2000.

11.0 ANNEX I

Abbreviations:

ACT	Artemisinin based Combination Therapy
CDC	Centers for Disease Control and Prevention
EPI	Expanded Program on Immunisation
GFATM	The Global Fund for Aids, Tuberculosis and Malaria
IDP	Internally Displaced People
IFRC	International Federation of the Red Cross and Red Crescent national societies
IPT	Intermittent Preventive Treatment
ITN	Insecticidal Treated Net
LLIN	Long lasting insecticidal net
MDG	The Millennium Development Goal
MoH	The Ministry of Health
RBM	Roll Back Malaria
U5	Children under the age of five years
UNDP	The United Nations Development Programme
UNICEF	The United Nations Children`s Fund
WHO	The World Health Organisation

