Roll Back Malaria:
Country Needs Assessment

Nigeria Report

April 2008

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Acknowledgements

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Executive Summary

The Global Roll back Malaria (RBM) Partnership charged the Harmonization Working Group (HWG) in May 2007 with identifying and quantifying financial and technical gaps that are hampering countries from scaling up malaria control activities and achieving the RBM 2010 and national targets. To this end, a comprehensive needs assessment was conducted in Nigeria from 3rd to 18th April 2008 led by the National Malaria Control Programme and supported by stakeholders, partners and consultants from the Malaria Consortium.

Nigeria, a country with an estimated population of over 140 million people of whom about 97% are exposed to stable malaria transmission, has made some significant progress towards establishing sound malaria control interventions but is still clearly behind in reaching the 2010 RBM targets. Currently the NMCP and partners are revising the Malaria Control Strategic Plan in order to accommodate a change from malaria prevention targeted to biologically vulnerable groups to universal access. The major strategy in malaria prevention is to distribute ITNs (LLIN) through the public as well as an active commercial sector, while IRS and environmental management are thought to complement these efforts where feasible. In addition to ITNs for the prevention of malaria in pregnancy, IPT is recommended as policy and applied country wide but at different levels of coverage. The national treatment policy was changed to ACT in 2005 and currently Artemether/Lumefantrine (AL) is officially the first line treatment for uncomplicated malaria with Artesunate+Amodiaquine (AS+AQ) used as the alternative. However, in 2007/08 most ACT supplies are AS+AQ. The level of coverage achieved to date is estimated at about 12% of households owning at least one ITN, 17% of pregnant women accessing at least two doses of IPT and not more than 9% of children with fever in the last two weeks receiving any ACT (2.4% within 24 hours).

After considering past efforts, existing tools and capacities, the needs assessment team came to the conclusion that it will be possible to reach the RBM 1010 target of "at least 80% of the population at risk protected either by ITN or IRS" and even the 100% universal coverage target provided a) sufficient LLINs are made available before the end of 2010 and b) the NMCP and RBM partners quickly move from a more opportunistic approach of distribution where activities are linked to those of other partners (e.g. from EPI) to a pro-active application of distribution campaigns targeting the general population while at the same time strengthening routine distribution systems through health services and the commercial sector. Taking into account wear and tear, population growth and the number of nets needed per household it is estimated that to reach the 80% target a total of 70.3 million LLIN have to be distributed between now and the end of 2010 and further 57.9 million between 2011 and 2013 to maintain this level. For the 100% target the figures are 88.2 million LLIN and 72.2 million respectively. The cost for the 80% target including distribution is estimated to be USD 918.5 million with a funding gap of USD 373 million 2008-2010 and 421 million 2011-2013. For the 100% target the total cost will be USD 1,106.2 million and the gaps 510 million and 478 million respectively.

In the area of IPT, treatment and diagnosis the situation is complicated by the fact that currently utilization of public or not-for profit private health services is only about 30-40% for treatment and 60% for ANC services. While it is thought possible to increase coverage of those attending health services with the respective interventions to 80-100% by 2010 it is not thought to be possible to extend the reach to those currently not attending before 2013. This will involve also a significant effort in subsidizing malaria treatments (ACT) in the private (for profit) sector.

Taking into account the absorptive capacity of the health system it is estimated that between now and 2010, 8.4 million pregnant women can be reached with at least two doses of IPT and 17.8 million between 2011 and 2013. This implies that the proportion of all pregnant women

receiving IPT2 will increase from 23% in 2008 to 50% in 2010 and 75% in 2013. The cost for this relatively cheaper drug (SP) are estimated to be USD 4.8 million for the period 2008-2013 with a funding gap of USD 3.3 million.

The current strategy for diagnosis in the public sector does not envisage any parasitological diagnosis in children less than 5 years of age. For those 5 years and above the target is to have at least 80% of fever patients diagnosed by either microscopy (25% of those diagnosed) or RDTs. Based on this diagnostic strategy, the absorptive capacity of the public health system and the plan to increase access of treatment for children through community based distribution mechanisms from 3.4% in 2008 to 35.1% in 2013 it is estimated that between 2008 and 2010 a total of 99.7 million ACT treatments can be delivered and another 145 million between 2011 and 2013. The number of diagnostic tests involved would be 94.0 million (70.5 million RDTs). The total cost for ACTs 2008-2013 for the public sector is estimated to be USD 198.6 million (assuming an increase of AL in the public sector to 50%) and another USD 84.2 million for RDTs. However, it is also estimated that once ITN coverage has reached 80-100% in 2010 the proportion of children treated with ACTs that are not malaria cases will increase proportionately and it will be required at that time to review the policy of number of parasitological diagnosis for children.

In the private sector it is anticipated to subsidize ACTs by about 80% so the price reaches the level that had been previously reached by chloroquine. Assuming that the proportion of fever cases among those not attending public health services reached with subsidized ACT will increase from 10% in 2008 to 70% in 2013 it is estimated that 195 million subsidized doses of ACT will be needed with a total cost of USD 118 million.

While the needs assessment team was able to compile good estimates of needed commodities and cost for the key interventions it was more difficult to compile detailed estimates of cost for cross-cutting issues. This was mainly due to the absence of detailed activity plans and budgets for these areas and a lack of time to develop these within the period of the needs assessment. Therefore, only approximate estimates are used for these categories. The total cost for malaria control in Nigeria as outlined here would cost USD 1,940 million at 80% ITN coverage and 2,127 million for the 100% ITN coverage while treatment and IPT have been budgeted according to absorptive capacity. The estimated funding gap is USD 1,746 million for the 80% ITN scenario and USD 1,934 million for the 100% ITN scenario.

Nigeria will also need significant additional human resources and technical assistance (TA) to implement this ambitious plan. The most urgent TA need is to finalize the revised National Malaria Control Strategic Plan 2009-2013, to assist in writing a successful GFATM proposal for round 8, to urgently clarify the strategic role of IRS in addition to the ITN distributions and develop a costed M&E plan after a thorough M&E system evaluation.

List of acronyms

ACT	Artemisinin-based Combination Therapy
ANC	Ante-Natal Care
BCC	Behaviour Change Communication
CCM	Central Coordination Mechanism (GFATM)
DFID	Department for International Development (UK)
EPI	Expanded Programme on Immunization
GFATM	Global Fund to Fight AIDS, TB and Malaria
IDP	Immunisation Days Plus
IEC	Information, Education, Communication
IPD	Immunisation Plus Days
IPT	Intermittent Preventive Treatment
IRS	Indoor Residual Spraying
ITN	Insecticide Treated Net
IVM	Integrated Vector Management
LLIN	Long-lasting Insecticidal Net
LQAS	Lot Quality Assurance Sampling
NAFDAC	National Agency for Food and Drug Administration and Control
NMCP	National Malaria Control Programme
PMI	President's Malaria Initiative (US)
RBM	Roll Back Malaria
RDT	Rapid Diagnostic Test
SFH	Society for Family Health
SP	Sulphadoxine/Pyrimethamine
UNICEF	UN Children's Fund
USAID	US Agency for International Development
USD	US-Dollar
WB	World Bank
WHO	World Health Organization
WHOPES	WHO Pesticide Evaluation Scheme
YGC	Yakubu Gowon Centre

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1. Introduction

Malaria continues to be the main public health problem in sub-Saharan countries. Increased financial resources and concerted efforts by national malaria programs have not had the impact expected and there has been a growing realization that it will require a massive and accelerated scale-up of core interventions if malaria mortality and morbidity is to be halved by 2010.

Country needs assessments have been commissioned by the Harmonization Working Group to identify and quantify programmatic, operational and financial gaps that are hindering countries' from realizing this concentrated scale-up of core interventions so as to reach national and RBM 2010 targets and thereby achieving massive reductions in malaria mortality and morbidity.

As one of the core countries on which success in reaching the 2010 RBM targets will depend the Nigeria needs assessment was given high priority particularly as much of Nigeria's progress will depend on the success of the Round 8 GFATM application.

The team was composed of James Tibenderana (team leader) and Albert Kilian both from the Malaria Consortium. They were assisted by staff of the National Malaria Control Programme and members of the RBM country team namely Bayo Fatunmbi (WHO and Emmanuel Gemade (UNICEF).

The mission started on the 3rd April 2008 and was completed on 18th April 2008.

2. Methodology

The team collected data and information from various sources (Annex 1) including the FMOH NMCP current strategic plan (2005 – 2010) as well as the draft of the revised strategic plan 2009-2013, reports, guidelines and manuals and recent GFATM applications. Interviews were conducted (Annex 2) with staff from the FMOH, partners and donors using the need assessment guideline issues for qualitative analysis and field visits to two States, Nasarawa and Lagos which took place on 16th April.

Initially the consultants participated in a two day meeting (4th and 7th April) revising the current strategic plan to meet the "universal access" approach. This was followed by a stakeholders meeting on the 8th and 9th to present this revised strategic plan to all stakeholders, inform them about the purpose and methodology of the needs assessment and start the consultation process. The 10th-16th April were used for intensive interviews as well participation in the CCM stakeholders meeting regarding the upcoming GFATM Round 8 proposals.

The Debriefing of stakeholders about the preliminary findings of the needs assessment took place on April 17.

3. Demographic, socio-economic and epidemiological profile

According to the 2006 census Nigeria then had a population of 140 million people and is by far the most populous country in Africa with a fairly high average population density of 156 per square kilometre. The population growth rate is high, currently estimated at 3.0% and, accordingly, the proportion of children under 5 years of age is 20% and the proportion of the population pregnant during one year 5%.

The most important issue in describing the socio-economic and epidemiological profile is the significant gradient between the South and the North in almost all variables. As an example Figure 1 shows the disparity in child mortality rates based on the NDHS 2003.

Table 1. Socio-economic and health indicators

Indicator	Rate/Ratio	Source (and year)
Crude Birth Rate	43/1000	World Population Data Sheet 2007
Crude Death Rate	18/1000	World Population Data Sheet 2007
Growth Rate	3.0%	Census 2006, National Population Commission
Population urban	36.3%	NBS Statistical fact sheets 2006 (2005)
Infant Mortality	99/1000	UNICEF 2006
Child Mortality	92/1000	UNICEF 2006
Under Five Mortality	191/1000	UNICEF 2006
Maternal Mortality Ratio	800/100,000 (210-1,500)	NDHS 2003
Women receiving Antenatal Care	60%	NDHS 2003
Deliveries by professionals	36.3%	NDHS 2003
Total Fertility Rate	5.9	World Population Data Sheet 2007
HIV prevalence in 14-49yr cohort	5.4%	WHO World Statistics 2006 (2004)
Life expectancy	46 years	WHO World Statistics 2006 (2004)
Literacy	66.8%	WHO World Statistics 2006 (2004)
Per capita GDP	$ 582	World Bank 2005
Population below poverty line	54.7%	NLSS 2006
Fever cases among U5 accessing public health care (including non-profit private)	30.1%	NDHS 2003
Proportion of children receiving measles vaccine	38.3%	NDHS 2003
Proportion of U5 stunted	38.0%	NDHS 2003
Proportion wasted	9.2%	NDHS 2003

Figure 1: North-South disparity in child mortality (Source T. Freeman, UNICEF)

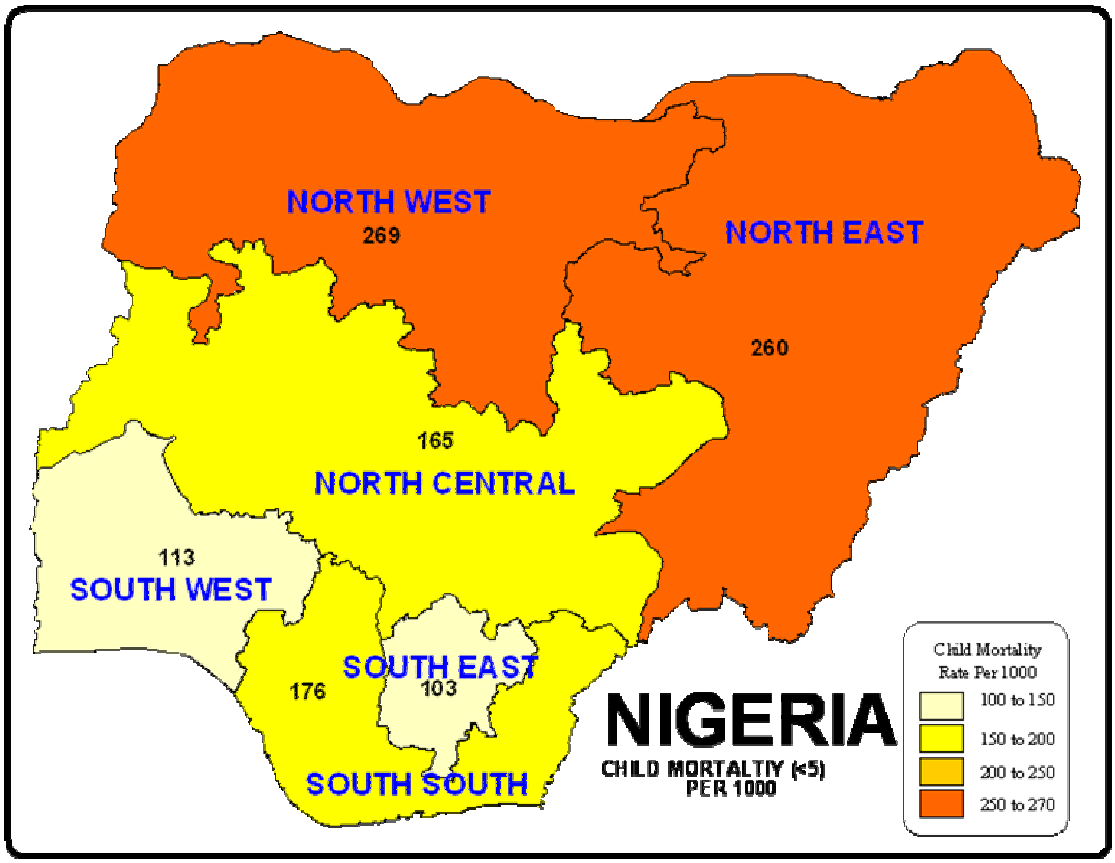


Table 2. Demography

Indicator	2008	2009	2010	2011	2012	2013	Source (and year)
Total population	144,483,655	149,107,132	153,878,561	158,802,674	163,884,360	169,128,660	Census 2006
Average Household Size	5.0	5.0	5.0	5.0	5.0	5.0	NMCP 2007
Total households	28,896,731	29,821,426	30,775,712	31,760,535	32,776,872	33,825,732	NMCP 2007
Number of pregnant woman*	7,224,183	7,455,357	7,693,928	7,940,134	8,194,218	8,456,433	NMCP 2007
Number of infant	4,765,993	4,918,505	5,075,897	5,238,325	5,405,952	5,578,942	Census 2006
Number of under-fives*	28,896,731	29,821,426	30,775,712	31,760,535	32,776,872	33,825,732	Census 2006
Percentage of population living in urban areas	36.3%						NBS 2005

Malaria Epidemiology

Situated between 4˚ and 13˚ Northern Latitude Nigeria has a suitable climate for malaria transmission throughout the country. The only exception is the area South of Jos in Plateau State where some mountain peaks reach 1600 meters and the altitude of settlements lies between 1200 and 1400 meters. This area can be considered of low or very low malaria risk.

There are five ecological strata from South to North that define vector species dominance, seasonality and intensity of malaria transmission: mangrove swamps, rain forest, guinea-, sudan- and sahel-savannah. Accordingly, the duration of the transmission season decreases from South to North (Figure 2) from perennial in most of the South to only 3 months or less in the border region with Chad.

The dominant species of malaria parasites is *Plasmodium falciparum* (>95%) with *P. ovale* and *P. malariae* playing a minor role with the latter being quite common as a double infection in children (see e.g. The Garki Project). Dominant vector species are *Anopheles gambiae s.I.* and the *A. funestus* group with some other species playing a minor or local role*: A. moucheti, A nili , A. pharaoensis, A. coustani, A. hancocki* and *A. longipalpis*. Within the Anopheles gambiae complex, A. *gambiae s.s.* is the dominant species with *A. arabiensis* being found more often in the North and *A. melas* only in the mangrove coastal zone. A summary of the entomological inoculation rates (EIR) reported in 86 studies from Nigeria suggests that EIR for *A. gambiae s.l.* ranges from 18 to 145 infective bites per person per year and for *A. funestus* from 12 to 54.

Based on the climatic and ecological data and historical data on malaria parasite prevalence rates the MARA Project has compiled a model of likely distribution of malaria prevalence (Figure 3). This suggests that malaria endemicity is highest around the two river valleys. Taking into account this distribution as well as the population density (Figure 4) it can be estimated that approximately 30% of the population live in areas of high to very high transmission intensity and 67% in the moderate transmission zone. These proportions have been used in the calculations resulting in an estimated number of fever and malaria episodes per person and year of 3.5 and 1.5 respectively for children under 5 and 1.5 and 0.5 for those 5 years and older. The current malaria related annual deaths for children under 5 years of age are estimated at around 300,000 (285,000-331,000).

Figure 2: Seasonality of malaria transmission

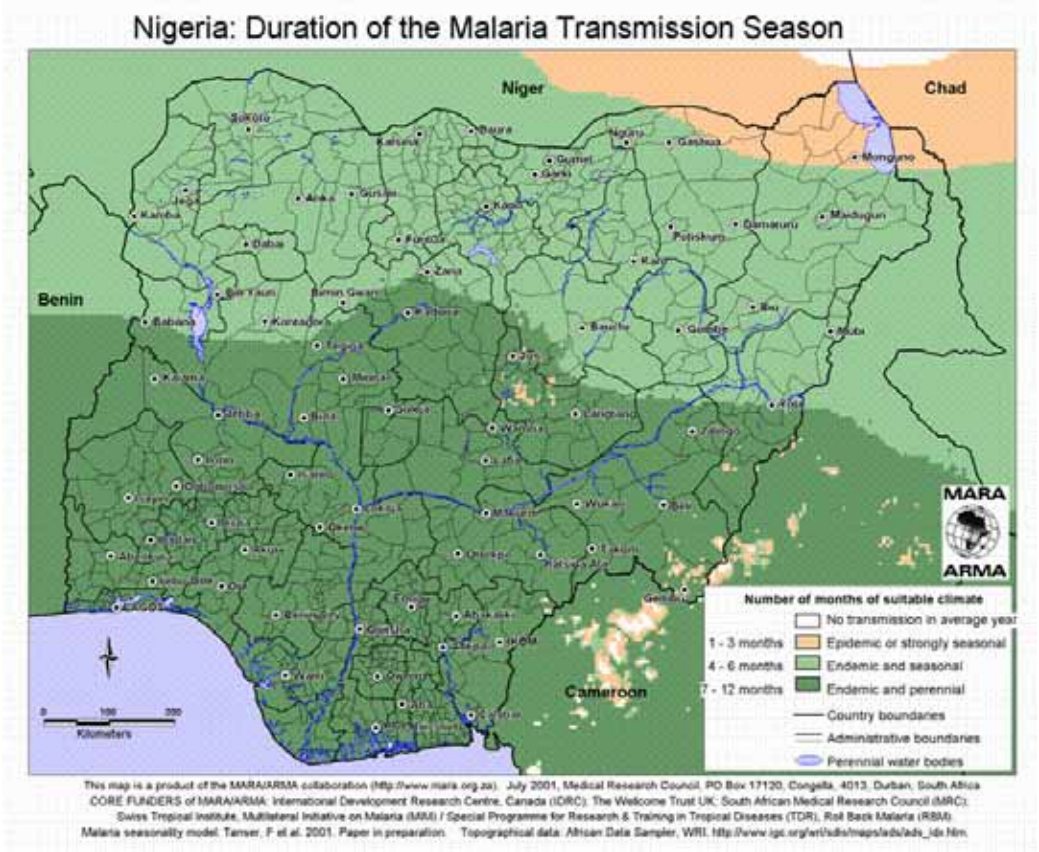


Figure 3: Distribution of projected malaria prevalence rates

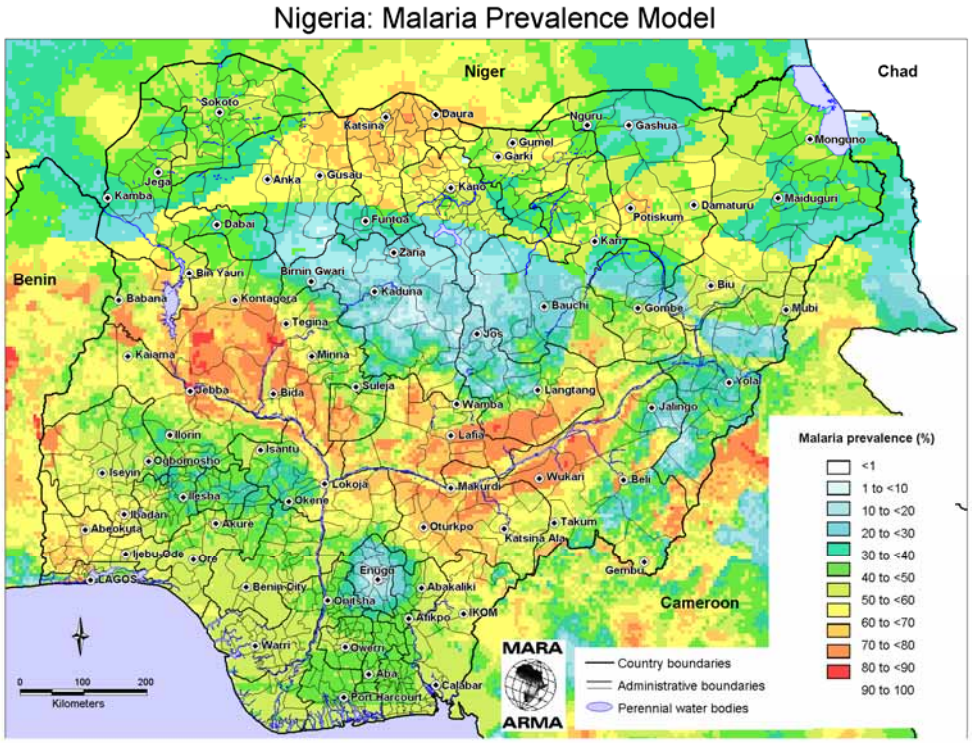
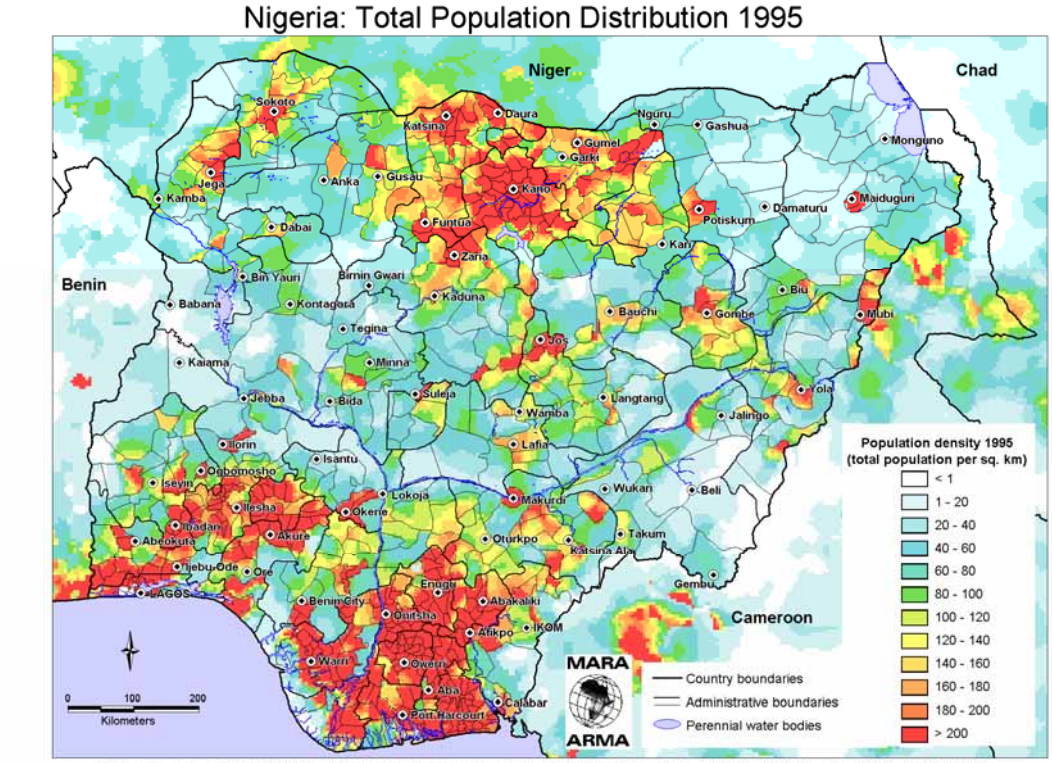


Table 3. Population at risk of malaria by epidemiological stratification

Indicator	Number	Percentage	Source (and year)
Population living in stable malaria areas	149,107,132	97%	NMCP 2008
Population living in unstable malaria areas	n.a.	0%	
Population living in malaria free areas	4,473,214	3%	NMCP 2008

Figure 4: Population density (1995 census)



4. Progress, estimated gaps and requirements

4.1. Progress towards 2010 targets

The targets of the Nigeria NMCP with respect to malaria prevention are in keeping with the RBM and universal access targets. In the case of IPT, diagnosis and treatment the targets are somewhat lower than the RBM targets as they attempt to be realistic in view of the enormous challenges in developing high quality health services in Nigeria. The issues are discussed in detail in the various intervention sections.

Table 4. RBM Core (and Country-specific) Indicators and Targets[1]

Indicators	Baseline Year (indicate)	NMCP Target 2008	NMCP Target 2009	NMCP Target 2010	NMCP Target 2011	NMCP Target 2012	NMCP Target 2013	RBM Target 2010	NMCP Achieved 2006/2007
Crude death rate (under five)	191 (2006)			148			95		191
Mortality attributed to malaria (all ages)								*50% reduction from 2000*	
Mortality attributed to malaria (under five)								*50% reduction from 2000*	
Mortality attributed to malaria (5 and above)								*50% reduction from 2000*	
Morbidity attributed to malaria (all ages)								*50% reduction from 2000*	
Morbidity attributed to malaria (under five)								*50% reduction from 2000*	
Morbidity attributed to malaria (5 and above)								*50% reduction from 2000*	
Case fatality rate (under five)	Not defined			2%				*50% reduction from 2000*	To be determined
Case fatality rate (five and above)	Not defined			2%				*50% reduction from 2000*	To be determined

[1] Original RBM 2010 targets: http://rbm.who.int/docs/abuja_declaration.pdf
Updated RBM 2010 targets:http://www.who.int/gb/ebwha/pdf_files/WHA58-REC1/english/Resolutions.pdf and http://rbm.who.int/forumV/docs/gsp_en.pdf

Indicators	Baseline Year (indicate)	NMCP Target 2008	NMCP Target 2009	NMCP Target 2010	NMCP Target 2011	NMCP Target 2012	NMCP Target 2013	RBM Target 2010	NMCP Achieved 2006/2007
% of under fives with fever getting appropriate treatment within 24 hours of onset	0.1% (2005)		20%		60%		80%	80%	1.0-2.4%
% of children five years and above plus adults with malaria/fever receiving a diagnostic test (community/health facility)	Not defined	5%	20%	50%	60%	75%	80%		
% of severe malaria cases (under-five) correctly managed at health facilities	Not defined		20%	80%	80%	100%	100%		To be determined
Proportion of inpatients cases due to malaria all ages									
Proportion of inpatients cases due to malaria under five									
Proportion of inpatients cases due to malaria five and above									
% pregnant women taking at least 2 doses of SP for IPT	28% (2005)		60%	80%	100%	100%	100%		To be determined
% pregnant women taking at least 2 doses of SP for IPT	17% (2005)		36%	48%			75%	80%	To be determined
Proportion of the population at risk from malaria who are protected by appropriate prevention measures (ITNs or IRS)	10.9% (2005)		60%	100%	100%	100%	100%	80%	12%
% pregnant women sleeping under an ITN	3.1% (2005)		40%	80%	80%	80%	80%	80%	To be determined

Indicators	Baseline Year (indicate)	NMCP Target 2008	NMCP Target 2009	NMCP Target 2010	NMCP Target 2011	NMCP Target 2012	NMCP Target 2013	RBM Target 2010	NMCP Achieved 2006/2007
Proportion of pregnant women sleeping under any mosquito net									
% of under fives sleeping under an ITN								80%	
% of under fives sleeping under any mosquito net									
% of mosquito nets treated with insecticide within the last 12 months									
% of households having at least one ITN	10.9% (2005)		60%	100%	100%	100%	100%		12%
% of households with at least two ITN	2.2% (2003)		40%	80%	80%	80%	80%		To be determined
Proportion of population sleeping under any mosquito net									
Proportion of houses or structures in targeted areas that are sprayed	n.a.	85%	85%	85%	85%	85%	85%	At least 80% in targeted areas	n.a.
Proportion of the population protected by IRS	0% (2007)	2.4%	4%	8%	10%	15%	20%		n.a.

4.2. Current financing

Health financing in Nigeria follows the three tier system of health services, i.e. the Federal Budget covers tertiary care, State budgets secondary and LGA budgets primary health care. However, the federal level also funds directly some of the disease control programmes including malaria control. The amount of government spending on health and malaria is difficult to ascertain as funding levels vary, actual spending does not always follows the original budget and no health accounts have as yet been established allowing a more detailed break down of cost. It is generally believed that the overall health spending by the Nigerian Government is below 5% of the national budget (DFID Nigeria Country Profile). Figures regarding the proportion of government spending on malaria are not directly available. However, according to the NMCP budget summary for 2008 the federal contribution to malaria control will be 2.0 billon Naira which would be equivalent to 0.08% of the 2.7 trillion Naira National Budget recently passed by the National Assembly.

The largest contributor to malaria control efforts currently is the World Bank Booster Programme (2007-2012) operating in 7 states with a five year total contribution of 180 million USD. The Global Fund contributed to malaria in rounds 2 and 4. After initial difficulties in implementation and some delays these two grants have now joint to a two year phase two (2008/2009) with a total of 23.4 million USD. Although Nigeria is not a PMI country, it will receive 12 million USD from PMI in addition to the regular USAID contributions and these additional funds will be mainly targeted for commodities in the two states of Kano and Cross Rivers. WHO, while not providing commodities, is a crucial partner in the provision of technical assistance and training. The DFID funded malaria project has only recently been awarded and is currently in the process of starting up (2008-2012). It will have a budget of 100 million USD in total. The figures given in table 5 are only accurate for 2008 and beyond this no exact figures are available for most partners. The Figure 5 below shows a mapping of partners in malaria control from May 2007 compiled by Tim Freeman (UNICEF) it does not yet include the DIFD supported states as these are not yet decided. It also highlights the GFATM round 7 states but this proposal was not approved by GFATM.

Figure 5: Map of funding support by state (2007) by Tim Freeman

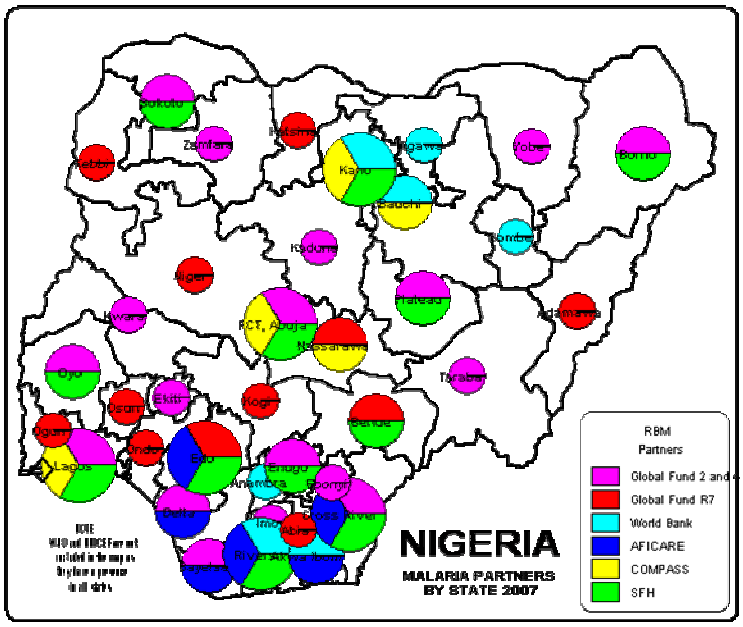


Table 5. Main Donors and Areas of Support

Organization	Areas of Support									
	ITNs	IRS	Larval Control	IPT	Diagnosis	Treatment	IEC/BCC	Epidemics	M&E	Programme Mgt
Ministry of Health	+			+		+	+		+	+
GFATM	+			+	+	+	+		+	+
USAID/PMI	+			+	+	+	+			
WB Booster	+	+	+	+	+	+	+		+	+
UNICEF	+			+						
WHO	+	+	+	+	+	+	+		+	+
DFID	+			+	+	+	+		+	+

Table 6. Current financing by year (2008-2013) (USD)

Organization	2008	2009	2010	2011	2012	2013	Source
Ministry of Health	17.8	*18.0*	*18.0*	*18.0*	*18.0*	*18.0*	
GFATM Rd 2/4	11.7	11.7					Phase 2 Rd 2+4 agreement
USAID/PMI	14.5	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
WB Booster	24.0	40.0	60.0	30.0	24.0	0	WB Booster Project Appraisal
UNICEF	2.5	2.5	*2.5*	*2.5*	*2.5*	*2.5*	Including JICA contribution for LLIN
WHO	3.4	3.4	*3.4*	*3.4*	*3.4*	*3.4*	Dr. Fatunmbi - WHO
DFID	12.9	20.2	24.5	17.3	17.1	0	MC proposal to DFID
Total Funds Available ($)*	**86.8**	***98.8***	***111.4***	***74.2***	***68.0***	***26.9***	
Adjusted for management cost	**79.4**	***86.8***	***94.5***	***64.7***	***64.7***	***26.9***	Applied to WB and DFID

* Figures include administrative and management cost and can not be in total translated to commodities or activities

4.3. Estimated gaps and requirements to attain 2010 targets

Tables 7 – 11 are summary tables of all requirements, both financial and commodity related (Tables 8 -11) and otherwise (Table 7).

In calculating the gaps not all the available funds presented in Table 6 could be allocated to specific areas. Therefore the gaps expressed for each row in Table 8a are somewhat overestimated and it appears better to use the needs rather than the gaps as an orientation.

In the tables 10a-e the 100% for IPT, diagnosis and treatment, the estimates are those assuming that all cases country wide (public and private) would be included and – in the case of diagnosis and treatment – applying the diagnostic policy. The gaps, however, refer to the national target, i.e. take into account what the NMCP and their partners feel they can achieve.

Summary of Technical Assistance Needs

Immediate TA needs

- Support to finalize Strategic Plan 2009-2013
- Support to write a successful GFATM proposal
- Support to clarify role and implementation procedures for IRS
- Support for the November measles/LLIN campaign

Medium term TA needs

- Support to develop and implement a comprehensive Operational Plan for large scale general LLIN campaigns in all areas currently not yet fully covered (rolling campaigns).
- Support to develop detailed diagnostic guidelines and a quality control system
- Support to carry out a nationally representative Malaria Indicator Survey with biomarkers.

Table 7. Summary of targets, strategies, progress and additional activities needed by core intervention area.

Core interventions	Key targets	Strategies and approaches to achieve targets	Progress and bottlenecks	Additional activities needed
ITNs	Rapidly scale up universal coverage with ITN (LLIN) to reach 100% of households with at least 1 ITN and 80% with at least 2 ITN by 2010 and sustain this level to 2013.	Mixed approach with free distribution through campaigns and routine health services as well as subsidized and at cost sales through a vibrant commercial sector LLIN technology transfer to local net manufacturers	Presently approximately 12% of households have at least 1 ITN and the proportion of LLIN is rapidly increasing. Campaigns so far restricted mainly to children under 5 and routine distribution still weak.	Complete the current change from targeted to universal access to LLIN by switching to general population based campaign distributions. Pro-actively develop plan for rapid roll out involving all possible partners
IRS	To cover 8% of households with IRS by 2010 and 20% by 2013	IRS is applied in addition to ITNs	To date only 5 pilots have been carried out successfully. IRS in 3 LGA each in the 7 WB states is planned for this year.	Urgently define the strategic role of IRS as a complement to ITNs (where and why) and develop concrete implementation plan and procedures.
Malaria in Pregnancy	To scale up access to SP-IPT$_2$ to 80% of pregnant women attending ANC clinics by 2010 (100% by 2013) To scale up access to SP-IPT$_2$ to 48% of all pregnant women by 2010 (60% by 2013)	Strengthen the malaria component of Focused Antenatal Care (at least 4 visits) in collaboration with the Reproductive Health Division of the FMOH.	Coverage of pregnant women with IPT2 varies significantly within country but is generally still low (3-17%). Even where SP is available it is not consistently implemented.	Increase availability of SP and promote its use by health workers (performance improvement). Gradually increase access to and utilization of ANC services.
Diagnosis	To improve malaria case management so that at least 80% of cases in persons aged 5 years and	Upgrade use of microscopy and rapid diagnostic test kits for improved diagnosis and to promote rational	Currently it is estimated that about 15% of fever patients five years and older attending public facilities are diagnosed	Major issues are: Develop a more detailed plan for commodity and human

Core interventions	Key targets	Strategies and approaches to achieve targets	Progress and bottlenecks	Additional activities needed
	above are parasitologically confirmed before treatment at health facility level by 2013	drug use. Introduce community diagnostic programme (CDP) and focus on providing simple tests for anaemia and malaria.	by microscopy. RDTs are not yet applied at scale.	resource needs for microscopy. Start rolling out RDTs based on detailed guidelines and training materials. Establish quality control for RDTs and microscopy.
Treatment – Health facility level	Rapidly scale up access to ACTs within 24 hrs of onset of fever/malaria to 60% by 2010 and then to 80% by 2013	Provide free ACTs through public sector and faith-based/NGO health facilities Provide highly subsidised ACTs through the private health care sector Carry out capacity building activities for health practitioners in both the public and private health care sectors on the current treatment of malaria with ACTs Support the improvement of clinical diagnosis of malaria using the IMCI/RBM approach in peripheral health facilities. Support strengthening of	A new malaria treatment policy based on ACT was adopted in 2005. Standard treatment guidelines for case management were updated in February 2005 In October 2006, health workers in 19 non-GF supported states in the public sector have been trained on case management with ACT. However this training has not been extended to the private sector and neither has the impact of the training been evaluated to determine if there is adherence to the national guidelines Funds have been mobilized to deploy ACT through health	Carry out detailed quantification of ACT nationwide needs based on pre-pack specified age groups Mobilize resources to procure sufficient treatment doses for all ages Develop a procurement plan. The NMCP PSM unit should streamline procurements and supply of all malaria commodities including third party stock. Train all health workers who are responsible for prescribing antimalarials in the public sector that have not been trained on malaria case management using ACTs. Extend this training to health workers in the private health

Core interventions	Key targets	Strategies and approaches to achieve targets	Progress and bottlenecks	Additional activities needed
		referral systems Monitoring drug resistance by strengthening existing sentinel sites and expanding them to cover the various epidemiological settings of the country Encourage and support the agricultural and pharmaceutical industries to grow *Artemisia annua*, extract and purify artemisinin, manufacture and pre-package ACTs.	facilities. GF is supporting deployment of AL through the public sector and AA through the private sector. The Federal Government through the MDG project is deploying AA through the public sector. The deployment has still not covered the whole country and is limited to children aged under five years. 54 pharmacists and 672 drug store officers/pharmacy technicians 336 LGAs in the States supported by GF were trained on Drug Supply management in 2006 NAFDAC and NMCP are committed to implementing a pharmacovigilance system to capture adverse drug reactions to antimalarials NMCP has set up a PSM unit to improving streamlining of procurements and supply management of its commodities The Pharmaceutical Manufacturing Group of	care sector in all states Improve storage facilities for ACTs at all levels of the health system. A pull system of drug supply should be used at all levels of the health system. Routine monitoring of the consumption antimalarials should take place and orders of non-recommended malaria drugs should be restricted A communication campaign should be implemented to increase awareness and willingness to use ACT as the first choice for treatment of uncomplicated malaria Increase awareness of pharmacovigilance among health workers through IEC and training. Reporting forms should be made widely available in all health facilities.

Core interventions	Key targets	Strategies and approaches to achieve targets	Progress and bottlenecks	Additional activities needed
			Manufacturing Association of Nigeria (PMG or MAN) are engaged with NMCP in promoting local production of ACTs. Guidelines for pre-packaging of ACTs were finalized in June 2006 In 2007, NAFDAC ceased further registration of antimalarial monotherapies.	
Treatment – community level	Rapidly scale up access to ACTs within 24 hrs of onset of fever/malaria to 60% by 2010 and then to 80% by 2013	Improve home management of malaria through community programmes designed to ensure early recognition of signs and symptoms, and prompt access to treatment	Guidelines for Home Management of Malaria were drafted in December 2005 and finalized. AL and AA were reclassified from POM to OTCs in 2005. Six states and FCT began piloting the implementation of the HMM strategy with Role Model Mothers (RMM) in 2007	Gather lessons learned and use them to improve the strategy in preparation for national scale up. Streamline the role of RMM, VDC and PMV in the HMM strategy Quantify the number of HMM kits required for scale up Develop a communication strategy to increase awareness and willingness to use HMM. Develop and print recording and reporting tools for HMM Select and train RMM. Revitalize at least 2000 VDCs as part of the HMM strategy.

Core interventions	Key targets	Strategies and approaches to achieve targets	Progress and bottlenecks	Additional activities needed
				Identify, train and organize 2000 PMVs across the nation to provide ACT via the private sector at a highly subsidised price. Strengthen the capacity of 3000 CBOs / NGOs / FBOs to coordinate and supervise RMM / VDCs / PMVs within the HMM strategy Implement a supervision system that provides regular support to the community drug agents i.e. RMM, VDC, PMV. This system should be used to collect returns on drugs dispensed.
Treatment – severe malaria		Provide technical support to tertiary health facilities that handle case management of severe malaria. Ensure that there is a feasible and effective referral system, which includes a method of feedback Promote and institute the		Evaluate the current practices in the management of severe malaria. Use the findings to inform the development of a refresher course that targets behaviours that need to be changed. Prepare a training manual on the management of severe malaria

Core interventions	Key targets	Strategies and approaches to achieve targets	Progress and bottlenecks	Additional activities needed
		use of pre-referral treatment Promote the recognition of danger signs among caregivers and the immediate actions that should be taken		Train health workers in tertiary and secondary health facilities that handle severely ill children on the management of severe malaria according to the new malaria treatment policy. Improve caregivers treatment seeking behaviour by increasing awareness of illness danger signs and what actions to take. This should be incorporated into a nationwide communication campaign

Table 8a. Summary of overall funding gaps by intervention area (million USD)

Core interventions	2008	2009	2010	2011	2012	2013	TOTAL
ITNs (80% target)	5.3	148.2	220.1	60.0	177.9	183.2	794.7
ITNs (100% target)	5.3	213.8	285.8	60.0	206.1	211.4	982.4
IRS	0.3	5.1	12.6	15.6	26.2	38.9	98.7
IPT	0	0	0	0.9	1.1	1.2	3.2
Diagnosis	2.6	21.5	40.2	40.5	46.0	46.3	197.1
Treatment	13.8	37.6	45.7	52.0	65.9	77.4	292.4
IEC	24.0	35.0	40.0	38.0	38.0	38.0	213
Epidemics & Emergencies	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
M&E	0.4	6.0	6.0	8.0	5.0	5.0	30.4
Management	13.4	30.0	28.0	19.0	13.0	13.0	116.4
TOTAL (80% LLIN)	**59.8**	**283.4**	**392.6**	**234**	**373.1**	**403**	**1,745.9**
TOTAL (100% LLIN)	**59.8**	**349**	**458.3**	**234**	**401.3**	**431.2**	**1,933.6**

* This table is compiled as a summary of the financial gaps to reach **2010 targets** as detailed in Tables 10a-e & Table 11

Table 8b. Summary of overall funding gaps by cost type (million USD)

Cost type	2008	2009	2010	2011	2012	2013	TOTAL
Commodities	$16.5m	$219.8m	$307.5m	$152.8m	$294.6m	$317.6m	$1,308.9m
Delivery costs	$5.1m	$58.7m	$75.0m	$18.1m	$49.0m	$50.8m	$256.7m
Infrastructure	?	?	?	?	?	?	?
Operational costs	?	?	?	?	?	?	?
Training	See above	See above	See above	See above	See above	See above	See above
IEC	See above	See above	See above	See above	See above	See above	See above
Monitoring & Evaluation	See above	See above	See above	See above	See above	See above	See above
Management	See above	See above	See above	See above	See above	See above	See above
TOTAL							

Table 9. Summary of major commodity requirements

Commodity		2008	2009	2010	2011	2012	2013	TOTAL
LLINs	Target coverage (RBM or national if higher)		60%	100%	100%	100%	100%	
	No. required (RBM / national targets)	10,004,000	34,673,000	40,557,000	8,577,000	28,101,333	28,864,333	150,776,667
	GAP – No. of LLINs	0	26,358,600	35,868,800	8,577,000	28,101,333	28,864,333	127,770,067
Insecticide for IRS	Target coverage (national and additional to ITN)	2%	4%	8%	10%	15%	20%	
	No. required (national targets)	1,141,856	1,963,992	6,080,519	7,843,870	12,142,311	16,707,820	45,880,368
	GAP – No. of *sachets* lambda-cyhalothrin	0	1,678,000	5,794,500	7,557,000	11,856,000	16,707,820	43,593,320
RDTs	National Target (only 5+ yrs public sector)	5%	20%	50%	60%	75%	80%	
	No. required national targets	0	6,564,695	12,275,000	10,472,221	10,306,635	10,115,807	49,734,358
	GAP – No. of RDTs	0	6,564,695	12,275,000	10,472,221	10,306,635	10,115,807	49,734,358
1st line malaria drug	Target coverage national (public)	40.0%	50.0%	60.0%	80.0%	100.0%	100.0%	
	No. doses required (RBM / national targets)	43,412,304	52,261,505	67,460,803	77,180,731	93,299,951	106,299,009	439,914,303
	GAP – number of 1st line doses	14,912,304	51,141,505	65,360,803	74,380,731	90,499,951	106,299,009	402,594,303
SP for IPT	Target coverage (national)*	23%	36%	50%	65%	70%	75%	
	No. of doses required** (national targets)	4,274,000	7,007,800	9,964,000	13,475,667	14,976,667	16,559,667	66,257,800
	GAP – No. of SP doses	0	0	0	12,930,279	14,976,667	16,559,667	44,466,612

*combining ANC attendance and absorptive capacity
** including 15% mark-up for women receiving more than 2 doses and 10% logistic mark-up

Table 10a. Funding Requirements Linked to Targets – Commodity and delivery costs, ITNs (USD)

ITNs	2008	2009	2010	2011	2012	2013	TOTAL
Financial need for 100% coverage	$71,827,020	$250,837,200	$305,930,400	$60,039,000	$206,108,500	$211,449,500	$1,106,191,620
RBM Target (or national target if higher)*		60%	100%	100%	100%	100%	
Financial needs to reach RBM (80%l) target	$71,827,020	$185,161,200	$240,254,400	$60,039,000	$177,911,625	$183,252,625	$918,445,870
Resources available	$66,539,500	$36,987,600	$20,149,032	$0	$0	$0	$123,676,132
GAP TO REACH RBM TARGET (80%)	$5,287,520	$148,173,600	$220,105,368	$60,039,000	$177,911,625	$183,252,625	$794,769,738

* Note only commodity and delivery costs are included in the above figures. All cross cutting costs are included in Table 9

Table 10b. Funding Requirements Linked to Targets – Commodity and delivery costs, IRS (USD)

IRS	2008	2009	2010	2011	2012	2013	TOTAL
Financial need for national plans at RBM targeted coverage level of 80%	$5,163,431	$7,104,881	$14,664,474	$17,565,945	$28,237,932	$38,855,395	$111,592,059
Resources available	$5,133,419	$2,000,000	$2,000,000	$2,000,000	$2,000,000	0	$13,133,419
GAP to fulfil national plans	$30,012	$5,104,881	$12,664,474	$15,565,945	$26,237,932	$38,855,395	$98,458,640

* Note only commodity and delivery costs are included in the above figures. All cross cutting costs are included in Table 9.
** For IRS it is not applicable to differentiate between 100% and RBM targets. Costs are based on country scale up plans. RBM targets are related to coverage within targeted communities. Country budgets will be generated based on costs for completing IRS in specified areas of the country. The budgets will always be costed for spraying 100% of households / structures in those areas. The target of 80% coverage does not have any implication on budgeting or resources required and therefore is not included as part of this table.

Table 10c. Funding Requirements Linked to Targets – Commodity costs, IPT (USD)

IPT	2008	2009	2010	2011	2012	2013	TOTAL
Financial need for 100% coverage	$1,317,336	$1,401,528	$1,446,384	$1,492,680	$1,540,440	$1,589,736	$8,788,104
National target*	23%	36%	50%	65%	70%	75%	
Financial needs to reach national target	$307,728	$504,562	$717,408	$970,248	$1,078,320	$1,192,296	$4,770,562
Resources available	$1,568,966	$0	$0	$0	$0	$0	$1,568,966
GAP TO REACH RBM TARGET (or national if higher)	$0	$0	$0	$930,980	$1,078,320	$1,192,296	$3,201,596

* taking into account ANC attendance and absorptive capacity

Note for Tables 10c – e. Only commodity rather than commodity and delivery costs should be presented. Complete delivery costs for treatment and diagnosis are considered broader health system costs that do not fall under a malaria specific funding need. Issues that are specific to these malaria areas and can be considered a factor in delivery costs such as training and supervision are included elsewhere in the health systems, Programme management and institutional strengthening sections.

Table 10d. Funding Requirements Linked to Targets – Commodity costs, Diagnosis (USD)

DIAGNOSIS	2008	2009	2010	2011	2012	2013	TOTAL
Financial need for 100% coverage	$4,835,715	$29,818,206	$51,623,961	$45,844,141	$45,945,661	$46,442,019	$224,509,704
National Target (only 5 years and older public sector)	5%	20%	50%	60%	75%	80%	
Financial needs to reach national target	$2,757,321	$21,516,152	$40,158,965	$40,593,156	$45,945,661	$46,442,019	$197,413,273
Resources available	$197,903	$0	$0	$0	$0	$0	$197,903
FUNDING GAP TO REACH RBM TARGET (or national if higher)	$2,559,418	$21,516,152	$40,158,965	$40,593,156	$45,945,661	$46,442,019	$197,215,370

Table 10e. Funding Requirements Linked to Targets – Commodity costs, Treatment (USD)

TREATMENT	2008	2009	2010	2011	2012	2013	TOTAL
Financial need for 100% coverage	$136,227,693	$136,227,693	$136,227,693	$136,227,693	$136,227,693	$136,227,693	$817,366,158
National Target	40.0%	50.0%	60.0%	80.0%	100.0%	100.0%	
Financial needs to reach national target	$31,679,675	$38,405,445	$47,259,457	$53,977,844	$67,815,736	$77,352,775	$316,490,932
Resources available	$17,887,573	$784,000	$1,506,000	$1,960,000	$1,960,000	$0	$24,097,573
FUNDING GAP TO REACH NATIONAL TARGET	$13,792,102	$37,621,445	$45,753,457	$52,017,844	$65,855,736	$77,352,775	$292,393,359

Table 11. Funding Requirements - Crossing cutting areas (USD)

Intervention area	2008	2009	2010	2011	2012	2013	TOTAL
IEC							
Financial need	$25.0m	$35.0m	$40.0m	$38.0m	$38.0m	$38.0m	$214m
Resources available	$1.0m	?	?	?	?	$0	$1.0m
GAP	$24.0m	$35.0m	$40.0m	$38.0m	$38.0m	$38.0m	$213m
M&E:							
Financial need	$2.0m	$6.0m	$6.0m	$8.0m	$5.0m	$5.0	$32.0
Resources Available	$0.4m	?	?	?	?	$0	$0.4m
GAP	$1.6m	$6.0m	$6.0m	$8.0m	$5.0m	$5.0	$31.6
Management							
Financial need	$10.0m	$20.0m	$20.0m	$15.0m	$10.0m	$10.0m	$85.0m
Resources Available	$1.0m	?	?	?	?	$0	$1.0m
GAP	$9.0m	$20.0m	$20.0m	$15.0m	$10.0m	$10.0m	$84.0m
Other (e.g. TA)							
Financial need	$6.0m	$10.m	$8.0m	$4.0m	$3.0m	$3.0m	$34.0m
Resources Available	$1.5m	?	?	?	?	$0	$1.5m
GAP	$4.5m	$10.m	$8.0m	$4.0m	$3.0m	$3.0m	$32.5m
TOTAL NEED	$43.0m	$71.0m	$74.0m	$65.0m	$56.0m	$56.0m	$322.0m
TOTAL AVAILABLE	$3.9m	?	?	?	?	$0	$3.9m
TOTAL GAP	$39.1m	$71.0m	$74.0m	$65.0m	$56.0m	$56.0m	$318.1m

* Table 11 includes total costs and gaps in cross cutting areas to support full national scale up. It is expected that RBM 80% targets for commodity delivery and use will only be reached if these cross cutting areas are fully supported. There is therefore no breakdown into costs for full scale up versus 80% scale up for these cross cutting areas.

5. Core interventions

5.1. Prevention

5.1.1. ITNs

a. Situation analysis

i. Policies, strategies and approaches

Within the Integrated Vector Management approach for malaria prevention ITNs clearly form the major approach. The current 5 year Strategic Plan for Malaria Control 2006-2010 includes as a major objective to cover 80% of the population at risk (young children under pregnant women) with ITNs. In the ongoing revision of the Strategic Plan 2009-2013 the strategy is now shifting to universal access of the total population of Nigeria with the objective of 100% coverage by 2010.

The principle approach to the distribution is a mixed approach that involves all form of deliveries: free public sector campaigns either integrated with other health activities such as immunizations or as "stand alone" campaigns, free public sector routine distributions through ANC and EPI services and subsidized and at cost sales through the commercial sector. While in the 2006-2010 Strategic Plan the focus was on public campaigns for children under 5, it is now shifting to general population campaigns in the revised 2009-2013 Strategic Plan. In the commercial sector partners have been supported directly through the Netmark project and social marketing has been implemented either through subsidized sales of ITN through social marketing organizations (Futures Group and Society for Family Health) or as voucher schemes which have been supported by Netmark and Exxon Mobile.

An ITN policy and strategy paper exists although it needs updating as it only includes specification for polyester nets but not polyethylene. Since 2006 the distribution of ITN in the public sector has shifted completely to LLIN and in the private sector increased efforts are under way to facilitate transfer of LLIN production technology to the local manufacturers. Currently four LLIN brands are registered in the country with the Nigerian registration authorities (NAFDAC): Olyset Net (Sumitomo/A-Z), PermaNet (Vestergaard Frandsen), IconLife/Netprotect (Syngenta/Bestnet) and Duranet (Clarke Mosquito Netting) with a fifth undergoing registration procedures (Interceptor, BASF). In addition two wash resistant net treatment kits are registered (KO-Tab 123, BAYER and IconMaxx, Syngenta).

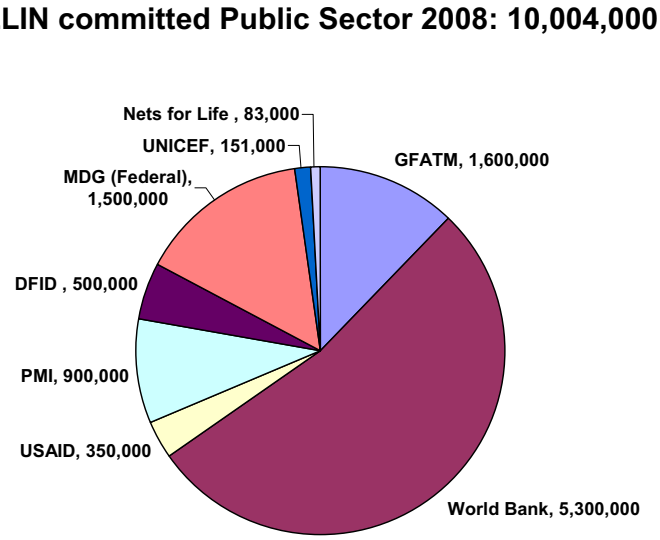
The policy for tax waivers for nets and insecticide in Nigeria has seen an up and down in the recent years but had – until recently – been tax exempt. Now, however, all tax waiver programmes have been suspended temporarily so that the current situation is uncertain.

ii. Financing

The federal government (FG) as well as some states have been contributing to the procurement of ITN/LLIN. For 2008 the FG contribution through the Millennium Development Goal Project is expected to be for 1.5 million nets with similar contributions in the future. At state level the commitment for LLIN is less predictable and various from state to state. On the donor side all partners have been contributing to the financing of procurement (WB, GFATM, USAID/PMI, DFID, UNICEF with additional support from the Japanese Government, and private companies such as Exxon Mobile, Coca Cola and Standard Bank) and this support is usually targeted to specific states (see figure 5). WHO significantly

contributes towards the implementation process although they do not directly procure commodities.

Figure 6: Contributions to LLIN procurements by partners for 2008 (# of nets)



iii. Implementation status

Significant progress has been made in the implementation of the ITN strategy in Nigeria in the last three to four years which has been excellently summarized in much detail by a WB/UNICEF report in May 2007 (Tim Freeman). Since 2005 the number of distributed ITN is estimated to be 5 million (12 million since 2000 of which approximately 6 million through the commercial sector)

- *Management and partners' roles*

The NMCP jointly with EPI, State and LGA health/malaria staff and supported by partners such as WHO, UNICEF and USAID funded projects (ACCESS, ENHANSE) and to some extent NGOs have gained much experience in distributing free LLIN through the public sector.

On the one hand this has been done through campaigns to children under 5 and pregnant women mainly linked to immunization campaigns (National Immunization Days [NID] or Immunization Plus Days [IPD]) but in some cases also linked with other disease control programme such as the ochocerciasis control programme through the Community Directed Treatment with Ivermectin (CDTI), schistosomiasis mass drug administration or as stand alone campaigns. In 2007 IPD has been the main mechanism to distribute LLIN in 272 LGAs (35% of all LGAs). Guidelines for training, micro planning and registration/reporting exist although they have not yet been brought together in one standard package. These describe in detail the organization, responsibilities and procedures of the integrated campaign distributions. Allocation of LLIN for the integrated campaigns has been done as follows: under fives (20% of population) divided by two (assuming on average 2 children share a net) plus 10%; pregnant women (5% of population) one net per woman.

On the other hand distributions have been made through health facilities either through the UNICEF IMPAC (ITN Massive Promotion and Awareness Campaign) which started in 2002 and distributed ITN through ANC and EPI services (linked to DPT3 immunizations) in

combination with intensified communications for net use, or through the Global Fund related activities through ANC clinics (with distribution managed by Chan-Medipharm).

Coordination of efforts was originally planned to happen through the IVM sub-committee of the National Malaria Coordination Committee which worked well until 2006 but has not met since then. Some coordination occurs based on individual efforts of NMCP staff and partners but there is no overall plan in place for a coordinated scaling up of LLIN implementation.

In the commercial sector there are a number of partners that support either social marketing or directly the Nigerian net manufacturers and distributors. These are SFH doing social marketing funded by GFATM and Netmark and the currently starting DFID funded malaria project providing direct support.

There have been some efforts with respect to the re-treatment of non-LLIN in the last two years. In 2007 UNICEF procured 54,000 wash resistant treatment kits (KO-Tab 123) and carried out campaigns in 3 LGAs in 3 States and for 2008 NMCP has procured another 100,000 kits from the Debt Relief Funds. Treatment kits are also being sold by the commercial sector (conventional and wash resistant) but the exact number is not known. Netmark supported partners alone accounted for 290,000 with 12 months 2006/07. Overall, however, the number of net re-treatments is minimal compared to the estimated number of untreated nets in circulation which is estimated at 8.5 million for 2008 based on model simulations.

- *Procurement and logistics*

The procurement of LLIN in the public sector is handled separately by each donor and products are received at the Port (Lagos or Port Harcourt) and warehousing and transport to destination handled by the respective donor/partner. NMCP has developed detailed specifications which refer to two specific brands (Permanet and Olyset Net) but it appears that these are not used by all procurement agents and they have not yet been updated to include more recently WHOPES recommended and NAFDAC registered products.
Transport of nets to the State or LGA has been a problem as central funds are often not sufficient for this and States are then just asked to pick up the ITN on their own which then depends on the release of funds at that level.

Of the 10 million LLIN expected for 2008 (see figure 6) a total of 901,000 have already been procured while for the others the procurement process is ongoing or in preparation. For some such as DFID and the Nets for Life (Standard Bank, Exxon, Coca Cola) it has not yet started but it is still possible to be completed within this year although not certain.

- *Communications*

Training materials include lists of clear messages regarding the use and handling of LLIN and leaflets, posters and other materials exist. Also, the distribution teams are instructed to demonstrate the hanging of a net during the distribution. It could, however, not be verified during the needs assessment to which extent materials are available on the ground and instructions are followed.

- *M&E*

Monitoring and evaluation for ITNs can be divided in the three areas of:

- Routine monitoring of distributions
- Tracking of distributed nets (retention and use)
- Surveys for net coverage and use

The monitoring forms for the campaign distributions include information on each child under 5 and pregnant woman with head of household's name, name of person, age and the number of nets allocated. These are summarized at ward and LGA level and sent to the State Malaria Programme and NMCP. At national level a data base exists where the number of nets distributed to under 5's in each LGA (but not the nets given to pregnant women) are kept at least for the years 2006 and 2007. Otherwise the information is contained in many individual reports from the integrated distributions from some but not all LGAs. Records from other distributions such as those through ANC and EPI services were not readily available at NMCP level, although they may exist somewhere. Therefore, it is impossible to assess what level of coverage with routine distribution mechanisms has been achieved to date.

Generally, the information flow and data management is weak and not always consistent, e.g. the achieved coverage is calculated in some result sheets based on the allocation criteria (one net per two under 5've) in others as one net per child. It also is not clear in the instructions or the data analysis how the distribution rule of one LLIN per two children is implemented as not every household has two or more children. From the lists of allocated nets per LGA it appears that the number of LLIN given varies considerably, sometimes reaching almost one net per child but often less than even the figure based on the allocation formula.

During the integrated campaigns a post-distribution tracking exercise is carried out two to four days after the campaign. For each LGA two wards are selected and in each ward three distribution points. The team then visits 10 households each in 2 settlements within the distribution point catchment area so that 60 households are visited per ward and 120 per LGA. During the visit the number of children and pregnant women in the house are counted, number of available ITN established and their use (hung up and used last night) are recorded. This information is then reported in the LGA distribution summary. From the few reports seen there appears to be a slow uptake of net hanging and use at least immediately after the distribution but as the information is not summarized across all LGAs it is difficult to say whether this is a general trend or not.

The last nationally representative household survey including malaria information with report available is the Demographic and Health Survey from 2003. The NMCP supported by WHO undertook a RBM evaluation survey using the MIS questionnaire in 2005. This survey was a national one but the sampling design was not equivalent to an MIS or DHS (three stage cluster sampling: 2 states per geo-political zone (6), 3 LGAs per state, 2 communities per LGA, 100 households each, total of 72 clusters). Another survey carried out by NMCP/WHO in 2007 was targeted only to those areas where integrated campaign distributions had been carried out. For both these surveys only incomplete draft reports are available. A national Multi-Indicator Cluster Survey (MICS) was carried out by UNICEF in 2007 but the report is not yet released due to some inconsistencies in the results and a new DHS survey (but without bio-markers) is currently implemented. In addition to these surveys there is data from the WB-Booster project which undertook a LQAS based assessment at the start of the activities in 2007 and two Netmark surveys on net and ITN possession and use in 200 and 2004. The results of these with respect to net and ITN coverage trends are shown in figures 7 and 8 and compared with results from model simulations based on the DHS survey result and the subsequent net/ITN distributions and re-treatments. From these data it is realistic to assume that the current household net coverage (at least one net) is around 30-35% and the ITN coverage 10-15%. Interestingly, the ITN coverage in the areas where intensive campaign distributions had taken place was only 42% with a range of 5-85% in the 16 LGA sampled and only 4 LGAs (25%) reaching an ITN coverage of 60% or more.

Figure 7: Net coverage

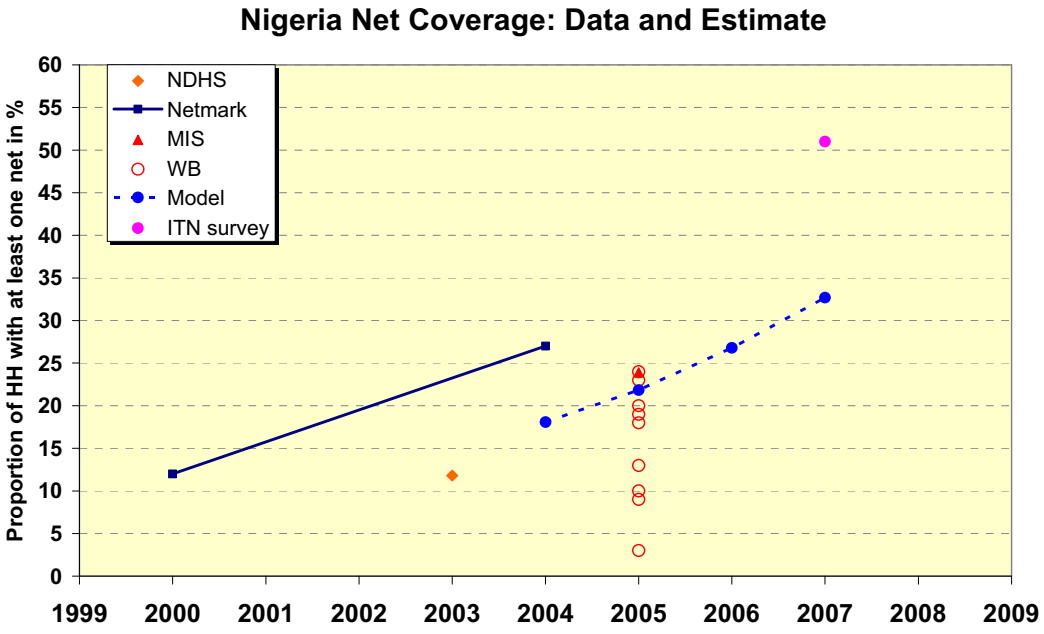
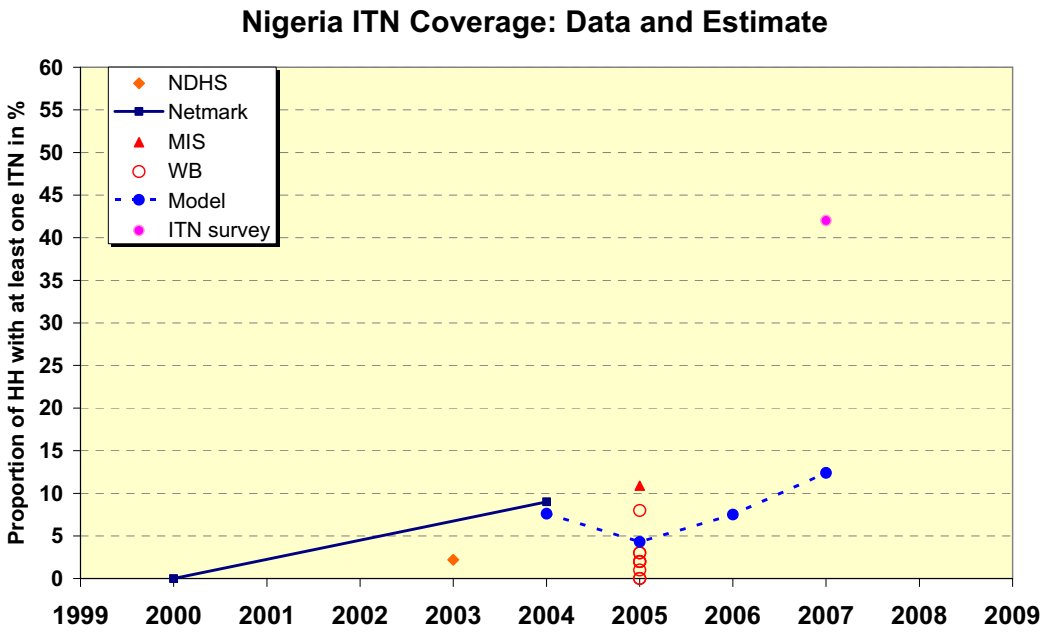


Figure 8: ITN coverage



b. Gaps and requirements

i. Key bottlenecks and challenges

In spite of the tremendous efforts and considerable success of NMCP and the RBM country partnership in the scale up of ITN/LLIN to date has been limited by insufficient resources for LLIN, logistics and distribution. As a consequence the roll-out did not follow a consistent

plan to eventually reach and sustain the necessary targets but rather was driven by the opportunities arising from other partner's activities leading to a very patchy picture of ITN current coverage. Even where LGAs have been reached many have been underserved so that in the future it will be very difficult to address these gaps as only a partial distribution would be needed but determining who exactly needs additional nets will be difficult and costly.

Also the shift from campaigns targeted at the biologically vulnerable to general population campaigns for universal access will be a challenge as they will require a rethinking of the campaign design as well as review and streamlining of many of the forms and planning/training materials used.

For the routine distributions through health facilities the major challenges have been lack of nets for distributions and a weak monitoring system that makes it difficult to assess the extent of coverage to date.

The commercial sector is expected to play a significant role for the continuous net distributions/sales. There is no doubt that the Nigerian net manufacturers and distributors have a huge potential and have contributed significantly to net distributions in the past. The major challenge here is the shift from untreated nets or bundled ITN towards LLIN which will require special promotion and at least a partial subsidy for the consumer price. The transfer of LLIN technology to local manufacturers has seen a setback by the failure of the DAWA Plus net obtaining WHOPES recommendation as an LLIN. This implies that the process of using the KO-Tab123 approach in an industrial design to manufacture LLINs can not be used as had been planned (at least not for the time being). This leaves only the polyethylene based incorporation technology which is more complex to transfer. Nonetheless, two international manufacturers (Sumitomo and Bestnet) have plans for such technology transfers in Nigeria.

ii. Proposed solutions to attain 2010 targets

Malaria prevention is the most significant contributor towards achieving the RBM targets for 2010 and in the Nigerian setting ITN distribution is the key to success. The approach chosen by NMCP and its partners is that of a mixed approach using health system independent campaigns for rapid scale up and continuous distributions through routine services at health facilities and subsidized and at cost sales through the commercial sector to maintain high levels. This approach is suitable for the country situation and considering aspects of implementation capacity it appears that reaching the RBM targets in this area is still possible if:

In the short term

- A comprehensive implementation/logistics plan is developed to reach all LGAs currently not sufficiently covered and includes the timing of activities from arrival of product to distribution to the recipients.
- Human resources are concentrated on the effort and a strong national ITN task force that involves all stakeholders is created to manage and coordinate the campaigns supported by strengthened teams at State level (e.g. one additional WHO National Programme Officer per State as suggested by WHO).
- A rapid shift towards general population campaigns is made including a streamlining, revision and bundling of standardized tools and materials. This may not be feasible for 2008 as a measles campaign with at least partial LLIN distributions is already being planned but should commence in 2009 as a rolling campaign each covering State or at least LGA with sufficient LLIN.
- States and LGAs increase their commitment and resources for the campaigns and involve all civil society organizations active in their areas.

- Campaigns are accompanied by a national and professionally done IEC/BCC campaign.

In the medium term:

- Establish a sound system of continuous distributions of LLINs to pregnant women through ANC services and to young children through EPI services (measles or DPT3 vaccinations).
- Continue to support the commercial sector in the manufacture and distribution of LLIN.

The immediate technical assistance needed to implement such an approach is difficult to estimate as in part it will coincide with the GFATM application support. In addition, long term support will also be available through the new DFID funded malaria project. However, for logistics and design issues at least two consultants for 20 working days each should be envisaged (estimated cost USD 50,000).

Although a considerable number of untreated nets can be assumed to exist in the country, it is not recommended to engage in large scale net treatment campaigns but rather concentrate all resources on LLIN distributions. As shown in Figure 9 the proportion of untreated nets among the net crop will rapidly drop if LLINs are distributed as outlined making the treatment of conventional nets rather cost-ineffective as by 2010 they will comprise less than 10% of the net crop. This does not exclude local and time limited initiatives for net retreatment in 2008 and 2009.

Figure 9: Net retreatment

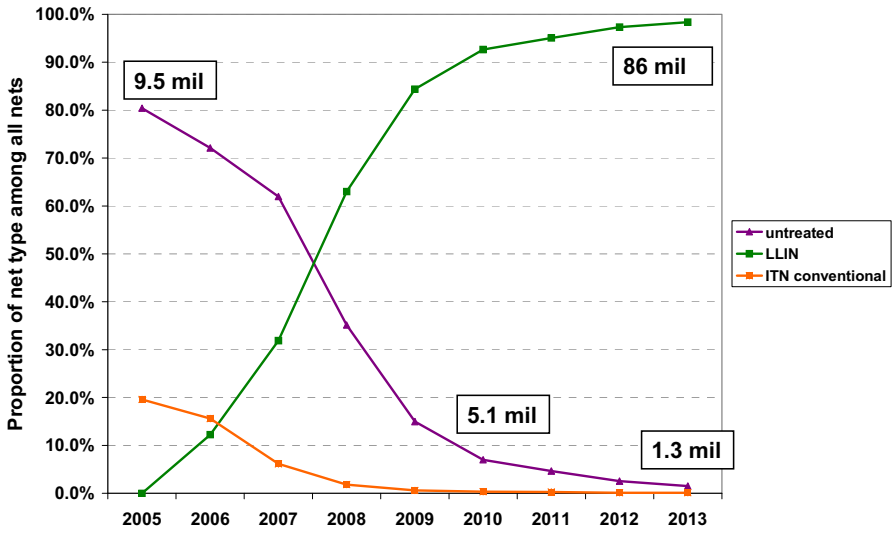


Table 12 summarizes the needs and cost for LLIN and distribution that would be needed for such an approach. These are based on the calculated range of nets needed to achieve the 80% and 100% universal coverage targets (needs assessment calculation tool) taking into account population growth, wear and tear and sufficient nets to cover each households (in this case 2.6 nets per household for 100% coverage). The results are summarized in Table 12b.

The actual nets that can be delivered are based on the distribution mechanisms in the public sector. It is assumed that in 2008 only those nets already in planning stages will be available and that whatever is not used in ANC distributions is used for campaigns (most likely measles campaign). General campaigns (average 2 nets per household) are then planned to cover 75% of LGAs assuming that the other have already some coverage and can be served with routine

distributions alone for the 80% target. For the 100% target all LGAs are covered with general campaigns irrespective of previous distributions. The routine distributions are assumed to be ANC only in 2008 and ANC and EPI from 2009 onwards but an increasing absorptive capacity has been included (see Table 12) as it appears unrealistic given the current level of implementation that all persons attending these services country wide will be served. It is also assumed that ANC attendance is increasing over time (see Table 15 for details).

Table 12a presents the expected subsidized (DFID and GFATM) and unsubsidized sales of LLIN in the commercial sector which will contribute to the maintenance of ITN coverage. However, due to the low health service access and utilization rates continuous distributions through health facilities and the commercial sector will not be sufficient to reach the number of LLINs needed to sustain the coverage rates until 2013. In the distributions it is, therefore, assumed that 2012/13 a replacement campaign is carried out that targets all under fives (80% scenario) or under fives and pregnant women (100% scenario). In contrast to the current practice it is assumed that on average 1.2 children under five will share a net (i.e. a family with only one under 5 is given a net, those with two one, those with three two etc.).

As can be seen in Table 12b the numbers that are realistically to be distributed with the mentioned mechanisms are roughly in keeping with the needs calculated from population/household estimates suggesting that the RBM or 100% targets can be met that way. This is confirmed by an independent ITN model simulation (Malaria Consortium ITN model) into which the anticipated distribution figures have been entered (Figure 10).

Figure 10: Estimated net and ITN coverage rates from model simulation

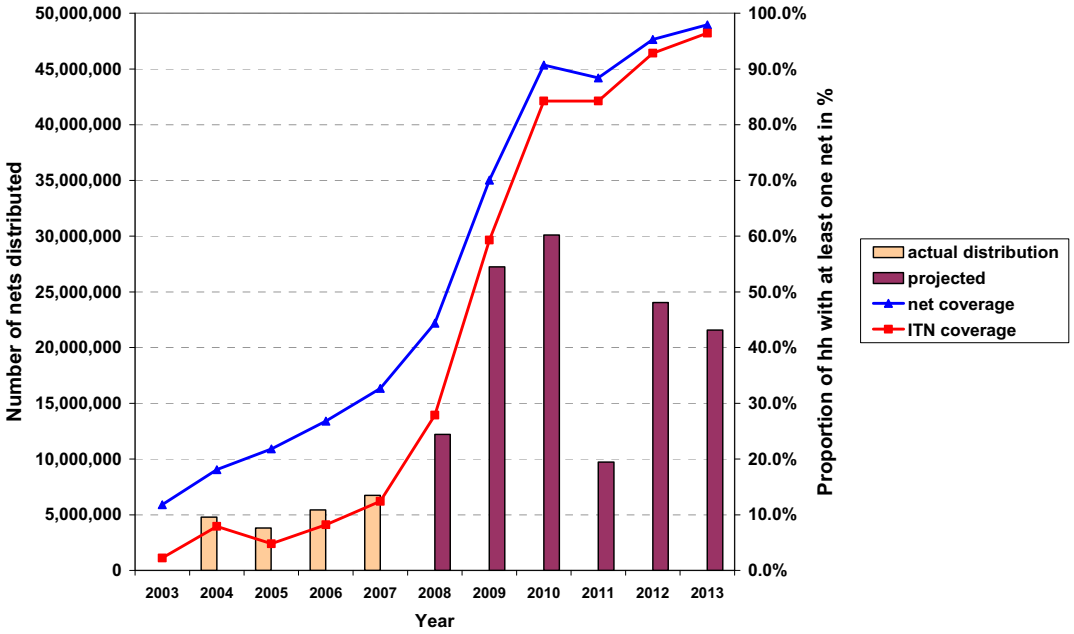


Table 12a. ITN funding needs to attain RBM 2010 Targets (costs in USD)

Number and cost of LLINs to be delivered to achieve target	2008	2009	2010	2011	2012	2013	Total
Delivery Approach 1 (Campaigns)							
A. Average cost per LLIN delivered* (delivery $ 1.50 for integrated and $ 2.00 for stand alone)	$7.50-8.00	$7.50-8.00	$7.50-8.00	$7.50-8.00	$7.50-8.00	$7.50-8.00	$7.50-8.00
B. Number of LLINs to be delivered **to reach 100% coverage (national target)**	7,092,200	27,687,000	32,838,000	0	18,798,333	18,798,333	105,213,867
C. Number of LLINs to be delivered **to reach RBM targets**	7,092,200	19,477,500	24,628,500	0	15,038,750	15,038,750	81,275,700
Delivery Approach 2 (Health Facilities, ANC+EPI)							
A. Average cost per LLIN delivered* ($ 1.00 delivery)	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00
B. Number of LLINs to be delivered **to reach 100% coverage (national target)**	2,911,800	6,986,000	7,719,000	8,577,000	9,303,000	10,066,000	45,562,800
C. Number of LLINs to be delivered **to reach RBM targets**	2,911,800	6,986,000	7,719,000	8,577,000	9,303,000	10,066,000	45,562,800
Absorptive capacity	40%	60%	80%	100%	100%	100%	
Realistic delivery	1,164,720	4,191,600	6,175,200	8,577,000	9,303,000	10,066,000	39,477,525
TOTAL number of LLINs to be delivered to achieve **100% coverage** (B1+B2) **(national target)**	10,004,000**	34,673,000	40,557,000	8,577,000	28,101,333	28,864,333	150,776,667
TOTAL number of LLINs to be delivered to achieve **RBM targets** (C1+C2)	10,004,000**	26,463,500	32,347,500	8,577,000	24,341,750	25,104,750	126,838,500

TOTAL available resources for LLIN distribution (D1+D2)	$66,539,500	$36,987,600	$20,149,032	$0	$0	$0	$123,676,132
TOTAL FUNDING GAP to reach RBM targets	$5,287,520	$148,173,600	$220,105,368	$60,039,000	$177,911,625	$183,252,625	$794,769,738
COMMODITY GAP to reach RBM target– number of LLINs	0	18,149,100	27,659,300	8,577,000	24,341,750	25,104,750	103,831,900
TOTAL FUNDING GAP to reach 100% target	$5,287,520	$213,849,600	$285,781,368	$60,039,000	$206,108,500	$211,449,500	$982,515,488
COMMODITY GAP to reach 100% target– number of LLINs	0	26,358,600	35,868,800	8,577,000	28,101,333	28,864,333	127,770,067
TOTAL number of LLINs to be delivered to achieve **100% coverage** (B1+B2) **(national target)**							

*Total costs in this table include the cost of the **LLIN and delivery** only. Other cross cutting costs such as IEC are included in later cross cutting costings.
** It is assumed that LLIN for 2008 not distributed through ANC services are channelled to the measles campaign.

Table 12b: Estimated subsidized and unsubsidized sales in the commercial sector

Commercial LLIN sales	2008	2009	2010	2011	2012	2013	Total
Subsidized	500,000	1,000,000	1,500,000	2,000,000	1,000,000		6,000,000
Unsubsidized	200,000	350,000	500,000	750,000	1,200,000	1,500,000	4,500,000
Total	**700,000**	**1,350,000**	**2,000,000**	**2,750,000**	**2,200,000**	**1,500,000**	**10,500,000**

Table 12c: Comparison between calculated needs to reach LLIN targets and planned distributions of LLIN including the commercial sector

	RBM target 80%		Target 100%	
	2008-2010	2011-2013	2008-2010	2011-2013
Need low	69,086,000	51,032,000	86,979,000	63,541,000
Need high	71,573,000	64,849,000	89,466,000	80,937,000
Distribution	72,865,000	64,473,500	89,284,000	71,992,667
Distribution adjusted for capacity	66,779,725	64,473,500	83,198,725	71,992,667

5.1.2. IRS

a. Situation analysis

i. Policies, strategies and approaches

Indoor residual spraying in Nigeria is planned to be complementary to ITN distributions and defined in the National Malaria Strategic Plan as part of the integrated vector management approach. It is also included in the Policy and Framework for IVM although no detailed description of the criteria where IRS should be applied is given. Based on the experience of a number of small IRS pilots carried out in 2006 the revised Strategic Plan 2009-2013 includes a target of 2% of households to be sprayed in 2008 (600,000 households) and this rate is to increase to 4%, 8%, 10%, 15% and 20% in the following years. For 2008 it is planned to carry out IRS in 3 LGAs each in the 7 states supported by the WB (4 in the North, 3 in the South). Beyond this the criteria for the expansion has not yet been worked out.

For the implementation of IRS, detailed training manuals for spray personnel and supervisors have been developed mainly based on WHO materials as detailed figures for mean number of structures per household or average surface of houses or proportion of houses with certain surface qualities (formal or informal) is not available. There is hardly any infrastructure or human capacity for IRS remaining from the IRS activities that were carried out in Nigeria until the 1970's mainly in the State capitals. NMCP has therefore envisaged using "principle implementers" who are expected to be hired from universities (entomologists) to lead the IRS activities at state level. However, criteria by which these persons will be selected and plans on how they will be logistically supported in the implementation are not yet prepared.

There is some data available on vector resistance to various insecticides (summarized in the "Entomological profile of Nigeria" commissioned by WHO) although not all geographical areas have up-to-date information. Based on these data some resistance has been reported for both major vector species against all types of insecticides including pyrethroids, the insecticide to be used by NMCP although most sites have reported susceptibility. DDT has also been tested for resistance in the past but is currently banned from any use including public health.

ii. Financing

Federal Government and WB are the two players that are currently contributing to the cost of IRS with a total of USD 5.1 million available for 2008. While WB is contributing to the cost of insecticide and equipment, operational cost are entirely covered by the Federal Government. However, the pilot spray projects in 2006/07 have been strongly supported by commercial partners (insecticide distributors).

iii. Implementation status

The tender for the procurement of insecticide and equipment through WB funds has been completed but the contract had not yet been awarded by the time of the needs assessment. Also, no detailed plans have been made for the implementation, i.e. areas targeted for IRS have not yet been selected and accordingly not mapped, no baseline data collected, no community mobilization carried out and no detailed budgets available. Given this situation it is highly unlikely that any spray activity can be carried out before the rainy season of 2008

b. Gaps and requirements

i. Key bottlenecks and challenges

The major problem with the IRS component within IVM is that its role as an additional tool to ITNs to reduce transmission is not clearly defined and the current implementation plans more driven by the availability of funds rather than a concept of synergy or complementarities with other approaches.

Possible application areas of IRS could be

- In the Sahel-savannah in the Northeast where transmission season is short (about three months) and IRS in conjunction could be expected to interrupt transmission
- Around urban centres as a form of barrier spraying significantly contributing to keep large cities malaria free or at least at very low transmission levels
- In areas of perennial and particularly high transmission in areas along the two major rivers where LLINs alone may not be sufficient to significantly reduce transmission. The disadvantage of this approach would be, however, that spray activities would have to be carried out twice a year.

Another challenge in the current concept is the issue of resistance management. Since only pyrethroids can be used for the treatment of ITNs it is generally thought a poor strategy to also use this class of insecticide for IRS, particularly when it is applied in the same area, as it would be expected to accelerate the development of vector resistance. Since organochlorates (e.g. DDT) are banned in Nigeria the other alternative would be carbamates which however are more costly and have a shorter residual effect. This issue has already been flagged by the WHO consultant who did the evaluation of the IRS pilot projects in June 2007 but clearly needs further considerations.

ii. Proposed solutions to attain 2010 targets

Since IRS will be implemented in addition to ITNs the achievement of the 2010 RBM targets will not directly depend on it. It would, therefore, be useful not to push its implementation before a more detailed strategic approach has been developed and costed. This could in part be done in the context of finalizing the revised Strategic Plan 2009-2013 but also would need specific technical assistance from an entomologist and IRS specialist (e.g. 3 weeks consultancy at USD 20,000). WHO has already indicated that they would be willing to provide such TA.

For the purpose of the needs assessment estimates are provided in table 13 based on the current targets of the NMCP of an increase of coverage from 2% to 20% of all households and a target with the IRS areas of spraying 85% of all structures. Furthermore it is assumed that on average 3 structures need to be sprayed per household with an average surface of 270m for formal structures, 125m for informal and a proportion of 25% formal structures. Cost have been obtained from a recent (yet unpublished) assessment from Uganda which, using pyrethroids, showed costs of close to USD 9 per house sprayed for the first round and as low as USD 6 per household in later rounds. The average cost is then modified based on the proportion of new spray areas added each year.

Commodity gaps are difficult to estimate as currently three different insecticides (deltamethrin WP, lambda-cyhalothrin SC and bifenthrin WP) are ordered but no clear guidelines as to what will be used in the future. Therefore, the insecticide need has been expressed as sachets of lambda-cyhalothrin as a general reference. For the funds available it is assumed that WB will continue to contribute USD 2 million for the remainder of the WB-Booster project although this is a rough assumption.

Table 13. IRS funding needs to support national scale up plans at RBM 2010 coverage targets (USD)

Number and cost of households (HH) to be sprayed	2008	2009	2010	2011	2012	2013	Total
A. Average cost per HH sprayed*	$8.75	$7.00	$7.00	$6.50	$6.75	$6.75	$6.83
B. Total number of HH targeted to be sprayed	590,106	1,014,983	2,094,925	2,702,453	4,183,397	5,756,355	16,342,220

C. Available resources for IRS	$5,133,419	*$2,000,000*	*$2,000,000*	*$2,000,000*	*$2,000,000*	0	$13,133,419
FUNDING GAP	**$30,012**	**$5,104,881**	**$12,664,474**	**$15,565,945**	**$26,237,932**	**$38,855,395**	**$98,458,640**
Total amount of insecticide required ** *(sachets Lambda-cyhalothrin)*	1,141,856	1,963,992	6,080,519	7,843,870	12,142,311	16,707,820	45,880,368
COMMODITY GAP – *sachets* of insecticide	0	1,678,000	5,794,500	7,557,000	11,856,000	16,707,820	43,593,320

* Since no exact costing is available to date cost per household sprayed is taken from a recent Uganda costing study (unpublished) and modified according to ratio of first/repeated spraying

** NMCP is currently procuring three pyrethroid insecticides (lambda-cyhalothrin, deltamethrin and bifenthrin) but no decision has been made for future use or the criteria for insecticide selection.

5.1.3. Larval control

In the setting of Nigeria, larval control and environmental management can not be expected to significantly contribute to malaria transmission reductions as in the majority of areas a substantial proportion of breeding sites can neither be easily reached nor be identified. However, in certain settings such as urban environments or specific agricultural projects (e.g. irrigation) larval control could be an important local addition to the control interventions. A pilot of larval control is being planned and will be funded by WB in 2008 after which a more detailed assessment of the possible role of larval control will be made.

Table 14. Larval Control and Environmental Management funding needs (costs in USD)

Cost of larviciding/ Environmental Management	2008	2009	2010	2011	2012	2013	Total
A. Cost of Intervention	$80,690						
B. Available resources	$80,690						
FUNDING GAP (A - B)	$0						

5.1.4. Malaria in Pregnancy (IPT)

a. Situation analysis

i. Policies, strategies and approaches

Intermittent preventive treatment in pregnancy was introduced as a policy to replace chemoprophylaxis with chloroquine in 2002 but implementation roll out was slow starting with only some pilot states and then expanding in 2003. In 2004 implementation manuals were developed and IPT was then included in the 2006-2010 Strategic Plan as part of the Focused Ante Natal Care (FANC). The revised 2009-2013 Strategic Plan states as targets that 60% of women attending ANC services should receive at least two doses of IPT by 2009, 80% by 2010 and 100% thereafter. At the same time it is expected that the proportion of women attending ANC services at least twice will increase from the current 58% to 62% in 2010 and 75% in 2013.

ii. Financing

Major contributor to the funding of IPT is the Federal Government as well as the States and LGA level authorities. For 2008 Federal Government contributes USD 860,000 while USD 396,000 comes from the GFATM and USD 310,000 from WB. The exact contributions at State and LGA level are unknown.

iii. Implementation status

Overall the implementation status for IPT is not as good as it should be given that IPT is part of the malaria in pregnancy package for 3-4 years. The proportion of women receiving any dose of IPT during their last pregnancy reported in the DHS 2003 was 1.0% while 20.4% of these women had taken any anti-malarial during that pregnancy. The 2005 Malaria Survey gave a figure of 17% of women receiving IPT2 while the baseline assessment in the seven states supported by WB in November 2006 gave a range of 2%-30% using an LQAS approach. In the 2007 Malaria Survey in selected States/LGAs the IPT2 rate among women with a live birth in the last two years was 7.0% (range 1-18%). This shows that in spite of increased efforts to establish IPT as a part of ANC services following the 2003 RBM needs assessment (REAPING mission) the level of implementation is low particularly in view of the fact that approximately 60% of women attend ANC services at least twice.

- *Management and partners' roles*

Primary responsibility for the implementation of IPT lies with primary health care level for which the LGAs are responsible and to some extent by the secondary care level run by the States. Technical support, supervision and guidance come from the Reproductive Health Department within the Ministry of Health with support from NMCP. Interestingly the organogram of the NMCP does not show a specific position responsible for malaria in pregnancy nor is it listed among the major topics of the Malaria Coordination Committee Sub-Committees. On the other hand several partners such as GFATM, WB, WHO, UNICEF, DFID, USAID funded projects (COMPASS, ENHANSE), SFH and JHU/CCP support the promotion and implementation of IPT.

- *Procurement and logistics*

As SP is part of the essential drug list in Nigeria it is procured and supplied as part of the general drug supply management. To some extent it is also procured by the Federal Government although no exact data on the proportion of these procurements among all supplies of SP is available

- *Communications*

While the currently updated BCC Strategic Framework 2008-10 presents a very detailed analysis of audiences and appropriate messages for malaria in pregnancy including IPT the implementation is still inadequate.

- *M&E*

The major problem in the monitoring of IPT is that no data from routine health services on the number of delivered IPT2 doses and the number of women attending ANC services (first visits) is available that would allow the calculation of the proportion of women attending ANC that receive IPT2. This is in part due to the general weakness in the implementation of the HMIS system (see M&E section). On the other hand the summary forms to be sent from health facility level to the LGA and then to state and federal levels include the variable of ANC first visits but not the IPT doses although the register to be used in the health facility records them. This means that at present the only source of information on the level of IPT delivery are surveys.

b. Gaps and requirements

i. Key bottlenecks and challenges

The major challenges for the implementation of IPT have been stated repeatedly by various assessment missions but remain essentially the same. They are:

- Irregular/insufficient supply with SP resulting in frequent stock outs
- Poor performance of health workers in offering/giving IPT (lack of cups, clean water, lack of awareness etc)
- Low level of awareness about the need for IPT among women in reproductive age

Additionally, implementation of IPT falls within the remit of both NMCP and the Maternal and Child Health / Reproductive Health unit (MCH/RH) of the MoH. Suboptimal coordination of the inputs of both of these entities has hampered progress towards the national target.

ii. Proposed solutions to attain 2010 targets

The solutions are closely linked to the issues of procurement and supply management and health system strengthening discussed in detail in sections 7.2 and 7.3. Essentially it implies mainly health service performance improvements and hence will not be something that can be achieved in the short term.

Table 15 summarizes the needs for drugs and their cost for ITP under different scenarios. It provides the number of women that would need IPT if 100% or 80% of all pregnancies nation wide would be targeted. Since this is not possible given the health system scenario in the country the table then shows the expected increases in ANC attendance rates, the realistic absorptive capacity (national targets) and the resulting number of women that can be reached. These will be 50% of all pregnant women by 2010 and 75% in 2013. For the calculation of the number of SP doses needed and their cost it has been further assumed that 15% of women attending ANC services actually receive three doses of IPT and an additional 10% of SP is needed to keep the supply chain filled at all times.

Table 15. IPT funding and major commodity needs to attain RBM 2010 targets (costs in USD)

Number and cost of pregnant women receiving IPT	2008	2009	2010	2011	2012	2013	Total
A. Average Cost of IPT (2 doses) per pregnant woman	$0.18	$0.18	$0.18	$0.18	$0.18	$0.18	$0.18
B. Number of pregnant women targeted **to reach 100% coverage**	7,231,696	7,693,928	7,940,134	8,194,218	8,456,433	8,727,039	48,243,447
C. Number of pregnant women targeted **to reach RBM targets**	5,785,357	6,155,142	6,352,107	6,555,374	6,765,146	6,981,631	38,594,758
Proportion of women attending ANC at least twice	58.4%	60.0%	62.0%	65.0%	70.0%	75.0%	
Proportion of women attending ANC receiving IPT (Absorptive capacity)	40.0%	60.0%	80.0%	100.0%	100.0%	100.0%	
Number of women reached for IPT2	**1,689,324**	**2,769,814**	**3,938,306**	**5,326,242**	**5,919,503**	**6,545,279**	**26,188,468**
Proportion of all pregnant woman receiving IPT2 (National target)	**23%**	**36%**	**50%**	**65%**	**70%**	**75%**	
D. Available resources for IPT	$1,568,966						$1,568,966
FUNDING GAP to reach RBM targets (or national if higher)	$0	$0	$0	$930,980	$1,078,320	$1,192,296	$3,201,596
Total number of SP doses required to reach national targets*	4,274,000	7,007,800	9,964,000	13,475,667	14,976,667	16,559,667	66,257,800
COMMODITY GAP to reach national targets - number of SP doses	0	0	0	12,930,279	14,976,667	16,559,667	44,466,612

* including 15% mark-up for women receiving 3 times and 10% for logistics

5.2. Case Management

5.2.1. Diagnosis

a. Situation analysis

i. Policies, strategies and approaches

The current 5 year strategic plan (NMCP 2005) which is being revised, indicates that early diagnosis and prompt and effective case management is one of the core interventions that will be used to control malaria (pg 10). In this regard, the stated objective will be to ensure that at least 80% of malaria is appropriately diagnosed and effectively treated by 2010. To achieve this, microscopy will be strengthened through procurement of microscopes, supplies and capacity/skills developed through training and retraining of laboratory technicians. The plan further adds that rapid diagnostic tests will be deployed to improve diagnosis of uncomplicated malaria. In terms of the strategic approach the following are given:

- Support the improvement of clinical diagnosis of malaria using the IMCI/RBM approach in peripheral health facilities
- Upgrading microscopy use and rapid diagnostic test kits for improved diagnosis and rationalisation of drug use
- Improve home management of malaria through community programme designed to ensure early diagnosis and prompt access to treatment

The National Antimalarial Treatment Policy (NMCP 2005) gives more specific guidance on malaria diagnosis. In section 4.1.1 pg 27, diagnosis of malaria is described at four levels of health care. At home, diagnosis depends on recognition of symptoms and signs by caregivers. At Level I i.e. PHC centres, dispensaries and health posts, diagnosis will be based on the IMCI classification because there are no laboratory facilities at this level. At Level II i.e. general hospitals and some private hospitals, it is "desirable that a laboratory diagnosis of malaria be established when possible" and for those without formal medical training, "the IMCI algorithm would still be employed". At Level III i.e. specialist, teaching and some private hospitals, parasitological-based diagnosis should be emphasised.

The strategy highlighted above encompasses both clinical assessment (including IMCI) and parasitological testing (both microscopy and RDTs) as the diagnostic approaches. At the lower level of the health care system, Level I, where most cases of uncomplicated malaria will present, the recommendation is to practice clinical-based diagnosis.

In the ongoing revision of the strategic plan which will cover the period 2008 to 2013, NMCP is keen to emphasize parasitological-based diagnosis in patients aged five years and above and maintain clinical-based diagnosis in those aged under five years. The amended programme objective will be to improve malaria case management such that at least 80% of cases in persons aged 5 years and above are confirmed prior to treatment in health facilities by 2013. This is a health facility based target and not a population based target. This shift to parasitological-based diagnosis is in line with RBM's priority of broadening the use of confirmatory diagnosis to increase rational medicine use (RBM Partnership secretariat 2005).

The National Drug Policy of 2005 (FMOH 2005, pg 10) recognises that rational prescribing can be improved by increasing accuracy of diagnosis if diagnostic services appropriate to the level of care are provided at health facilities.

ii. Financing

Financing for the deployment of diagnostics, in terms of parasitological diagnosis, is predominantly by the Federal Government. The World Bank booster programme is supporting the scaling-up of effective diagnostic

and treatment services as part of the Malaria Plus Package (World Bank 2006). Given that clinical diagnosis is part of the training on malaria case management, its financing is captured as part of health worker training.

iii. Implementation status

The implementation status of the malaria diagnostic approaches has not been adequately monitored or evaluated. Therefore, it is not possible to objectively appreciate progress towards the target of "at least 80% of malaria is appropriately diagnosed and effectively treated by 2010". There has been no nationwide distribution of job aides that guide users on how to handle symptomatic patients that are negative on parasitological testing. Bench aides for laboratory diagnosis have not been provided to all health facilities with laboratories. No in-service training has been organised on a nationwide scale for laboratory personnel in the past three years.

The use of RDTs was to be piloted but hitherto there has been no large scale pilot that can inform policy and implementation.

A substantial proportion of Nigerians seek medical care in the private sector. NMCP is yet to engage this sector in the provision of parasitological-based diagnosis. However anecdotal reports suggest that microscopy is provided in facilities with laboratories and that clinicians working in such facilities prescribe treatment according to the results of microscopy. RDTs are not commonly used in the private sector.

- *Management and partners' roles*

Management of malaria diagnosis is not spared from the concurrent list. The Federal, State and Local government levels are responsible for their health care facilities with some oversight from other bodies such as the Central Public Health Laboratory, National Primary Healthcare Development Agency (NPHCDA) and Institute of Medical Laboratory Scientists. At the Federal level, NMCP has treatment guidelines in place although no separate policy or guidelines on malaria diagnosis exist. The Federal government supports Level III health facilities to procure laboratory equipment and supplies. Tertiary training institutions carry out pre-service training of laboratory personnel before they are posted to health facilities around the country. The Institute of Medical Laboratory Scientists (IMLS) accredits laboratory scientists that graduate from these institutions and is responsible for renewing their licences to practice, on an annual basis. At state level, the RBM office is responsible for the in-service training of health workers on the relevant guidelines, recruiting laboratory personnel and the procurement of equipment and supplies for Level II health facilities. At LGA level, the RBM team handles in-service training on IMCI. NPHCDA supports the LGA RBM team by providing technical oversight to Level I health facilities.

The World Bank through the Nigeria Malaria Control Booster Project is helping to expand access to, and utilization of effective diagnostic and treatment services in seven states as part of a well-defined set of Malaria Plus Package of interventions. The project started in March 2007 and will last four and a half years until September 2011. Procurement of microscopes and RDTs for use at health facility level is being supported. DELIVER is providing technical and logistic support for this component of the project.

WHO and UNICEF have provided technical support at both Federal and State levels.

- *Procurement and logistics*

Each level of the concurrent health system list is responsible for its own procurement and logistics. In turn each state handles PSM for its Level II and Level I health facilities. The newly formed PSM unit in NMCP will work to streamline procurements at Federal level including third party procurements.

- *Communications*

There has been no nationwide communication campaign to promote awareness among the public of the role of malaria diagnosis in better quality of care. However there is an updated strategy for Behaviour Change Communication that has an inventory of key messages for caregivers and health workers (NMCP 2008). It however does not have messages that promote parasitological-based diagnosis in those aged five years and above. With the shift to parasitological-based diagnosis in this age group it will be important to get the public and health workers to appreciate the reasons for this shift and get their acceptance.

- *M&E*

The provision of diagnostic services is not routinely monitored in either the public or the private health care sectors. The revised NHMIS forms will capture data on the number of health facilities offering laboratory services (Forms 002 and 003) but do not capture the number of malaria cases that have been confirmed by parasitological testing. The availability and quality of services have not been evaluated at federal or state levels.

A quality control or assurance system for laboratory services is lacking in both the public or private health care sectors.

b. Gaps and requirements

i. Key bottlenecks and challenges

With regard to parasitological-based diagnosis, the RBM priority is to broaden the use of confirmatory diagnosis to increase rational medicine use. The target is to achieve and sustain 80% coverage with such services because the proper use of effective antimalarial medicines will contribute towards the reduction of the burden of disease. Nigeria is not likely to achieve this target by 2010 because there are significant bottlenecks to increasing access to diagnostic services in Nigeria. These are not unique to the country but are of greater magnitude because of the sheer size of the country and its enormous population. Uniquely however, is the concurrent list which divides the responsibility of health facilities according to levels in the health system. As a result, Level I health facilities which carry the burden of malaria, are overseen by the LGA health authorities which unfortunately are further down the concurrent list and have less financial and human resources. This drastically curtails the capacity of the country to rapidly scale up interventions that depend on the public health care system for their delivery. Case management in the broad sense falls into this category of interventions. It is for this and the bottlenecks and challenges listed below that it is not realistic to believe that Nigeria will reach either the RBM target for improvements in case management by the year 2010. In the estimates of the diagnostic commodity needs (Table 16) for the period 2008-2013, absorptive capacity to implement the various approaches is taken into consideration. Below are the key bottlenecks and challenges that impair access to parasitological-based diagnosis.

- Clear policy and guidelines

Despite the information given in the strategic plan and the treatment policy it is still difficult to appreciate the role of parasitological diagnosis in malaria case management. For example, the policy does not differentiate between the approach in children aged under five years and those aged five years and above, which would be in alignment with the WHO's global approach to differentiate between these two age groups. These documents do not guide health workers on the role of microscopy and RDTs, for instance whether RDTs can be used at health facilities with microscopy or should be used in health facilities without laboratory services. There is no recommendation that HRP-2 based RDTs are the preferred type nor is there any indication as to which blood smear staining technique should be routinely used. These matters should be tackled and clearly communicated to health workers if the use of parasitological-based diagnosis is to be emphasised over the next five years.

- Alternative treatments

Implementation of parasitological-based diagnosis will be curtailed by inadequate consideration of the treatment options available to health workers. For example, the handling of a symptomatic patient with a negative parasitological test has not been elucidated and articulated to health workers. If appropriate treatment alternatives are not provided for the other common causes of fever, it is unlikely that health workers will adhere to the results of a test. These challenges have not yet been addressed by NMCP.

- Changing behaviour of health workers

Clear guidelines and available treatment options will go some way in promoting improved malaria diagnosis but should be augmented by interventions that target health worker practices and behaviour. It is evident that there are other factors such as training and peer pressure that influence the use of diagnostic tools and adherence to the results. If these influences are not tackled, they will create bottlenecks to achieving the target for improved malaria case management.

- Public awareness of causes of fever

The norm has been to emphasize the importance of malaria as a cause of fever without consideration of the other causes of fever such as acute respiratory infections (ARI). The need to shift towards an integrated approach of managing childhood diseases has been articulated in the National Child Health Policy (FMOH 2006). The public need to be aware that malaria, although the common cause of fever, is not the only cause especially in those aged five years and above. This will support health workers to adhere to the results of the tests by limiting any pressure from patients for antimalarials as treatment for their symptoms.

- Access to diagnostic approaches

The diagnostic tools and their appropriate supplies should be readily available to health workers if high coverage is to be achieved. This requires proper quantification, procurement of sufficient quantities and regular supply to service points. At the moment the status and quality of diagnostic services are unknown. On the other hand, patients should have access to the diagnostic approaches. In line with the new strategic plan, in which the target will be patients aged five years and above, a microscope should be accessible at all health facilities with laboratories and RDTs should be accessible at all Level I health facilities. Additionally, the private sector will have to be involved if there is any realistic chance of achieving high coverage by 2010 and beyond. For children aged under five the IMCI approach should be emphasised and health workers at PHC and Level II health facilities given the necessary skills and job aides to follow the IMCI guidelines. These guidelines should be updated to include use of ACTs.

- Quality assurance to promote accuracy of results of microscopy and RDTs

A routine system that assures and controls the quality of microscopy and RDTs does not exist. This provides a major bottleneck to confidence in the results of these tests among health workers and the general public.

- Engaging and maintaining involvement of all levels of the concurrent health system list

A major challenge will be to get all states and their LGAs to buy in to and implement the new strategic approach to malaria case management. Without involvement of all states improved malaria case management cannot be delivered at the majority of health facilities that deal with the burden of uncomplicated malaria i.e. Level I and II health facilities.

- Changing malaria epidemiology

The approach to diagnosis has been to rely on clinical diagnosis except at Level III. Even at this level, there are no guidelines to indicate how to handle patients with symptoms but a negative parasitological test. Therefore the tendency to continue to attribute most fevers to malaria will exist at all levels. This will lead to over diagnosis of malaria and over use of antimalarials. Over time, as malaria prevention interventions are scaled up, the proportion of fevers attributable to malaria is expected to decline. This will mean that without scaling up diagnostic services the degree of over diagnosis and overuse of antimalarials will increase. As a consequence, the quality of malaria case management will reduce especially in those aged five years and above.

ii. Proposed solutions to attain 2010 targets

The solutions proposed below if implemented will go some way in helping Nigeria to progress towards its target of at least 80% of malaria is appropriately diagnosed and effectively treated by 2010. The proposals in this section focus on the diagnosis component of this compound indicator for which the programmatic objective is that at least 80% of patients aged 5 years and above have confirmatory diagnosis prior to treatment in health facilities by 2013. The FMOH should engage the private health care sector in these proposals if there is to be any realistic chance of attaining high coverage.

- Diagnostic guidelines and job aides

The revised strategic plan should clearly indicate that a) parasitological-based diagnosis should be a pre-requisite for treatment in patients aged 5 years and above when available and b) clinical-based diagnosis will continue to remain the norm in the lower age group. These practices should be emphasized at all level of health facilities using either microscopy at health facilities with laboratories and RDTs at those without laboratories. Job aides that tackle the common differential diagnoses, such as the IMCI charts, and give clear guidance on treatment options to take should be developed or updated and disseminated to all health facilities. Laboratory bench aides should be procured and disseminated to all laboratories, and pictorial guides on RDT use and interpretation should be adapted or developed and disseminated to all health facilities where RDTs are deployed.

- Training and supervision of health workers and laboratory personnel

Training on parasitological-based malaria case management should be combined with the use and interpretation of microscopy and RDT results. Given the shift to emphasize parasitological-based diagnosis in patients aged 5 years and above and the challenges in changing prescribing behaviour, all health workers responsible for treating malaria should undergo re-training and be supervised routinely. Instead of lecture style sessions, more participatory and interactive methods should be employed if the re-training is to be effective. Laboratory personnel should be re-trained on microscopy and RDTs as complementary methods.

- Increase access to diagnostic tools, especially to RDTs at Level I health facilities

Microscopy and RDTs should be procured and supplied in sufficient quantities for all health facilities. The FMOH should work with SMOH and partners to agree how to share the costs and responsibilities in order that all states are able to implement this new strategic approach. The thrust should be to make these diagnostic tools and their supplies available without interruption. Private sector Level I health care facilities should be provided with subsidized RDTs to promote parasitological-based diagnosis. At the mid-term review of the new strategic plan, i.e. 2010, the position to exclude parasitological-based diagnosis in children aged under five years should be reassessed based on the implementation context and progress at the time. Deployment of RDTs in the HMM strategy is not yet advisable given that HMM has not be fully operationalised and that it would not be in line with NMCP's strategic plan since HMM targets children aged under five years.

- Improving M&E and monitoring progress towards targets

The health facility survey that NMCP is preparing to carry out soon should be used to collect baseline information on the status of diagnostic services. If possible this should be complemented with a quality of care survey to evaluate current adherence to national treatment guidelines. The NHMIS should revise its health facility reporting forms to capture and monitor the number of confirmed malaria cases among both age groups. In the next MIS, NMCP should include questions that can capture the population prevalence of parasitological testing e.g. among those with fever in the last two weeks, what proportion of them had a finger or heel prick for diagnostic testing before treatment was given.

The operational performance of different brands of HRP-2 based RDTs should be evaluated in order to select a list of up to three or four brands that can be included on the procurement list for tenders. This will avoid reliance on one brand and promote competitive pricing.

A system to assure and control the quality of parasitological-based tests and instill confidence in the results should be instituted. The options of either a Federal or zonal QA/QC system should be considered.

Sentinel sites should be used to capture information on slide positivity rates over time. Alternatively this information can be included in the NHMIS health facility reporting forms.

- IEC to the public

A well designed nationwide communication campaign should be implemented within the next one year. It should address improved malaria case management focusing on prompt treatment with ACT, the role of parasitological-based diagnosis, recognition of danger illness signs and actions to take, and use of ITNs to prevent malaria.

- Advocacy to states

Without commitment of the States this new strategic approach will not be implemented to scale. Additionally, State governments have financial resources that can be mobilized in this regard. NMCP and the RBM partnership should together employ evidence-based information/messages in their advocacy to State governments to convince them of the need to improve malaria control and prevention.

- Technical Assistance (TA) needs

To implement the proposed solutions highlighted above, NMCP will need additional TA to complement its current programme capacity and support SMOH. These include i) designing and implementing a baseline health facility and quality of care surveys, ii) preparing comprehensive malaria diagnosis guidelines, iii) designing and implementing a QA/QC system for parasitological-based diagnosis, iv) designing participatory and interactive training curricula for health workers and laboratory personnel that focus on the role of parasitological-based diagnosis, v) providing implementation support to SMOH.

- Mobilise the resources needed

The financial and human resources need to implement the new diagnostic approach should be mobilized at all levels of the health system. Strengthening of laboratory services such as microscopy should be considered to be part of the broader health system because the services are used for other diseases such as tuberculosis. Support should be sought from the Federal and State governments and development partners such as GF, WB, DFID, USAID so that implementation can cover the majority of Nigeria's population.

Table 16 summarizes the need for diagnostic tests. The first rows show the diagnostic policy as it is planned or realistic and the absorptive capacity/uptake anticipated. Row B then shows the total number of fever cases that would have to be tested if every case in the country would be covered. The remainder of the table refers only to diagnostic tests that result when applying the rates in the first 5 rows. For the number of tests needed (row C) these have been separated out for the public and private sector. Details on how the number of fever cases in the country was estimated are given in the Annex.

Table 16. Diagnostic services funding needs to attain RBM 2010 targets (costs in USD)

Number and cost of malaria diagnostic services	Age Group	2008		2009		2010		2011		2012		2013		TOTAL	
		Micro-scopy	RDTs	Micro-scopy	RDTs	Micro-scopy	RDTs	Micro-scopy	RDTs	Micro-scopy	RDTs	Micro-scopy	RDTs	Micro-scopy	RDTs
Public sector % of fever cases diagnosed	< 5 yrs	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
	> 5 yrs	15%	0%	17%	30%	20%	60%	20%	60%	20%	60%	20%	60%		
private sector % of fever cases diagnosed	All ages	2%	0%	11%	5%	20%	10%	20%	10%	20%	10%	20%	10%		
Absorptive capacity public		40.0%		50.0%		60.0%		80.0%		100.0%		100.0%			
Absorptive capacity private		10.0%		15.0%		35.0%		50.0%		60.0%		70.0%			
A. Average cost per diagnostic test	All	$0.50	$0.90	$0.50	$0.90	$0.50	$0.90	$0.50	$0.90	$0.50	$0.90	$0.50	$0.90	$0.50	$0.90
B. Number of suspected malaria (fever) cases targeted to be tested to reach 100% coverage	< 5 yrs	83,437,513		82,464,427		75,704,126		62,606,760		62,608,110		64,611,569		431,432,505	
	> 5 yrs	131,961,531		132,700,179		127,957,551		117,209,499		119,045,496		122,854,952		751,729,208	
	Total (<5+>5 yr)	215,399,044		215,164,606		203,661,676		179,816,260		181,653,606		187,466,521		1,183,161,713	
C. Number of suspected malaria (fever) cases targeted to be tested to reach RBM	< 5 yrs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	> 5 yrs	2.8m	0	4.1m	7.0m	5.4m	16.1m	6.6m	9.7m	8.3m	25.0m	8.6m	25.8m	35.7m	93.6m

targets (or national if higher)	Total (<5+>5 yr)	2.8m	0	4.1m	7.0m	5.4m	16.1m	6.6m	9.7m	8.3m	25.0m	8.6m	25.8m	35.7m	93.6m
Cb. Diagnostic tests to be used in private sector	All	2.7m	0	14.6m	6.6m	23.8m	12.3m	20.3m	10.5m	20.0m	10.3m	29.8m	10.1m	101.2m	49.7m
D. Available resources for malaria diagnostic services	All	?	$0.2m	?	0	?	0	?	0	?	0	?	0	?	$0.2m
FUNDING GAP to reach RBM targets (or national if higher) (A*C) - D	**All**	**$2.8m**	**$0**	**$9.3m**	**$12.2 m**	**$14.6 m**	**$25.6 m**	**$13.4 m**	**$27.1 m**	**$14.2 m**	**$31.8 m**	**$14.1 m**	**$32.2 m**	**$68.4 m**	**$129.0 m**
Total number of RDTs required to reach RBM targets (or national if higher)	**All**		**0**		**13.5m**		**28.4m**		**30.2m**		**35.3m**		**35.9m**		**143.3 m**
COMMODITY GAP to reach RBM targets (or national if higher) - number of RDTs	**All**		**0**		**13.5m**		**28.4m**		**30.2m**		**35.3m**		**35.9m**		**143.3 m**

5.2.2. Treatment

Figure 11: Table of Annual Malaria cases reported and estimated malaria incidence.

Year	Estimated Population of Nigeria	Reported malaria cases	Estimated malaria incidence per 1000 (Freeman)	Estimated fever cases based on fever episodes (RBM needs assessment)	Estimated No. fever cases that go to public sector (RBM needs assessment)
1996	104,173,148	1,123,135	11		
1997	107,298,343	1,148,602	11		
1998	110,517,293	2,124,658	19		
1999	113,832,812	2,568,467	23		
2000	117,247,796	2,476,608	21		
2001	120,765,230	2,253,519	19		
2002	124,388,187	2,605,381	21		
2003	128,119,832	2,608,479	20		
2004	131,963,427	3,371,523	26		
2005	135,922,330	3,926,897	29		
2006	140,000,000	3,547,830	25		
2007	144,483,655	4,366,048	30		
2008	149,107,132			215,399,044	78,226,541
2009	153,878,561			215,164,606	78,111,402
2010	158,802,674			203,661,676	73,855,527
2011	163,884,360			179,816,260	65,064,321
2012	169,128,660			181,653,606	65,707,438
2013	174,540,777			187,466,521	67,810,076

Source Tim Freeman 2005, Epid/HER Division, Public Health Dept., FMOH and RBM needs assessment 2008.

a. Situation analysis

i. Policies, strategies and approaches

Prompt and effective case management is one of the objectives described in the Malaria Control Strategic plan (NMCP 2005, pg 36). The target set in 2005 is that at least 80% of children aged under-five years receive prompt and effective treatment for malaria according to the drug policy within 24 hours of onset of symptoms. In this case the treatment of choice is ACT and according to the revised strategic plan the targets for achieving coverage with this outcome indicator are 20% in 2009, 40% in 2010, 50% in 2011, 70% in 2012 and 80% in 2013. The approaches for tackling uncomplicated malaria that are highlighted are i) deployment of AL through public and faith-based/NGO health facilities, ii) deployment through the home management of malaria strategy (HMM) by expanding the Role Model Mother system (RMM) and using Patent Medicine Vendors (PMV). With regard to severe malaria the main approaches are i) prompt treatment of cases with parenteral antimalarial according to the drug policy and ii) early and effective referral of children with danger signs after giving pre-referral treatment with artesunate suppositories.

Nigeria adopted a new malaria treatment policy based on Artemisinin-based combination therapy (ACT) in 2005. The National Antimalarial Treatment policy (NMCP 2005, pg 20) states that "Artemether-Lumefantrine (AL) an artemisinin combination therapy (ACT) is the drug of choice in view of its effectiveness and prompt action against all forms of malaria species". It further adds that, however other ACTs may be used where AL is not available. Those listed for such use include amodiaquine + artesunate (AA), dihydroartemisinin + piperaquine + trimethoprim, artesunate + mefloquine. The policy indicates that monotherapies are no longer recommended.

The indicator for monitoring the outcome for severe malaria case management is the proportion of under five (U5) children admitted with severe malaria and correctly managed at health facilities. There is no known baseline figure for this indicator but the national targets over the next five years are 20% in 2009 increasing to 30% in 2010, 50% in 2011, 65% in 2012 and 100% in 2013. Therefore the RBM target of reaching 80% coverage for this indicator by 2010, like that for uncomplicated malaria, is far beyond what NMCP can realistically aim to achieve. The recommended medicines for severe malaria case management are quinine, artemether, artesunate in their parenteral forms (pg 25). Once the patient can take orally, the policy recommends that a full course of the oral form of the medicine should be given. Artesunate suppositories can be used for pre-referral treatment.

At health facility levels (i.e. Level II and III), the main approach is to deploy either AL or AA at no cost to the patient when treated in the public health care sector. Some Level III facilities have included ACT in their drug revolving funds, a cost-recovery mechanism that is supported by the National Drug Policy (FMOH 2005).

At primary health care level (i.e. Level I centres and community level), the approach has been to use Patent Medicine Vendors (PMV) to sell at a subsidised cost, the combination of AA, and to pilot deployment of AL through Role Model Mothers (RMM) within the Home based management of malaria strategy (FMOH 2005). In 2000-2001 it was estimated that there were about 36,000 PMVs country wide (FMOH 2002).

In support of public-private partnership (FMOH 2006), NMCP's current strategic plan, recognises the need for local manufacture of ACTs. This is one of the reasons why the combination AA was included in the treatment policy and is procured locally by the Federal government through the MDG project.

ii. Financing

Financing for malaria treatment commodities and implementation is mainly by the Federal and State governments and development partners.

iii. Implementation status

At health facility levels a dual system of deployment is in place. AL is deployed in some health facilities supported by the Federal government through the MDG project whereas those health facilities supported by the GF, WB, UNICEF, and USAID use the combination of AL. Prior to deployment, clinicians that handle cases of uncomplicated malaria have been trained on the new antimalarial treatment policy and job aides in the form of posters have been distributed.

At primary health care levels, through the HMM strategy, RMM in some wards have been trained on the use of ACT and are presumptively treating children aged under five years with AL. Through the private sector, PMV have been trained, supervised and supported by Society for Family Health (SFH) to presumptively treat children aged one to six years with AA. A significant milestone was the rescheduling of ACTs, specifically the combinations AL and AA, by NAFDAC (National Agency for Food and Drug Administration and Control) from a prescription-only medicine to an over-the-counter one in 2007. This paved the way for deployment of ACTs through the various primary health care channels. In addition, NAFDAC has stopped the registration of monotherapies for malaria treatment except SP and Quinine.

Implementation hitherto has focused on the procurement and supply of the lower weight specific pre-packs of AL, i.e. 5 to 24 kg representing the age groups 6 months to 8 years. This is mainly because funding for these procurements is from round 2 and 4 GFATM grants in which NMCP proposed to pilot ACT deployment in that age group.

There are no separate national standard treatment guidelines (STG) for severe malaria or the severely ill child. There has been no nationwide in-service training on this topic in the last three years and neither have any job aides been developed and distributed in this period.

- *Management and partners' roles*

NMCP plays a pivotal role in the management and coordination of malaria case management activities. NMCP is responsible for the quantification and forecasting of ACT needs, reviewing health facility monthly ACT medicine returns and orders, mobilising resources for implementation, training of state RBM focal persons, and carrying out M&E activities to track progress. NAFDAC carries out basic quality control checks on batches of AL that are imported into the country and on AA batches that are procured locally. NAFDAC has implemented, although on a small scale, a routine pharmacovigilance system for all medical products since 2005. The malaria control programme now (2008) has a focal person for pharmacovigilance who will work with NAFDAC to promote pharmacovigilance for antimalarials. The programme has also appointed two of its team members (2008) to handle and coordinate all PSM activities for malaria commodities.

A number of partners are involved in activities directly related to malaria treatment. The key ones include the following:

- The Global Fund – Through a Round 2 grant signed in 2004, NMCP planned to deploy 1.6 million treatment doses of AL in year 1 and 2.4 million treatment doses in year 2 to children aged under five years in 12 states through the HMM strategy. However, procurement and implementation were slow and subsequently only limited quantities were distributed. The grant was suspended but the commodities budgeted for in phase 1 of the grant, were rolled over to phase 1 of a Round 4 grant that NMCP successfully applied for in 2004. This Round 4 grant covers the periods January 2005 to December 2006 for phase 1 and January 2007 to December 2009. Children aged under five years are targeted for treatment with ACT in 18 states, namely Sokoto, Kaduna, Zamfara, Lagos, Oyo, Ekiti, Delta, Bayelsa, Cross Rivers, Borno, Yobe, Ebonyi, Enugu, Imo, Plateau, Kwara, FCT and Taraba states. The approach taken is to deploy the antimalarials through health facilities and the HMM strategy using RMM.
- The Yakubu Gowon Centre for National Unity and International Cooperation (YGC) – Has been the principal recipient (PR) for the 2 GF grants.
- Society for Family Health (SFH) - Is the PR on the Round 4 grant that handles ACTs for public sector deployment. It is involved in the social marketing of AA, branded as KidACT, for children aged 1-6 years.
- World Bank Booster Programme - The Nigeria Malaria Control Booster Project (NMCBP) is supporting the procurement of AL for deployment through health facilities, HMM and PMVs in seven states namely Kano, Jigawa, Gombe, Bauchi, Akwa Ibom, Rivers, and Anambra.
- WHO – Provides technical support at both Federal and State levels. It is the technical partner that is leading on malaria case management
- UNICEF – Provides technical support at both Federal and State levels
- USAID – Support for HMM and training of PMVs
- DFID – Is supporting a five year malaria project through the Malaria Consortium that will support subsidized ACT in the private sector
- CHAN Medi-pharm – This is an NGO that handles the supply management and logistics of ACT treatments procured by YGC and distributed to public sector health facilities in the GF supported states.
- First Bank PLC – Provides electronic fund disbursement facilities from YGC to SMOH in the GF supported states
- PMG – Pharmaceutical Manufacturers Group is an affiliate of the Manufacturing Association of Nigeria (MAN). They work with local manufacturers to manufacture and pre-pack AA

- *Procurement and logistics*

The Federal Procurement Office handles the procurement of treatment commodities on behalf of the Federal government and the World Bank's Booster Project. Procurements on behalf of the GF are handled by YGC.

The World Bank, in recognition of the challenges that face the routine procurement system is providing through its project long term technical assistance at Federal Level through supported a procurement specialist and a Project Implementation Facilitator (PIF) on an as-needed basis at State Level in seven states. No national procurement plan exists.

The quantities to be procured are estimated by NMCP using population projections and morbidity data. A combination of a push and pull system of supply exists, whereby in the first instance the central level pushes the estimated quantities needed to the State level stores and all Level III health facilities. The state RBM manager in turn pushes the allocated quantities to Level II health facilities, by either requesting them to collect or by using state transport to deliver the drugs there. Finally Level III health facilities to collect their allocations from Level II health facilities. This routine system was inefficient and was responsible for delays and drug stock outs to the extent that the FMOH had to contract out storage, supply and logistics for public sector medicines procured for GF supported states to a third party, CHAN Medi-pharm. A logistics specialist funded by the NMCBP is working at central level to strengthen the logistics system.

There is no national medicines and medical supplies delivery schedule. As a result, deliveries of medicines to health facilities do not follow a preset schedule but rather are on an as-needed basis determined by the submission of medicine orders to the Federal central stores and NMCP by state level authorities (for Level I and II health facilities) and pharmacists at Level III health facilities.

- *Communications*

There is a Behaviour Change Communication Strategy which was drafted in 2005 and finalised in 2008 (NMCP 2008). There is a Technical Working Group on Behaviour Change Communication which in 2005 developed messages on the key malaria interventions. However no nation wide communication campaign including messages on case management has been implemented. Instead each partner has taken on the responsibility to adapt IEC messages and disseminate them in their supported states, LGAs or wards. SFH has had a communication campaign to socially market its ACT products.

NMCP has one focal person for IEC and BCC. The capacity of each SMOH to implement effective IEC or BCC or among its population has not been evaluated. With sufficient capacity and funding, State RBM programmes can produce their own IEC materials, for example the leaflet on malaria produced by Lagos State Ministry of Health (Lagos SMOH)

- *M&E*

The NHMIS routinely captures data on the number of malaria cases seen and admitted to health facilities in the public sector. However there is gross under reporting and poor coverage. A rough estimate is that the data from the NHMIS represents only about 15-20% of what it should be capturing from public sector health facility attendance and about 3% of the estimated annual number of malaria episodes in the country (Freeman 2007, pg 4). The NHMIS forms have been revised but will not be printed by the FMOH. Instead the SMOH will be given the task to print copies for themselves as a way of getting their commitment to the information system.

There is a lack of well designed surveys to assess the factors that affect the quality of care given for uncomplicated and severe malaria. The World Bank has provided technical assistance to NMCP to design a health facility survey that will take place in the WB supported states later this year.

The sentinel sites should be collecting information on case management practices and trends. Recently the FMOH strengthened these sites and increased the number to 14.

Drug efficacy studies are carried out in accordance with the National M&E framework (FMOH 2007). Recent results from studies done in 2002 (NMCP 2002) and 2004 (NMCP 2004) are summarised in the Table below. The findings are used to inform the antimalarial treatment policy, and were in fact instrumental in the policy

review process when changing the antimalarial policy from chloroquine to ACT. The plan over the next five years is to strengthen these sites

An M&E technical working group exists and is lead by the WHO.

Figure 12: Table of Drug efficacy trials of Chloroquine, SP, Artemether-lumefantrine and Artesunate+Amodiaquine showing Adequate Clinical and Parasitological Response (%)

Geopolitical Area	State	Adequate Clinical and Parasitological Response (%)			
		CQ 2002	SP 2002	AL 2004	AA 2004
North Central	Plateau	53.2	82.7	100	96
North East	Borno	50.8	64.8	100	100
North West	Kaduna	77.3	94.2	100	100
South East	Enugu	3.7	14.9	100	100
South South	Cross River	9.1	8.5	87	82.5
South West	Oyo	40.9	75.6	100	100
Median		45.9	70.2	100	100

CQ-Chloroquine, SP-Sulphadoxine-pyrimethamine
AL- Artmether-lumafantrine (Coartem), AA- artesunate+amodioquine

Source: Tim Freeman 2007

b. Gaps and requirements

i. Key bottlenecks and challenges

Significant bottlenecks exist that hinder Nigeria's capacity to achieve the RBM targets for malaria treatment, i.e. not uncomplicated and severe malaria. Key ones are summarized below.

- Weak health care system

The achievement of the targets requires a functional and accessible health care system which is used by the majority of patients with febrile patients. Already the fact that the majority of patients use the private sector health care system poses a significant challenge to increase coverage of services to improve malaria case management. Therefore, if any significant progress is to be made, the FMOH has to extend its services by involving the private sector as soon as possible.

- Poor access to trained health workers

The majority of uncomplicated malaria cases should be dealt with at primary health care levels i.e. Level II health facilities and community-based health care providers. It is at this level that properly trained health workers should exist to handle cases and refer those who are severely ill or beyond the target group. The reality though is that this level is the weakest, in terms of numbers, skills and motivation, in the health system especially in the public sector.

- State-specific approaches

A challenge that needs to be tackled is the state-specific approaches used by developing partners to provide support to malaria prevention and control. First of all, there is no harmonisation in the approaches used to improve access to the case management interventions. For example, whereas the GF and WB deploy AL in the states they support, the MDG project and SFH favour the use of AA. This is in line with the national treatment policy but could cause inefficient implementation in areas where there is overlap between the various funding sources. Secondly, there is a tendency to select and support health facilities within a number of LGAs within a state with the anticipation that the improvements made in those facilities will be appreciated by the SMOH and transferred to the rest of the state. This is not a healthy approach because it becomes more difficult to achieve high coverage in a country of this size if the challenges are not actively dealt with in the

majority of health facilities, which at the moment are still mostly supported by the Federal and State governments. This means that the experiences from and outcomes of the various projects, if to have significant positive impact on malaria case management, should be actively promoted to the Federal and State governments to get their buy in and commitment to replicating the models in other areas. This should be an integral component of the implementation of these projects because the sum total of each cannot help Nigeria to achieve the RBM targets by 2010.

- No baseline data on availability of antimalarials

Without evidence on the routine availability of ACTs and Quinine at service delivery points it is impossible to appreciate the reliability of the estimates used to quantify and forecast the needs of these commodities. The supply of drugs follows a push and pull system, in which health facilities do order the quantities of antimalarials that they need. However, there is no evidence to show that these orders are based on consumption data or what the prevalence of any stock-outs is. Such information if available even if from a number of randomly selected health facilities, can help to improve the quantification estimates, say for example, on an annual basis.

- Lack of a procurement plan

Third party procurements are not coordinated within the framework of a procurement plan. This can have adverse consequences on storage capacity and delivery schedules.

- No evidence base for informing improvements in IEC and adherence to national treatment guidelines

It is not clear if there is high adherence to treatment to the antimalarials especially AA. Poor adherence we know can lead to poor treatment outcomes and possibly to the development of drug resistance in the long term. This sort of information can be used to inform and improve IEC. Likewise, the lack of information about prescribing habits in the public and private sectors means that interventions to improve any suboptimal practices cannot be designed based on local evidence.

- NHMIS lacks information on confirmed malaria cases

NHMIS does not capture data on the number of confirmed malaria cases. This means that any changes in the prevalence of malaria over time will not be captured by this system.

ii. Proposed solutions to attain 2010 targets

The ideal solution is to strengthen the health system, improve access to trained health workers and improve treatment seeking behaviour. This has to be done across the country which is an enormous task in a country as large as Nigeria and requires a longer term approach. In the short to medium term, the following proposals will increase progress towards the RBM targets.

- Improve access to trained health workers at primary health care level

The IMCI approach should be used by health workers at Level I health facilities. Training on the updated guidelines should be part of a nationwide in-service training programme. NMCP and state RBM units should collaborate with other child health programmes to reduce the verticalisation of malaria prevention and control in children aged under 5 years (FMOH 2006). Efforts to implement the HMM strategy should be stepped up in a coordinated and well planned manner. One uniform implementation model should be used across the country focussing on communities with poor access to health care facilities. Whereas volunteer-based community resource persons should be encouraged to perform their roles in the HMM strategy in the short term, a means of incentivising them should be considered for the medium term if HMM remains an important approach to increasing access to treatment. Lessons learned from the pilots should be taken on board during scale up (Gyapong M. and Garshong B. 2007). PMVs should be trained to handle ACTs for all age groups and supported to provide subsidised ACTs, preferably AL instead of AA. PMVs tend to establish where there is a combination of poor health services and sufficient purchasing power. This unique characteristic and their huge numbers should be taken advantage of to scale up access to treatment through HMM. A model in which RMM and PMVs work in a complementary manner should be considered. RMM or community drug distributors

(CDD) should be emphasised in areas that PMVs have not adequately penetrated and avoided in areas with a high density of PMVs, where it is likely that there is a population that can afford their services. Otherwise, the free ACT given by RMM will undermine the little income that PMVs make, yet they, PMVs, are a more sustainable way of deploying medicines to communities without access to health facilities. The feasibility of PMVs using RDT-oriented administration of ACT in patients aged five years and above should be examined.

Regular supervision should be an integral component of the HMM strategy. This requires a strong link between community resource persons and their supervising health facility or health worker. Routine supervision should therefore be planned, properly scheduled and funded. NHMIS should capture this information so that implementation can be monitored.

- Improve treatment seeking behaviour

A nationwide communication campaign to improve treatment seeking behaviour should be undertaken as soon as possible. Lessons learned from smaller IEC campaigns by other partners such as SFH should be used to inform the process and products. The impact of such an intervention should be evaluated using a pre and post intervention household survey. The findings can then be used to refine key messages and better target IEC.

- Strengthen severe malaria case management

This requires a number of activities that include, development and distribution of guidelines and job aides, re-training of all clinicians in Level III and Level II health facilities, provision of sufficient quantities of parenteral quinine or artesunate to all health facilities that admit severely ill children, improving supervision of all clinicians, improving the referral of severely ill children and providing sufficient quantities of artesunate suppositories for pre-referral treatment.

- Harmonise project support

NMCP should provide a coordination and stewardship role for all support that is provided for malaria control and prevention. Their capacity to do this should be strengthened at all levels down to the LGA. The specific approaches that are used should be standardised as described in implementation guidelines. Whenever possible, the maximum effect of project support should be realised by restricting the unit of implementation to a fairly large population such as all the LGAs in a State. If this cannot be done, then the implementation experiences from smaller administrative units such as LGAs should be proactively promoted to SMOH for them to transfer to other LGAs. In fact, State governments should commitment themselves to doing this in the first place, for example through memoranda of understanding (MoU), before the project is implemented.

- Prepare a detailed procurement plan and increase the capacity to implement it

NMCP in conjunction with key stakeholders should prepare a two or three year procurement plan. Adherence to the plan should be reviewed on an annual basis so as to make it a rolling plan that is useful for tracking procurements. In addition, a standard delivery schedule should be prepared by the Federal and State central stores. The capacity to implement these key planning tools should be strengthened at all levels.

- Strengthen M&E for drug availability and quality of care

Indicators that monitor information on drug availability should be included in the M&E framework and tracked through NHMIS and special surveys. For example, the indicator on the proportion of health facilities having stock outs of antimalarials lasting more than one week. Likewise the quality of care should be evaluated say every two years through special studies.

- Improve quality of NHMS and its coverage and completeness

Revision of the NHMIS forms is a welcome step. These forms should be pre-tested in selected facilities before they are finalised. A critical assessment of their user friendliness and ability to capture data of programmatic importance to NMCP should be done. A number of health facilities, e.g. the sentinel sites and their catchment health facilities, should be facilitated to use a computerised system to capture NHMIS data and transmit it to the FMOH. Emphasis should be made on completeness and timeliness. These data can be used to validate the information captured through the routine system.

The role of NHMIS information and its usefulness for planning should be promoted at State government and SMOH level in order that they can be more committed towards printing of the NHMIS forms and completing the forms. The focal persons for M&E at SMOH should be supervised on a regular basis by the M&E unit of NMCP. The planning dept of FMOH should on a periodic basis summarize the HMIS data and provide feedback to all SMOH and relevant programmes.

- Involve the private health care sector and civil society organisations

Within the framework of the public-private partnership, the FMOH should involve the private sector in its programmes. Relevant professional and other associations/bodies should be used to extend in-service training and supervision to health workers. Civil society organisations such as ACOMIN, with the sufficient capacity, should also be engaged at LGA and ward administrative levels. Subsidised ACTs should be provided through the private sector but these should be tagged to malaria diagnosis for those aged five years and above. Participating health facilities should commit themselves to reporting their data to NHMIS in return for this support from the FMOH or SMOH.

- Provide technical assistance and increase implementation capacity

To implement the solutions proposed, there is need for technical assistance at Federal, State and LGA levels. The following TA needs have been identified: a) BCC specialist to support NMCP to develop a IEC communication campaign, b) Training specialists to help with the development of in-service training manuals and training programmes that uses more effective methods to impart knowledge and skills, c) Severe malaria case management specialist to work with stakeholders to prepare guidelines on severe malaria management, d) M&E specialist – Health facility surveys, e) M&E specialist – quality of care surveys.

At State and LGA levels, additional TA support will be needed for implementation especially training and supervision.

Additional support can be sourced in country or through technical support from WHO and other technical agencies.

- Mobilise the resources needed

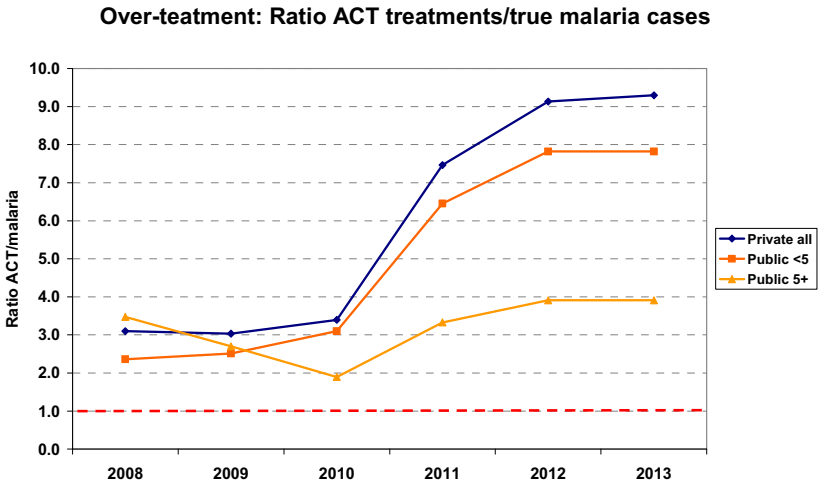
The resources required to implement the solutions proposed have to be made available as soon as possible if there is any chance of scaling up in time to make progress towards the RBM targets for case management of both uncomplicated and severe malaria. Not only are sufficient commodities required, i.e. AL treatment doses, quinine in its oral and parenteral formulations, artesunate suppositories, and ancillary medicines and supplies such as intravenous fluids, gloves etc, but in addition the human resources have to be sufficiently skilled, accessible and motivated. Therefore additional financial and human resources should be mobilised through the Federal and State governments and Nigeria's development partners.

Table 17 summarizes the ACT needs. The presentation of an average price per age category has been impossible as a mix of the two alternative 1st line treatments (AL and AA) with different age categories is used. The overall ACT need is presented as a hypothetical figure assuming that all cases identified by the diagnostic process presented in table 16 would receive an ACT. The remainder of the table takes into account the absorptive capacity and the expected uptake of subsidized ACT in the private sector. Further details on the assumptions used to estimate malaria cases are given in the Annex.

Table 17. Treatment funding and major commodity needs to attain RBM 2010 targets (costs in USD)

Number and cost of malaria treatments	Age group	2008	2009	2010	2011	2012	2013	Total
Proportion of children additionally accessing HMM	All	3.4%	9.1%	15.9%	22.7%	27.2%	35.1%	
Absorptive capacity public sector (utilization 35%)	All	40.0%	50.0%	60.0%	80.0%	100.0%	100.0%	
Uptake of subsidized drug private sector	All	10.0%	15.0%	35.0%	50.0%	60.0%	70.0%	
Number of cases targeted for treatment with AL if all cases in the public sector where to be treated applying diagnostic policy presented in table 16	< 3yr	16.3m	18.5m	19.7m	18.9m	20.5m	23.8m	117.5m
	3-8 yr	26.3m	26.0m	23.5m	20.0m	21.1m	24.2m	141.1m
	9-14 yr	8.5m	6.2m	3.4m	2.2m	2.1m	2.2m	24.6m
	> 14 yr	22.1m	15.3m	7.5m	5.8m	5.7m	5.9m	62.3m
	Total	73.1m	66.0m	54.0m	46.9m	49.5m	56.1m	345.5m
Additional cases that would have to be treated outside public sector	All	135.3m	117.3m	92.4m	74.9m	73.1m	71.7m	564.8m
Total number of ACT treatments	**All**	**208.4m**	**183.3m**	**146.4m**	**121.8m**	**122.6m**	**127.8m**	**910.3m**
ACT treatments realistically needed for the public sector	All	29.9m	34.7m	35.1m	39.7m	49.4m	56.1m	244.9m
Proportion of ACT for public sector being AL	All	20.0%	30.0%	40.0%	40.0%	50.0%	50.0%	
Subsidized ACT doses for private sector	All	13.5m	17.6m	32.3m	37.5m	43.9m	50.2m	195.0m
Cost for ACT public	All	$23.9m	$28.2m	$28.2m	$31.3m	$40.9m	$46.0m	$198.5m
Cost for ACT private (subsidy 80% of AA price)	All	$7.8m	$10.2	$19.1m	$22.7m	$26.9m	$31.9m	$118.0m
Available Resources	All	$17.9m	$0.8m	$1.5m	$2.0m	$2.0m	$0	$24.1m
FUNDING GAP	All	$13.8m	$37.6m	$45.7m	$52.0m	$65.8m	$77.4m	$292.4m
Total number of 1ST line doses required	All	43.4m	52.3m	67.5m	77.2m	93.3m	106.3m	439.9m
COMMODITY GAP - number of 1st line doses	All	14.9m	51.2m	65.4m	74.4m	90.5m	106.3m	402.7m

Figure 13: Over-treatment of true malaria cases



6. Cross-cutting issues

6.1. Epidemic/Emergency Control

Not applicable

6.2. Advocacy/BCC/IEC

a. Situation analysis

i. Policies, strategies and approaches

A Strategic Framework for BCC exists which originally dates 2004/05 but is currently updated for 2008/10. This document has been developed in a broad partnership in the "Central Working Group" which is the continuation of the defunct Sub-committee on advocacy and IEC/BCC of the Malaria Coordination Committee. The document outlines in detail the approach to be used including community involvement and participation and also describes key messages for particular audiences.

The major problem is that this is still a draft and no detailed implementation plan exists.

ii. Financing

In general organizations contribute to the IEC/BCC and advocacy components of activities which they are funding, although exact amounts can not always be tagged to these activities. In particular, no overall costed plan exists (as no implementation plan exists) making it impossible to provide a detailed financial gap analysis. For 2008 the amount for IEC/BCC stated in the NMCP budget presentation gives a total of USD 1.0 million based on Federal government, GFATM and WB contributions.

iii. Implementation status

As far as could be determined no systematic implementation of centrally coordinated advocacy or BCC activities is currently done and the "BCC unit" consists of only one person recently assigned to this task. Therefore, all IEC/BCC activities are implemented project related through e.g. UNICEF, GFATM (through SFH in the private sector), WB-Booster project and various USAID funded projects (e.g. COMPASS).

b. Gaps and requirements

i. Key bottlenecks and challenges

The key bottleneck is the lack of a strong unit within NMCP to coordinate advocacy and BCC activities and the absence of a comprehensive and costed plan of action.

ii. Proposed solutions to attain 2010 targets

In view of the short time period to 2010 and the situation described in this report it is evident that

- A massive effort is needed for advocacy at federal, state and LGA level that involves political decision makers as well as opinion leaders of society (including religious leaders) and which is targeted in a dramatically increased contribution of all government levels toward the provision of malaria control commodities as well as implementation support. Only if such a broad coalition of all partners in society can be created is there a reasonably good chance to achieve the ambitious targets.

- Professionally designed IEC/BCC campaigns that utilize all available channels of communication
- More emphasis on the involvement and participation of the communities through adequate structures such as the Community development committees where these exist.

Since no reliable costing data was available, the figures in Table 19 are based on rough estimates for a good BCC campaign provided by SFH and additional funds for advocacy and community level activities.

Table 18. Advocacy, IEC / BCC funding needs (costs in USD)

	2008	2009	2010	2011	2012	2013	Total
Costs for planned advocacy activities							
Costs for planned BCC/IEC activities							
Total estimated costs	**$25.0m**	**$35.0m**	**$40.0m**	**$38.0m**	**$38.0m**	**$38.0m**	**$214m**
Available resources for advocacy							
Available resources for BCC/IEC							
Total available resources	**$1.0m**	**?**	**?**	**?**	**?**	**$0**	**$1.0m**
FUNDING GAP – advocacy							
FUNDING GAP – BCC/IEC							
TOTAL FUNDING GAP	**$24.0m**	**$35.0m**	**$40.0m**	**$38.0m**	**$38.0m**	**$38.0m**	**$213m**

6.3. Surveillance, Monitoring and Evaluation & Operational research

a. Situation analysis

i. Policies, strategies and approaches

The only document available at NMCP is an M&E Strategic Framework paper that outlines in general terms the various sources of information for M&E. In addition M&E plans are available (but were not seen) for the various projects such as GFATM and WB-Booster but there is no overall costed M&E plan. A rather strong (8 staff) M&E group which also covers advocacy exists within the NMCP but most of the data that refers e.g. to ITN distributions, is kept by the respective focal persons and the M&E unit is not involved and hence poorly informed. In combination with the almost non-existent HMIS system (see treatment section) this leaves only the IDSR data which also has significant under-reporting. There are no operational research plans in place

ii. Financing

The contributions for M&E come from the WHO which has funded many of the surveys undertaken in the past, GFATM, WB, USAID and DFID.

iii. Implementation status

Currently a nation wide DHS survey is being implemented which, according to the information available, does include the malaria module but no measurement of bio-markers (anaemia, parasite prevalence). NMCP has not been involved in these efforts and was not aware that the survey is taking place. There are currently no plans in place for a comprehensive Malaria Indicator Survey with bio-markers in the near future.
Sentinel sites that were involved in drug sensitivity testing are currently inactive but are supposed to be expanded from 6 to 12 sites.
Neither pharmacovigilance nor resistance testing in the vector populations are currently in place nor do plans for the same exist.
Some net tracking activities are undertaken for the integrated vaccination/ITN campaigns as described under the ITN section but these are restricted to the first days after the campaign and have never been systematically analyzed. Similarly, the data base for ITNs distributed is limited to the recent integrated distribution campaigns.

b. Gaps and requirements

i. Key bottlenecks and challenges

The greatest challenges are the lack of coordination within the various M&E activities within NMCP, the weakness of the routine HMIS system and the absence of a comprehensive and costed M&E plan.

ii. Proposed solutions to attain 2010 targets

While strengthening data collection and use at the various levels of the health system is a long-term solution in the context of health system strengthening the most immediate steps to improve the situation are to:

- Undertake the M&E system evaluation and strengthening workshop required for the GFATM grant signing and building on this develop a costed M&E plan. This will require at least two workshops of one week each and will have to be supported by TA (approximately USD 40,000 per workshop). The M&E plan should then include all the necessary elements as described in the table below.
- Start planning for a comprehensive MIS survey for 2010 or 2011

Due to the lack of detailed information Table 20 only includes some very rough cost estimates.

Table 19. Surveillance, monitoring & evaluation and operational Research funding needs (USD)

Monitoring and evaluation needs	2008	2009	2010	2011	2012	2013	Total
Routine surveillance							
Routine Logistics Monitoring							
Supervision for above and data utilization							
Meetings for decision making							
Drug efficacy monitoring[1]							
Insecticide resistance monitoring[2]							
MIS survey[3]							
Other planned surveys							
Pharmacovigilance[4]							
LLIN tracking surveys[5]							
IRS quality assurance[6]							
Strengthening capacity to enforce regulations							
Equipment (computers, GPS, PDAs etc)							
Operational research							
Other costs							
Total estimated costs	$2.0m	$6.0m	$6.0m	$8.0m	$5.0m	$5.0	$32.0
Available resources	$0.4m	?	?	?	?	$0	$0.4m
FUNDING GAP	**$1.6m**	**$6.0m**	**$6.0m**	**$8.0m**	**$5.0m**	**$5.0**	**$31.6**

7. Programme Management and Health Systems

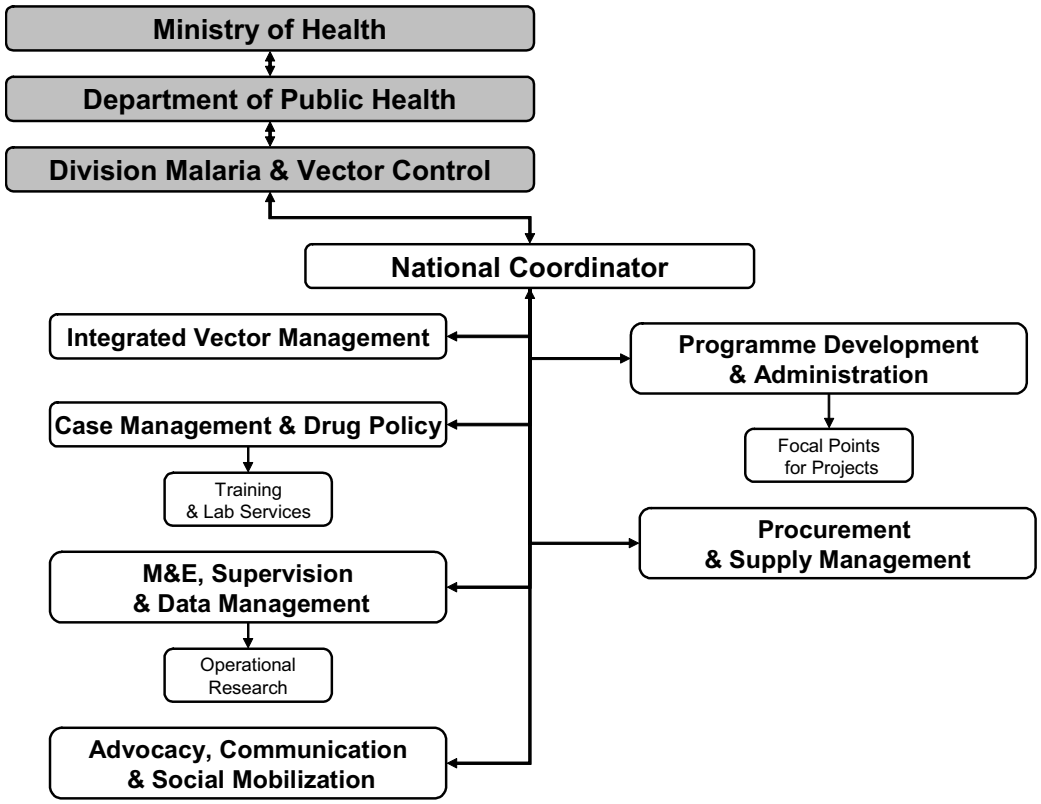
7.1. Programme Management and Health Systems

a. Situation analysis

i. The NMCP's mandated role

The NMCP is a division within the Department of Public Health. It has a National Coordinator and comprises about 51 other staff. Outlined in the figure below is the current organogram for the technical officers at the programme. Each technical area has a focal person in charge and more recently each large project, GF and the booster project, is assigned to a focal person. Despite this, the number of staff is not sufficient to effectively carry out NMCP's mandated role.

Figure 14: NMCP Organogram



ii. NMCP decision-making authority and management

The National Coordinator has the decision making authority and is responsible for managing all the staff. More recently the programme has set up units to handle M&E and PSM. Each of these units has a focal person that provides technical foresight to the other members of the unit.

iii. NMCP enabling environment

The programme is experiencing some constraints in terms of space, communication, transportation, and IT. The WB has rented new offices for the programme, which it will occupy soon. To effectively decide what needs to be done to improve the working environment an institutional review can be done as soon as possible to determine the number of staff, the skills/competences currently available and needed in the short term, and

the working tools required. The findings of this review will better guide how to improve NMCP using any resources that are provided for this purpose.

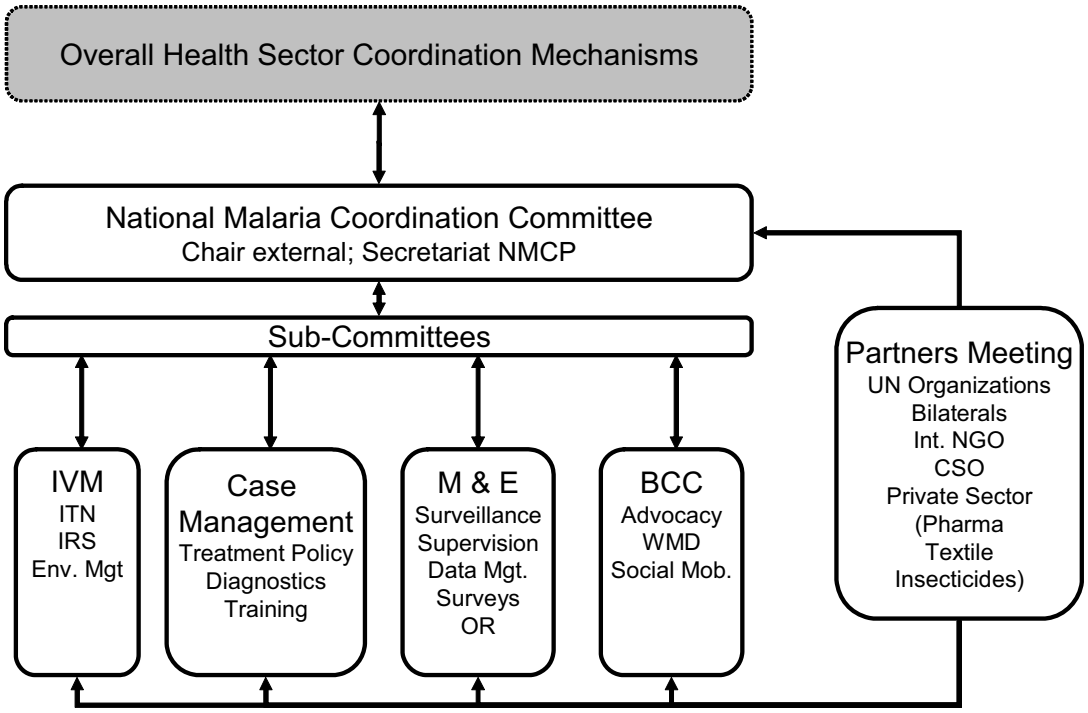
iv. Planning, monitoring and evaluation within NMCP

v. Internal linkages and coordination within Ministry of Health

vi. Co-ordination and main roles of RBM partners at national and sub national levels

This is represented by the diagram below.

Figure 15: The coordinating mechanisms for the country RBM partnership



Meetings of the National Malaria Coordination committee no longer take place as often as they should (last met in 2006). Given the importance of this committee and its subcommittees, there is need to support the meetings to take place at a frequency that is deemed to be feasible and not financially over burdensome.

b. Gaps and requirements to allow NMCP to perform its role

i. Key bottlenecks and challenges

The programme does not have sufficient human resources in terns of numbers and the right skills/competencies. This means that the programme can not be as effective as it should.

The policies in place are not supported with operational plans which makes it even more difficult for the programme to provide the stewardship and leadership that it should to partners and SMOHs. If these plans were costed, it would be easier to appreciate the enormity of implementing the malaria control and prevention strategies that are currently given in NMCP's policy documents.

Reports tend to be too descriptive with not sufficient strategic analysis. Executive summaries are not always done which means that policy makes or implementers have to read through the documents to extract the information they need. Data sources for these reports need to be streamlined e.g. Planning department or

Bureau of Statistics. Reports/Guidelines can then have greater impact. There should also be dissemination to SMOH and LGA.

ii. Proposed solutions

To improve the effectiveness of NMCP, there should be an external review of the programme to examine its technical and management structure and needs for the next five years. The recommendations of such a review will help the targeting of any support that can be provided by partners

7.2. Supply management

a. Situation analysis

i. Ministry of Health supply management systems

There is a central procurement system that is overseen by the Federal Procurement Office with some inputs from programmes. Commodities once procured are initially kept at the Federal Central Stores before their distribution to State general stores. It is from the state stores that they are then distributed to service delivery points at state and local government levels. Tertiary level health facilities obtain their supplies from the Federal Central Stores. In all cases a mixed from of supply obtains that sometimes is a push and sometimes is a pull. The tendency to push is greater at the lower levels. The reports suggest that this system is weak especially in terms of the quality of stores, inventory management and transportation at the state levels. It is for these reasons that the YGC contracted out the distribution of antimalarials for public sector facilities to CHAN med Pharm.

With regard to ITNs, the NMCP quantifies the number of nets needed. This data is passed on to the procuring agent who then arranges for the nets to be procured then delivered either to the Federal Central Stores or the State general stores. With regard to ACTs, NMCP has been responsible for the quantification and forecasting. State allocations are determined in this way and the first quantities were pushed based on these estimates. Thereafter health facilities accounted for what they used up by requesting for the quantities they required. The focal person for case management reviewed the orders which should be based on consumption and approves them by writing to the Federal Central Stores.

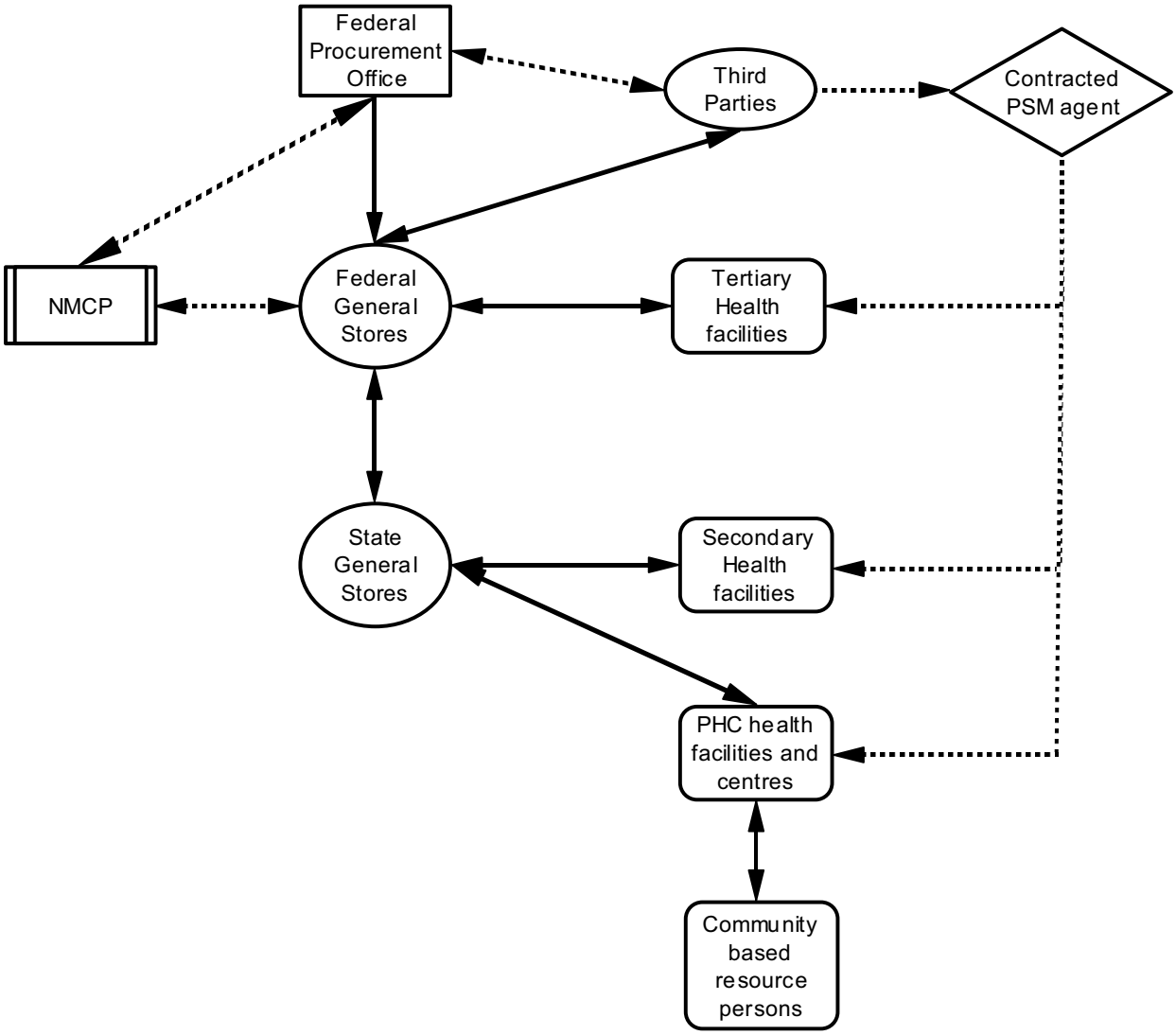
More recently NMCP has set up a procurement unit that will work with the RBM partnership to streamline procurements and improve the supply chain. This unit will also oversee pharmacovigilance of antimalarials by working closely with NAFDAC.

ii. Civil society and private sector supply management systems

Chan Med-Pharm handles PSM tasks on behalf of the YGC as a sub-recipient of Global funds. It currently handles all commodities in round 5 and the antimalarials commodities in round 4. They have 6 ware houses and 17 delivery vehicles. This NGO is the link between the federal central stores and service delivery points comprising selected health facilities. It delivers LLINs, SP and ACTs to 3,360 health facilities in 336 LGAs (10 facilities each) in the 18 GF supported states. Deliveries take place on a monthly basis although these are not scheduled in advance. Health facilities are encouraged to maintain a buffer stock of one month. This NGO does not monitor stock levels or consumption although it has plans to begin to do this.

Chan Med-Pharm handles PSM for 400 missionary hospitals. There is no systematic supply chain for private for-profit health facilities. The open market is used to source commodities for that sector.

Figure 16: The procurement and supply chain for malaria commodities



b. Gaps and requirements to allow NMCP to perform its role

i. Key bottlenecks and challenges

The storage facilities throughout the country are suboptimal in terms of the state of the stores, and the numbers and skills of the pharmacist assistants that manage them. There is need to renovate the 36 state stores and 1 FCT store and even either rent additional space or increase their capacity by building new ones. The personnel that manage them need skills enhancement because the last time there was in-service training was in 2005 for about 20% of the target audience.

Management of general stores is usually done by a general manager. The RBM focal person has to liaise with the general manager to ensure that the malaria commodities are handled and distributed according to plan. This sometimes has not been a very functional relationship and NMCP is looking into the option of renting other space at State level for its commodities.

The minimum stock threshold at state level is 4 months stock whereas the maximum is 6 months. At LGA level the minimum is 2 months stock whereas the maximum is 4 months stock. These levels are however not adhered to for a variety of reasons that have not been elucidated. Consequently, there are reports of stock outs and the delivery schedules are erratic because of frequent and uncoordinated orders.

The lack of transportation to collect commodities from the state stores is a major limitation at secondary and PHC level, but more especially at PHC level.

There is no information about the performance of the supply chain. This information is required if any improvements are to be made in a systematic way. At federal level e.g. NMCP, routine information should be computerised and regular feedback on performance given to stakeholders.

ii. Proposed solutions

- Renovation of all state general stores – This should happen as soon as possible. A report of the assessment carried out earlier this year should be made available to the relevant authorities for their immediate action. A PSM specialist should be contracted to review the capacity of these stores, and the performance of the PSM.
- Stores management – The authority that the RBM unit has over commodities kept at general stores should be reviewed. If there is need for any improvements, these should be made through the relevant authorities so that the health system can be strengthened.
- Consumption data – The pull system should be emphasized as the routine method of ordering commodities. The order should be based on consumption data and therefore, provisions have to be made for this data to be collected at all levels. The options for this need to be examined in a review of the performance of the supply chain.
- Logistics and transportation – Each state store should have sufficient logistics support from a logistician and an appropriate number of vehicles for the distribution of commodities to lower levels. If each store has a delivery schedule that is agreed and shared with its service points then there can be better coordination and more efficient deliveries.

TA support – There is urgent need for TA to carry out an in-depth review of the performance of the supply chain. The recommendations made from this work will need to be addressed if the availability of commodities at service delivery points is to be assured. NMCP's unit should be facilitated with the skills and IT support to effectively coordinate and streamline PSM for malaria commodities. Insomuch as there is need to create a different and more effective chain for malaria commodities, all efforts should be made to improve the routine system first. The exception is the delivery of LLINs for mass campaigns which has to be done through a different approach given the huge space required and the need to link their supply to the net distribution activities at village level.

7.3. Health Systems Strengthening

a. Situation analysis

In this section, the focus is on the cross-cutting health system issues although mention will be made of some of the other specific matters highlighted in the previous sections. It is noteworthy to say that some of the points raised here have been identified and documented elsewhere and yet, no solutions have been implemented.

i. The public sector health system

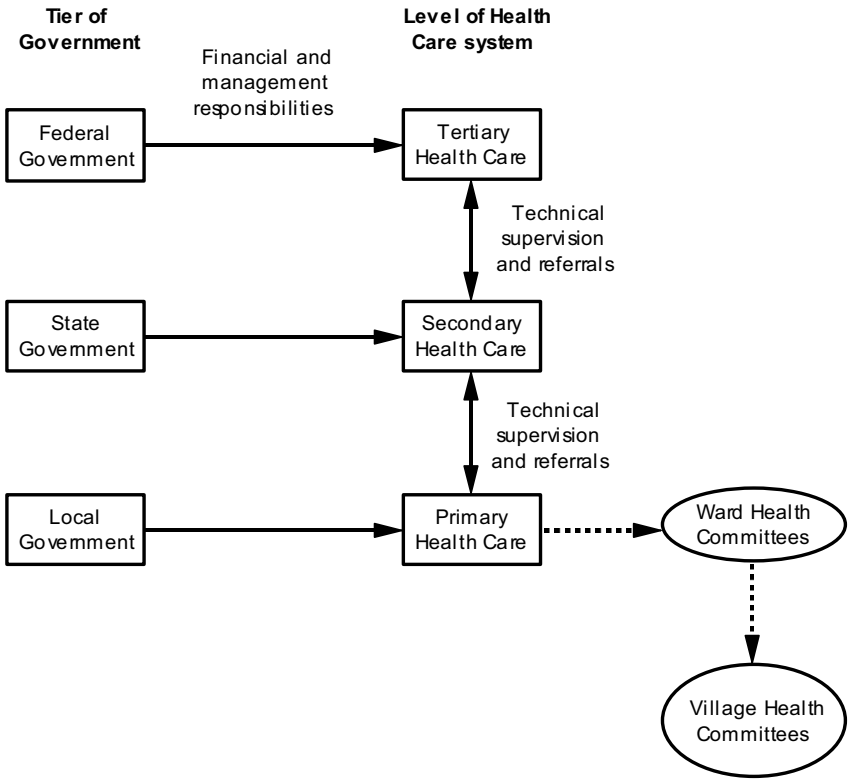
The Revised National Health Policy (FMOH 2004) describes the national health care system in detail. The system is built on the basis of the three-tier responsibilities of the Federal, State and Local Governments. The three levels of health care described below correspond with the three-tiers of responsibilities as a concurrent list.

- Primary Health Care – This comprises general health services of a preventive, curative, promotive and rehabilitative nature. This is the entry point for the population to the health care system. The Local Governments are largely responsible for the provision of care at this level, with the support of the SMOH. Private providers also provide health care at this level. Traditional practitioners can be engaged at this level to collaborate with local health authorities.
- Secondary Health Care – At secondary facilities, more specialised services are provided to patients referred from the PHC level. Outpatient and inpatient services comprising general medicine, surgical, paediatrics, obstetrics and gynaecology, and community services are provided. This level also serves as the administrative headquarters that supervise health care activities of peripheral units. Community health workers (CHEW) are attached to these facilities to carry out the outreach programmes. The SMOH is responsible for the provision of services at this level.
- Tertiary Health care – Highly specialised services are provided at this level. Teaching hospitals and special hospitals providing care for specific disease conditions or specific groups of patients fall into this category. The Federal Government takes responsibility for hospitals offering tertiary health care.

At each of these levels there are a number of bodies that provide guidance, oversight, technical and management support to promote the effective provision of services within national guidelines. These include (a) at Federal level the National Council on Health, the National Hospital Services Agency, the National Primary Health Care Development Agency (NPHCDA), (b) at State level include State Hospital Management Boards, State Primary Health Care Management Boards, (c) at Local Government Level include National Primary Health Care Development Agency, State Primary Health Care Development Board, Local Government Health Authorities, (d) at Ward level include a Ward Health Committee, and (e) at Village level include a Village Health Committee.

The figure below is a diagrammatic representation of the relationship between the tiers of government and the levels of the health care system.

Figure 17: Structure of health system



The Health care system is financed from the Federation Account which employs a complex formula to allocate funds to each tier of government. About 50% of the funds go to the federal government, 25% to state governments and about 15% to local governments. The transfers from this account to the states and local governments are not earmarked and they in turn are not required to provide budgets and expenditure reports to the federal government. Federal government health spending in 2003 and 2004 was calculated to be the equivalent of US$ 288 and US$ 265 million respectively or US$ 2.35 and US$ 2.10 per capita (FMOH and the World Bank 2005). Most of this expenditure goes to tertiary level health facilities, with estimates in 2002 indicating that 77% of federal expenditure went to federal hospitals. At state level a 2002 estimate from 13 states indicates that about 6.3% of state expenditure goes to health care provision representing about US$1.25 to 3.75 per capita. Similar estimates for health spending by the 774 local governments show wide variability from about 12% to 22% representing US$2.45 per capita if the lower estimate is used. The majority of LGA spending goes to personnel.

The National Health Policy (pg 5) documents public expenditure on health to be less than US$8 per capita which is far below the international recommendation of US$34. Private expenditures, mostly from out-of-pocket expenses, account for over 70% of total health expenditure. This inflicts a huge financial burden on a population of which about 52% in 2004 were estimated to live below US$1 per day (NBS 2005). In fact, the estimate for 2002 is that total domestic public health sector health spending ranged between US$3.65 to 8.75 per capita representing 2.9-5.8% of total government spending (FMOH and the World Bank 2005). Total international donor support for the health sector was as estimated to represent US$1 per capita in 2002 which was about one third of total federal government health spending and to similar proportions or more of state or local government spending that year. International donor assistance is growing and is expected to be higher already.

Data from a number of surveys conducted between 1999 and 2001 give the following estimates for the number of public sector health care facilities:

- There are 53 tertiary and specialised hospitals giving a population to facility ratio of 2.1 million people per hospital

- There are 855 secondary health facilities in the 36 states and federal capital territory giving a population to facility ratio of 135,000 people per facility
- PHC facilities are 13,000 in number with a population to facility ratio of 5,500 people per facility. These PHC facilities comprise health posts, clinics and dispensaries and tend to provide lower level services
- The population to facility ratio of PHC centres is 24,000 people per centre. These centres tend to provide higher level services than PHC facilities.

ii. The private for-profit and not-for-profit health systems

The private health care system consists of formal tertiary, secondary, PHC health facilities, pharmacies as well as informal PMV and drug sellers. The private sector comprising the not-for-profit and for-profit health facilities provides health care for a substantial proportion of the population. For example, in the period 1999-2001, although only 2% (n=1) of tertiary hospitals are private, 72% (n=2,147) of secondary health facilities and 35% (n=7,000) of PHC facilities are private. There are 2,751 registered pharmacies giving a ratio of 42,421 people per pharmacy. The informal private sector consists of about 36,000 PMV (2002 estimates) and an unknown number of drug sellers.

Services provided by the private sector are either partially subsidised as in the case of some missionary health facilities or not at all as in the case of individually owned clinics/hospitals. Their distribution therefore tends to follow a greater density in urban areas compared to rural areas except the informal PMVs and drug sellers who do establish in rural areas as much as in urban areas.

There currently is no mechanism of adequately monitoring and supervising the private health care sector.

iii. The reach of the health system

Sixty-four percent of the population is within 20 km from a hospital. Urban areas are better served as 78% of households are within 20 km of a hospital compared to 58% in rural areas. Seventy-one percent of households are within 5 km of a PHC facility. Again urban areas are better served with 80% of households in urban areas being within 5km of a PHC facility whereas 66% have similar access in rural areas. Thirty-nine percent of households live in communities visited by a community health worker (CHEW) at least once a month. The average is similar in urban areas (43%) as in rural areas (38%). Sixty percent of households live within a pharmacy or PMV. These figures arise from surveys carried out around 2001 (FMOH and the World Bank 2005) and therefore what pertains now may differ.

An assessment carried out by the FMOH that included a household survey found that 56% of respondents who were ill in the previous two weeks purchased drugs from a private seller compared to 35% who obtained drugs from a public health facility. A relevant finding in the 2003 NDHS, among children aged under five years who experienced symptoms of fever and or an acute respiratory infection (ARI), treatment was sought from a health facility or provider for 31.4% of them (National Population Commission [Nigeria] and ORC Macro 2004).

iv. Human resources: NMCP and national issues

Some of the key roles of NMCP are to provide a) the policy framework and guidelines, b) technical leadership, c) stewardship and coordination, d) overall supervision of subnational RBM units, c) evidence of progress and impact and d) the political commitment from the federal government to malaria control and prevention. To carry out these important roles the programme needs to have sufficient capacity in terms of competencies and numbers, an enabling environment and the required financial resources. Currently, these are not optimal although there have been some improvements. NMCP has recruited more technical staff in the last three years. The WB is supporting the programme with more office space and more technical staff. The DFID malaria programme that is beginning this year will provide technical programme support. As these initiatives are taking place there is a need to carry out an institutional review of the programme and prepare a development plan that reflects the needs of the new strategic plan. This should address the issues of job

descriptions, performance appraisal, supervision, capacity building and remuneration. In this way, the support received from the federal government and partners can be better targeted.

NMCP staff are very committed and appear to have a high level of motivation despite their lack of commensurate remuneration. It is a credit to the programme that even without all the tools they need that they have been able to make the achievements that they have, for example, the rescheduling of AA and AL to an OTC is commendable. At the policy level, there are numerous policies in place that can be effectively used to deploy the core malaria interventions. However, these policies are revised too often and are not followed with feasible and costed operational/implementation plans. Additional there is some degree of verticalisation with the programme in terms of the core malaria interventions and the various projects such as the MDG "project", booster project and the global fund. There is a focal person for each and more often than not there is a lack of effective communication and collaboration between them. This needs to be addressed by providing regular opportunities for sharing of technical and implementation information between all technical staff. The M&E unit should be able to pool all this programmatic information together in a user friendly format and give regular updates within the programme and to the various technical working groups. Reports that emanate for the technical officers should be reviewed by the M&E unit and circulated among each other. The quality of these reports in terms of summarisation and impact, for example executive summaries that carry the key messages, should be improved by a report writing skills enhancement workshop and on-job mentoring.

Recruitment of staff to NMCP does not appear to be a barrier.

v. Human resources: sub national and service delivery levels

In 2001, it was estimated that Nigeria is served by 24 doctors per 100,000 population and 126 nurses/midwives per 100,000 population (73 nurses per 100,000; 53 midwives per 100,000). The total number of community health workers and community drug distributors is not clear and so far a small number of role model mothers are trained and functioning. Overall, the human resources are scarce, especially in the public sector, for a country with such huge oil revenues illustrating a general lack of investment into the health sector. The National Health Policy (pg 25) indicates that a minimum of 15% of the allocation to health shall be devoted to human resources for health development. There are no figures available to show the level of compliance with this recommendation at the three-tiers of government. The positive note is the relatively large number of PMVs that exist, especially given that they are well distributed in rural areas.

At SMOH level the RBM unit is responsible for the control and prevention of malaria. The unit is headed by a RBM manager. The personnel within the unit should reflect the skills mix at federal level, i.e. a focal person for M&E, case management, integrated vector control, advocacy, communication & social mobilization, and procurement and supply management. However this is not usually the case and more often than not the unit consists of between one to three personnel. This limits the unit's capacity to effectively carry out all the functions that the unit should perform. Additionally they have limited resources to do so, including operational budgets, planning and management skills and tools, and logistic support such as vehicles. Partners at this level are critical to the performance of the unit. It is partly through their support that the RBM unit is able to carry out its activities.

At LGA level, the health authorities have a focal person for RBM. Usually this is one person who has other responsibilities as well. There is very limited capacity at this level to implement malaria control and prevention and it is probably preferable that at this level there should be less verticalisation of programmes so that for example, malaria is implemented as a package of childhood diseases. It is important that a review of health capacity at LGA level is carried out to determine the minimum number of staff that are required to effectively deliver the key health interventions and give effective oversight and support to community based resource persons. Any review should also assess their remuneration and enabling environment. It will be important to address capacity at this level if scale up of malaria core interventions is to be maintained at high levels in the long term, in which case, projects will have to be fully integrated into the national health system framework.

At ward level, there exist ward health committees that comprise health authorities and partners. Like at the other levels, capacity to implement, supervise and coordinate is very limited. It is this level that should be providing supervision to community based resource persons such as RMMs and CDDs.

Anecdotal reports indicate that health workers are not sufficiently motivated both financially and with an enabling working environment, especially at PHC levels. The extent of this was not verified during this assessment but there is need to do a critical review of the human resources and find solutions that can be implemented in the short term at national level. As NMCP is intending to scale up HMM by training more RMM it is important to decide whether this strategy based on volunteers will remain feasible in the medium term if RMM are not provided with financial incentives. In assessing the feasibility of scale up the operational plan should be costed with two scenarios, one with out financial incentives and the other with financial incentives.

vi. Human resources: initiatives to improve human resource situation

There are no nationwide initiatives to address the human resource constraints that exist. Several projects, such as the World Bank Booster project, have supported the national level to increase the number of technical personnel at NMCP. At state level, a number of RBM units have in some cases been supported by partners to have or recruit more staff to help with implementation, for example the seven World Bank supported States. WHO is considering in the short term, seconding a technical officer to each SMOH depending on the availability of funds.

The national treatment guidelines have been incorporated in to the pre-service curricula of medical and nursing training institutions. However, an in-service training programme for health workers does not exist. Such trainings are carried out on an as-needed basis when the funds to do so are available. The private sector health workers are usually not included in in-service training programmes carried out by the public sector.

b. Gaps and requirements to strengthen the health system

i. Key bottlenecks and challenges

The key bottlenecks and challenges that hinder high coverage of health care interventions in general and their impact are known and have been documented elsewhere.

A consultative meeting in October 2003 (Abebe E., Mosanya M. E., et al. 2003) listed the following cross cutting and health system strengthening actions required at the time, (a) Building capacity of health workers and community based workers, (b) Strengthening programme management at RBM secretariat, (c) initiate and implement operational research to support RBM implementation, (d) develop and implement comprehensive communication strategy to support essential actions to achieve Abuja targets and (e) strengthening monitoring and evaluation.

In the current strategic plan, a summary of a SWOT analysis is given on page 24. The weaknesses in the health system that are highlighted are a) a weak and constrained health system that may not cope with added pressures for a national programme expansion, b) inadequate funding for effective programme management and c) procurement and supply chain system that is in its infancy stages. The health system threats noted are a) human resource gaps especially at subnational level, and b) gaps in total required resources for meeting scale up targets.

Interestingly the project appraisal document for a malaria control booster project (World Bank 2006, pg 9) noted the lack of implementation capacity at state and LGA levels which is why the option to use the "contracting-out" approach was taken. A detailed identification and analysis of bottlenecks was carried out and highlighted in pages 79 to 89 of the same document. The bottlenecks described for the project will be similar to those in other states and therefore give insight to the health system bottlenecks that will face scaling up of the malaria core interventions. Key ones related to the health systems are a) Low quality of care in both public and private sector due to inadequate human resources, absenteeism, competing programmes, lack of

standards of care, and poor supervision; b) poor access to health services due to inadequate number of health facilities and trained health workers especially in rural areas, and poor remuneration for health workers; c) low utilisation of health services by the poor as a result of low incomes, lack of social security systems, improper practices by public sector health workers and the high cost of private sector care; and d) delayed use of services and poor adherence to treatment due to delays in recognition of illness, delays in decision making, and lack of transportation.

Little has been done in the recent past to address these bottlenecks and challenges as systemic problems. Significant efforts have been made to do so through the various projects but given the need to implement on a larger scale it is imperative that some bottlenecks are addressed in the short term.

ii. Proposed solutions

It is clear that at all levels there is need to invest in human resources. However the priority should be to start with investments that will pay strategic dividends in the short to medium term. In the case of malaria control and prevention this should be at the PHC level which at the moment is the weakest link. More health workers and CHEWs should be recruited and trained. They should be facilitated better to carry out their functions and to be supervised. They should be empowered to supervise community resource persons such as RMM and CDDs and to extend their reach to PMVs. The services provided at this level should be monitored and evaluated periodically to determine the quality of care provided, and to inform further improvements.

The services (including laboratory strengthening) at secondary health facilities also need additional investments in the short term because the referral system from PHC to this level depends on having a service that is accessible and of good quality. Improvements in the referral system should include the provision of pre-referral treatments and forms at low level facilities. The transportation bottlenecks should be tackled starting with facilities in rural areas especially those with PHC facilities that are far away from a secondary level hospital.

Significant coverage can be achieved through community-based programmes that are effectively implemented. Given the low implementation capacity at LGA levels, caution should be taken in expanding these programmes. Where they are implemented, they should be integrated whenever possible and properly supervised. An initiative that should be scaled up is to provide subsidised antimalarials (preferably AL instead of AA) to PMVs because they have the immediate potential of scaling up coverage to an effective treatment. The work done by SFH in this regard has lessons learned that can feed into the plans to do this. This can be done as the HMM strategy is scaled up but care should be taken to see that one does not undermine the other.

Another area of critical importance is the supply chain. If the commodities such as drugs and diagnostic tests are not available all of the time, then coverage will be hampered. The current system still has room for improvements especially streamlining procurements at Federal Level with a procurement plan, investments in the renovations of stores and building new ones, and improving the capacity of NMCP, SMOH and LGAs to handle PSM. The availability of these commodities should be monitored on a regular basis to track the performance of the chain.

Implementation capacity at state and LGA levels should be improved. This will entail employing more staff with the required competencies or to engage more partners at these levels. Before doing so, an evaluation of the needs at these levels should be carried out.

Strengthening of programmatic M&E and the NHMIS to track performance of the health system will be essential. It is the information from this that will guide further improvements and will galvanise support towards the achievements of targets. A number of health facilities and health authorities should be facilitated to routine provide reliable and timely data to the FMOH and its programmes. This will require computerisation of their data collection and reporting systems.

Improve staff motivation either by raising staff salaries across the board or considering other methods of remuneration. Allowances for working in rural or hard to reach areas can be used as a way of providing

incentives. Other non-financial motivators should be considered for example, improving the working environment.

It will be difficult to implement these solutions if there is no commitment from state governments and the federal government to improve the health of the population. This is the prerequisite to achieve progress because it is the gateway to more financial resources that are needed to address the health system bottlenecks. More effective advocacy and lobbying are required using various channels and employing information on the burden of disease in the country. Other important childhood diseases such as ARI and diarrhoeal diseases, although they cause less morbidity and mortality of disease than malaria, should be included in messages to the government. Other sources of funding for health system strengthening should be actively pursued such as GFATM and the development partners.

Table 20. Actual staffing, staffing norms and requirements

Region / Province / State	Doctors	Clinical officers	Registered Nurses	Nursing assistants	Env. Health Techs	Pharma-cists	Lab Techs	Comm'ty Health Workers
Sub national 1								
Actual								
Norm								
Gap								
Sub national 2								
Actual								
Norm								
Gap								
Sub national 3								
Actual								
Norm								
Gap								
Sub national 4								
Actual								
Norm								
Gap								
TOTAL ACTUAL	**55,376**		**219,407**		**4,280**		**22,683**	**19,268**
TOTAL NORMS								
TOTAL GAP								

Table 21. Public Health facilities and infrastructure

Level/Type	Tertiary and Specialised hospitals			Secondary health Facility			PHC facilities			PHC centres			Registered pharmacies			Patent Medicine Vendors			Informal drug sellers		
	Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
Actual	53	1	54	855	2,147	3,002	13,000	7,000	20,000				na	2,751	2,751	na	36,000	36,000	na	?	?
Norm																					
Gap																					

Annexes

List of people interviewed

	INDIVIDUAL / GROUP
	Ministry of Health
A	**NMCP technical team**
1	• Dr Sofola – Programme Coordinator
2	• Sam Oyeniyi-Booster project focal person (0808 514 3679)
3	• Dr Omede O – GF focal person (08065281448)
4	• Pharmacist Chukwumah Dupe – Head of PSM (0803 445 3939)
5	• Dr GN Ntadom – Case management and pharmacovigilance (0803 327 2644)
6	• Aro MA – M&E (0806 000 3618 / 0705 570 6215)
7	• Dr Olusola Oresanya – M&E (0805 273 4833)
B	**Dept of Health**
8	Planning & Research • Dr Akin Oyemakinde – Consultant/Physician Public Health (0805 776 7482)
C	**NAFDAC**
9	• Mrs Rametu Mamodu (0803 315 9778)
10	• Kalat Musa – National Pharmacovigilance Centre, NAFDAC (0803 596 0514)
D	**Multilateral partners**
11	WHO malaria NPO/s • Dr Bayo Fatunmbi
12	UNICEF • Dr Emmanuel Gemade
13	World Bank Booster Project • Ramesh Govindaraj – Senior Health Specialist & Pharmaceutical Coordinator • Oluwole Odutolu - Consultant
E	**Funding agencies**
14	USAID • Dr Garba (0803 786 8016)
15	DFID • Dr Ebere Anyachukwu – Health Advisor (0803 323 0612)
F	**NGOs**
16	Society for Family Health (SFH) • Uzo Gilpin – Senior Technical advisor (Maternal and Child Health) • Wale Adedeji – GM Maternal and Child Health • Ernest Nwokolo – Director, Malaria (0803 324 0058)
17	Yakubo Gowon Centre (YGC) • Dr Baba Ebenezer – Programme Officer (Malaria)
18	Chan-Medi-Pharm • Pharmacist Micheal Omotosho (0805 577 9543 / 0803 497 7181) • Yetunde Orungbamade – Training and Capacity Enhancement
19	ACOMIN • Adetunji Fadayiro – NAT Coordinator (08086601961)

List of resources used

	Title	Source	Year
1	National Malaria Control Strategic Plan 2005-2010	NMCP	2005
2	Draft National Malaria Control Strategic Plan 2009-2013	NMCP	2008
3	National Malaria Treatment Policy	NMCP	2005
4	National Antimalarial Treatment Guidelines	NMCP	2005
5	National Strategies and Guidelines for Home and Community Management of Malaria	FMOH	2005
6	Policy for the Implementation of Insecticide Treated Nets in Nigeria	NMCP	2005
7	Guidelines for the implementation for the Implementation of Insecticide Treated Mosquito Nets in Nigeria (Final Draft)	NMCP	2005
8	Training Manual for ITNs Promotion, Distribution and Use in Nigeria	NMCP	2008
9	Policy Framework for the Development and Implementation of Integrated Vector Management in Nigeria	NMCP	2005
10	Plan of Action for Integrated Vector Management for Nigeria (2006-2009)	NMCP	2005
11	Manuals for IRS for Managers & Spraymen (Drafts)	NMCP	2008
12	Strategy for Behavioral Change Communication 2008-2010 (Draft)	NMCP	2008
13	Strategy for Behavioral Change Communication 2004-205)	NMCP	2004
14	National Framework for Monitoring and Evaluation of Malaria Control in Nigeria	FMOH	2007
15	Malaria Control in Nigeria - 2007 Progress Report	NMCP	2008
16	Malaria Control in Nigeria - 2006 Annual Report	NMCP	2007
17	Malaria Control in Nigeria - 2005 Annual Report	NMCP	2006
18	Malaria Control in Nigeria - 2004 Annual Report	NMCP	2005
19	Nigeria Roll Back Malaria Consultative Mission: Essential Actions to Support the Attainment of the Abuja Targets	RBM	2003
20	Freeman T: Mapping Malaria in Nigeria	NMCP, World Bank, UNICEF	2007
21	Malaria Control Booster Project Nigeria - Project Appraisal Document	World Bank	2006
22	Nigeria Health, Nutrition, and Population Country Status Report Volume II: Main Report	World Bank	2005
23	Entomological Profile for Nigeria	WHO-AFRO Africa Network for Vector Resistance Nigerian Institute for Medical Research	2007
24	Evaluation of the Pilot Indoor Residual Insecticide Spraying for Malaria Vector Control in Nigeria	WHO	2006
25	Evaluation of the 2005-20010 Strategic Plan to Roll Back Malaria in Nigeria - Technical Report	FMOH	2006
26	Nigeria Demographic & Health Survey 2003	Nigeria National Population Commission & ORC MACRO	2004
27	Nigeria Living Standards Survey	National Bureau of Statistics	2004
28	Preliminary Results from the 2006 Census	Nigeria National	2007

	Title	Source	Year
29	The Statistical Fact Sheets on Economic & Social Development	Population Commission National Bureau of Statistics	2006
30	2007 Population Data Sheet	Population Reference Bureau	2008
31	Country Health System Fact Sheet - Nigeria	WHO	2006
32	UNICEF Infant and Under 5 Mortality Estimates - Nigeria	UNICEF (www.child.org)	2008
33	Summary of the Nigeria 2004 ITN Survey and Comparison with the 2001 Baseline Survey	Netmark	2005
34	Gyapong M. and Garshong B. Lessons learned in Home Management of Malaria: Implementation research in four African countries	WHO/TDR	2007
35	Guidelines for the treatment of malaria	WHO	2006

Description of calculations and assumptions used

2008 RBM-HWG Needs Assessment Calculation Tool 1.5

Approach and assumptions underlying calculation of key commodity needs

Albert Kilian – Malaria Consortium

Introduction

The purpose of the calculation tool is to provide some rough but yet reasonably realistic estimates of key inputs needed for malaria control in order to achieve and maintain the level of intervention that is thought to be sufficient to reach a 50% malaria morbidity and mortality reduction by 2010 (RBM target).

Time that was available to develop this tool did not allow for a detailed review and presentation of the relevant literature which led to the selection of certain values. Nonetheless these values are based on many years of experience in malariology and study of malaria literature. Some values may be less than optimal in specific country situations but that can never be avoided if one "simple" tool is to be applied to a huge variety of settings. Although based on the principle of a compartmental model the tool can not simulate all of the complex aspects of health seeking and treatment behaviours and their changes in the course of malaria control and all results – and particularly those for treatment and diagnosis – have to be interpreted with caution and need to be verified during implementation by actual consumption data of medicines and diagnostic tests.

The following description of the approach to calculations and underlying assumptions is meant to assist in understanding what the tool can and cannot provide and to extract information that can be used to explain the calculation background for third parties such as Global Fund proposals.

1. Population

The population is the starting point for all calculations and it is partitioned in three different ways whereby always the total population must be included in the sum of all categories

- By population subgroups (demography)
- By groups exposed to different levels of malaria transmission (endemicity)
- By groups of different health service utilization

1.1. Demography

The following are the key variables needed for the calculations

- Population size at a given year
- Population growth rate
- Average persons per household
- Proportion of total population being pregnant during one year
- Proportion of total population being below 5 years of age
- Proportion of the total population at ages 5-9, 10-14 and 15 and above

In general the population is defined by the last available census data and then adjusted to a specific year applying the population growth rate.

The total number of households is calculated by dividing the population of a given year by the average number of persons per households. The number of households is a critical starting point for the estimation of ITNs needed to reach RBM targets as well as the basis for the IRS calculation.

As the proportion of the various age groups is not readily available in many countries these have been taken from the data published by the US Census Bureau on the web for each country. The

rates are then divided by the number of years contributing to the age group assuming an even distribution within the age group, e.g. proportion under 5 years is divided by 5 to give the proportion each of those 0-1, 1-2, 2-3, 3-4 and 4-5 years. Based on these the rates the population is then divided into one year age segments 0-14 years while the rest is pooled into one category. This forms the basis for the calculation of fever and malaria cases in the population.

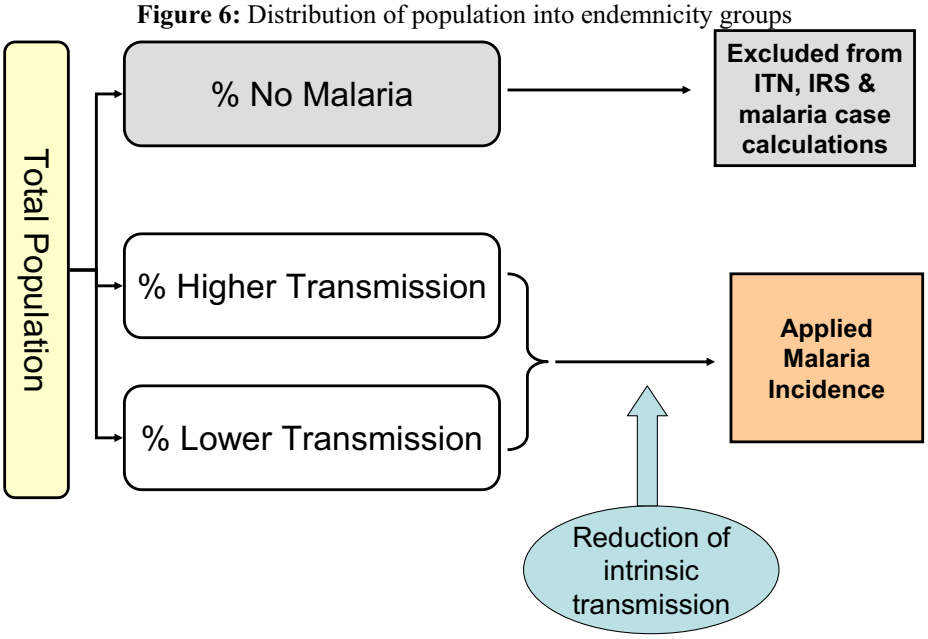
1.2. Endemicity

The tool currently allows only three categories of malaria transmission intensity

- No malaria risk
- Higher stable transmission
- Lower stable transmission

These are thought to be those that would apply if no control whatsoever were implemented. The naming of these categories is a bit misleading as the "low" category is still reasonably high and not equivalent to the classical hypoendemic area. It is hoped that a future version could allow such a fourth category. However, by varying the ratio between the two major transmission levels and introducing the option to reduce transmission at starting point, almost any level of malaria transmission can be simulated. The figure below shows a schematic presentation of the situation. Details of the resulting malaria incidence rates in each stratum are given in the treatment section.

Figure 6: Distribution of population into endemnicity groups



1.3. Utilization of Health Services

The information on curative health and ANC service utilization is needed for three calculations

- ACT treatments & RDTs needed for the public sector
- IPT needs (at least two ANC visits)
- ITN distribution through ANC services (at least one visit)

Therefore health service utilization in this context means "use of health services for the treatment of febrile illnesses". It should be noted that the population is divided in only two categories

- Public health services (which includes NGOs if these are provided free ACTs)
- Non-public services (which is the "private" sector in the broadest sense as it includes not only for-profit hospitals and clinics, pharmacies and drug shops but also herbalists, traditional healers and those who get treatment from home or none at all).

In order to allow the inclusion of home-based fever/malaria management programmes the proportion of children under 5 years who receive treatment through this channel can be defined separately. This population group is then shifted from "private" to "public" which means that they are added to those already accessing the health facilities for fever/malaria treatment. This is based on the experience from Uganda that increases in HMM did not reduce the attendance in the facilities but rather pulled clients from the informal private sector.

2. Prevention

2.1. ITN/LLIN

For the calculations of ITN/LLIN needs two independent calculations are carried out

- Estimation of the needs to reach the RBM (80%) and 100% universal access target based on the coverage of households and taking into account population growth as well as wear and tear
- Estimation of the number of nets needed and turned over defined by the distribution mechanisms a country has chosen

Comparing the two then allows an assessment whether the targets are likely to be reached provided the targeting for replacement nets is reaching those who actually need new nets. ITN distribution is only calculated for the free public sector distributions. Any nets distributed through the commercial sector (subsidized or at cost) have to be added manually before a comparison with the estimated need is done.

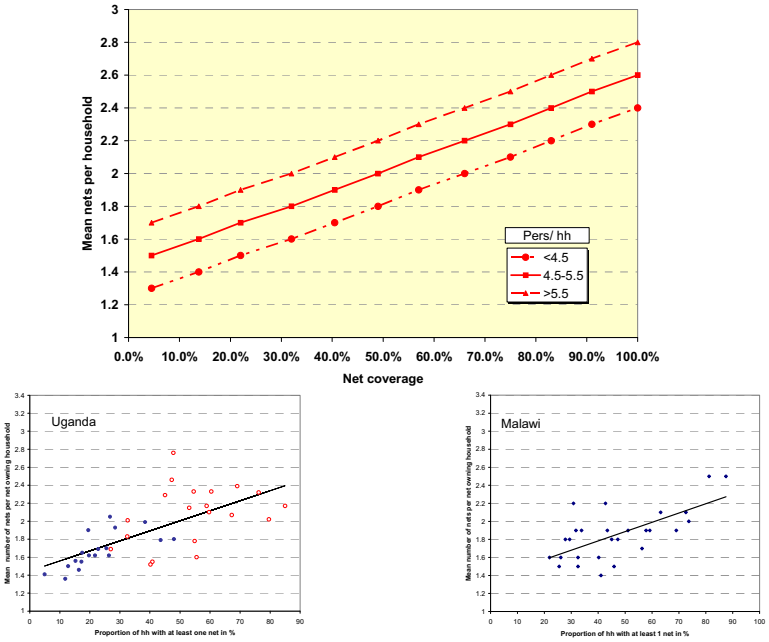
2.1.1. Estimated need to reach target

These calculations are based on a more detailed ITN model that has been developed over the last 5 tears and which is based on the following concept

- Calculations are based on households not individuals
- The number of nets allocated to one household is dependent on the net coverage rate based on empirical data on the relationship between coverage and mean number of nets per household. This relationship is also used to translate nets distributed into coverage achieved and vice versa
- Average loss of nets is a function of age of net and netting material and non-linear

The Figure below shows the relationship between average nets per household and net coverage rate applied in the calculation. Two examples are shown (Uganda and Malawi) to demonstrate that this is built on real data. As it seems plausible (and data support this) that the mean number of nets per household vary with the number of people in the household three levels have been implemented depending of household size. Assumed nets per household at 100% coverage are varying between 2.4 and 2.8 nets per household.

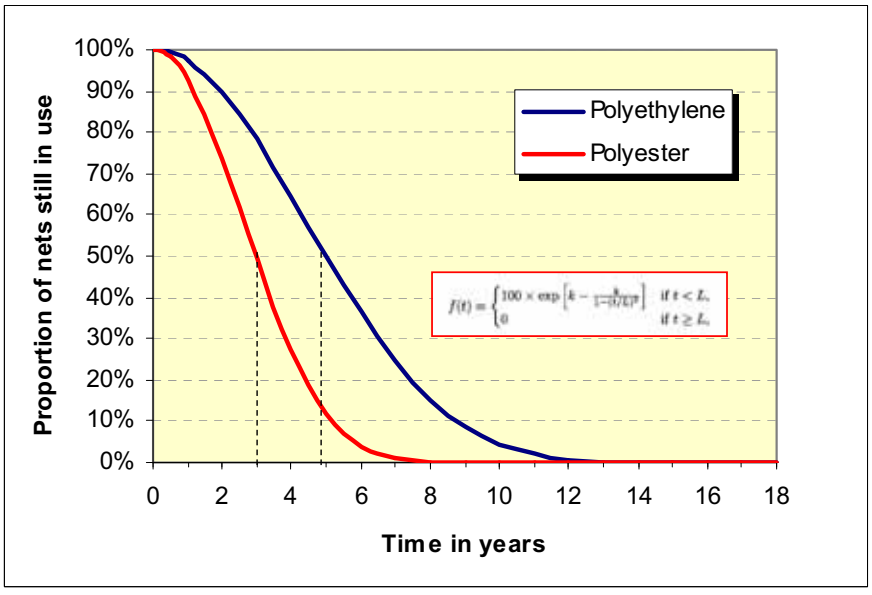
Figure 7: Relationship between number of nets per household and net coverage rate



The loss function (wear and tear) of the nets in the original ITN model is based on available published data and field observations in the case of polyester nets. In the case of polyethylene nets it is more hypothetical as no sufficient data on useful life of these materials exists as yet. The expected decline over time is then expressed as a mathematical function[2] and applied to each annual batch of nets distributed (see Figure below).

For the calculation tool average loss rates have been taken from these curves assuming a 50/50 mix of polyethylene and polyester nets and taking into account the average age of net at a given time point.

Figure 8: Loss rates (wear and tear) on which calculations are based

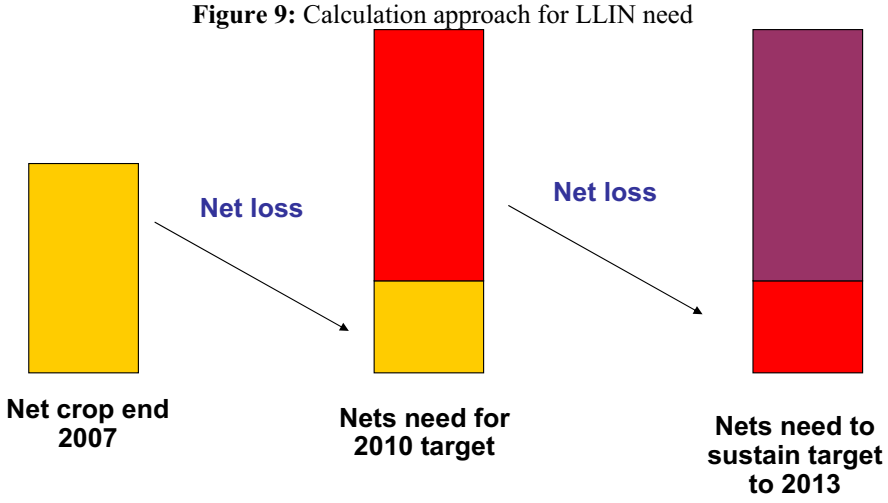


[2] The function was developed by Nakul Chitnis, Swiss Tropical Institute

The exact procedure to calculate the LLIN need to reach the 80% and 100% universal access targets in the proportion of the population targeted for ITNs is as follows:

- There are three steps involved in the calculations (see Figure below)
  - Establish the net crop at the end of 2007
  - Apply the adequate loss to these nets to calculate how many of these will be left by end 2010 and add sufficient nets to be distributed between 2008 and 2010 to reach the 80% or 100% target by end 2010 based on that year's households
  - Apply the net loss to the 2010 net crop for the end of 2013 and again calculate the nets that need to be distributed 2011-2013 to still have the respective coverage by end 2013.

Figure 9: Calculation approach for LLIN need



Step 1: Net crop calculations for end 2007 depend on the settings on the data input page:

- If survey data is available (2005 or earlier) the net crop for the survey year is calculated from
  - Number of households in that year
  - ITN coverage reported in survey
  - Mean number of nets per net owning household corresponding to the ITN coverage level as shown below

ITN coverage	mean net/hh
0-4.5%	1.5
4.6-13.8%	1.6
13.9-22%	1.7
22.1-32%	1.8
32.1-40.5%	1.9
40.6-49%	2
49.1-57%	2.1
57.1-66%	2.2
57.1-75%	2.3
75.1-83%	2.4
83.1-91%	2.5
91.1-100%	2.6

- This net crop is then reduced to the end 2007 net crop by applying the following loss rates based on mid-point time between survey and end 2007 (assuming that at the time of the survey the mean age of nets was already between 1 and 2 years)

time (years)	old net loss
1	20.0%
1.5	30.0%
2	40.0%
4	75.0%

- To this net crop the nets distributed between the survey year and end 2007 are added and these are submitted to the following loss rates depending on mid-point time between survey and end 2007 (assuming that all nets were new when distributed)

time (years)	new net loss
1	3.0%
1.5	7.5%
2	10.0%
4	60.0%

- If no survey data is available the ITN coverage rate entered in the data input page is assumed to be for end of 2007 and the net crop is calculated as described above but without applying any net loss and no nets are added.

Step 2: Calculation of nets to be distributed between 2008-2010 to reach targets by end 2010:

- The net crop of 2007 is brought forward to end 2010 by applying loss rates for nets of average 4 years (by end 2010) in the tables above separately for the old nets (from survey estimate) and new nets (between survey and 2007)
- Then the total need to reach the 80% and 100% targets is calculated from
  - Households at the end of 2010 (80% for 80% target)
  - Mean number of nets in net owning households at 80% and 100% coverage depending on mean household size

pers/hh	mean net/hh	
	80%	100%
>5.5	2.6	2.8
4.5-5.5	2.4	2.6
<4.5	2.2	2.4

  - Adding 10% to compensate for losses of the nets distributed between 2008 and 2010 (average time 2 years from "new nets" table above)
  - Adding another 10% for logistical losses (supply line etc)
- For the "low" estimate the remaining net crop from 2007 is deducted, for the "high" estimate they are ignored

Step 3: Calculation of nets to be distributed between 2010-2013 to reach targets by end 2013:

- Net crop from 2007 is now assumed to have been completely lost
- Nets distributed between 2008 and 2010 are reduced by 60% (4 year new nets from table above) by end 2013
- Nets needed by end 2013 for 80% and 100% target are calculated as described above

- For the "low" estimate the net crop remaining from the "low" estimate 2008-2010 is subtracted, for the "high" estimate 50% of the remaining "high" estimate from 2008-2010 is subtracted

2.1.2. Estimated number distributed by mechanism

The nets that can be distributed by free public distribution mechanisms as planned by the country are calculated separately for routine and campaign distributions and then added up.

- Annual routine distributions are based on individuals in the area targeted for ITN distribution in a given year as follows:
  - Pregnant women attending ANC services at least once
  - Children less than 1 year attending health facilities
- Campaign distributions in the selected year are calculated differently for targeted campaigns to children and pregnant women and general campaigns
  - Targeted campaigns use the number of individuals in that group and year
  - General campaigns use the households in target area applying the mean number of nets given per household as selected on the data input page
- For all distributions a 10% logistic add-on is calculated

2.2. IRS

Calculations for IRS are quite straight forward applying the rates selected on the data input page to the proportion of households targeted for IRS namely

- Proportion of houses to be reached within targeted area (usually 80%)
- Number of structures per household
- Surface area per structure (formal/informal)
- Number of rounds per year
- Cost per household for all IRS activities (insecticide & implementation but not IEC/BCC)

The amount of insecticide needed is calculated separately for formal and informal structures by calculating the total surface area to be sprayed divided by the surface per insecticide package depending on the selected insecticide brand.

2.3. IPT

For Intermittent Preventive Treatment in pregnancy calculations are restricted to the proportion of women selected in the data input page as IPT in many countries is not implemented in low endemicity areas.

Three variables are calculated

- Number of women targeted with at least 2 doses of IPT
- Number of treatments needed (2 per women)
- Amount of SP needed and its cost based on the number of needed treatments but increased by
  - 15% to allow for women who receive more than two doses
  - 10% as logistic add-on
  - Rounded to full tins of 1,000 tablets

All calculations of these variables are applied for four settings

- All pregnant women in the targeted area
- 80% of pregnant women in the targeted area
- All women in targeted area attending ANC at least once

- All pregnant women in targeted area attending ANC at least twice

3. Treatment & Diagnosis

The need for ACT treatments and diagnostic tests is done in two steps

- First, the number of fever and malaria episodes (*P. falciparum* and non-falciparum) is calculated for each age group and each year
- Then these fever and malaria episodes are subjected to the settings on health service utilization and diagnostic policies defined on the data input page.

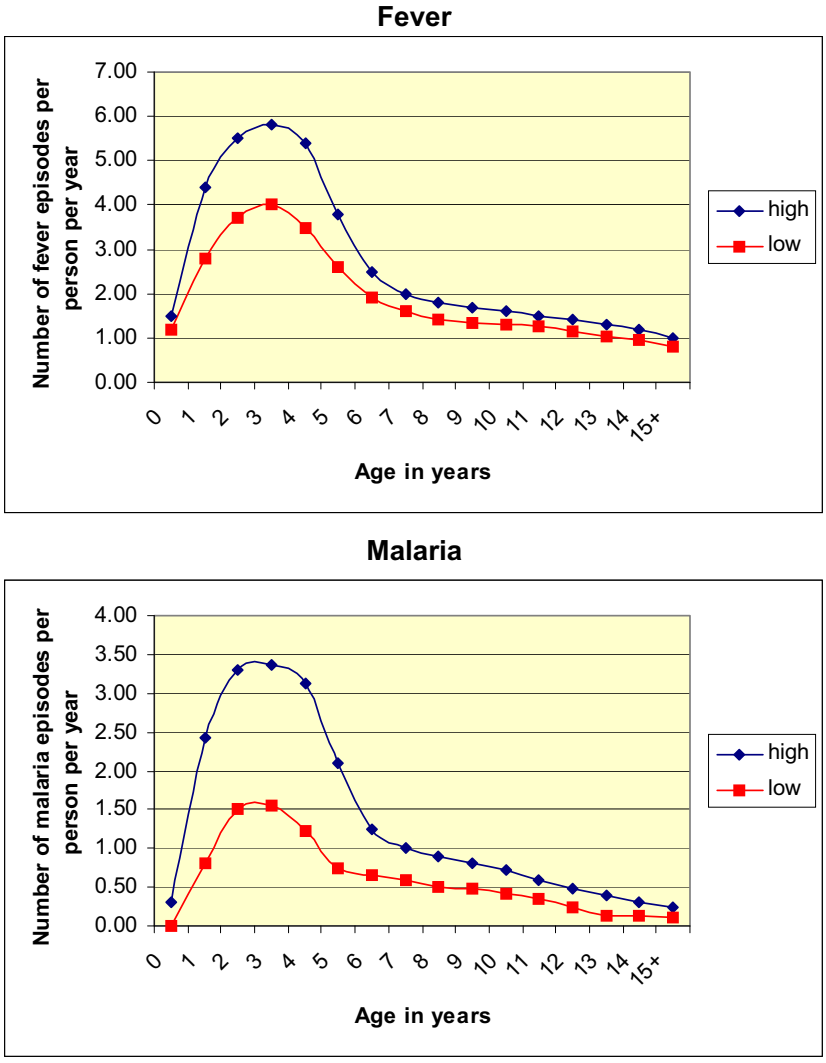
3.1. Fever and Malaria Incidence

As out lined in section 1.1 and 1.2 the fever and malaria incidence rates are applied to one year age intervals between 0 and 14 years of age and the rest of the population (15+) pooled into one age group and the number of episodes per person and year are defined by the settings of malaria endemicity and initial reduction of incidence already achieved at baseline year.

The figure below shows the age specific fever and malaria incidence rates which are

- based on the general malaria literature and accepted WHO estimates
- adjusted so that non-malaria fevers are the same in the "high" and "low" malaria settings

Figure 10: Fever and malaria incidence rates at baseline



The table below shows the average number of fever and malaria episodes by age group in the baseline settings.

Mean Episodes/Person/Year by endemicity level at baseline*				
	Fever		Malaria	
Age	"High"	"Low"	"High"	"Low"
<5	4.5	3.0	2.5	1.0
5+	1.8	1.4	0.8	0.4

As explained in section 1.2 these incidence rates can be influenced by the mix between the "high" and "low" endemicity settings and the level of initial reductions. The table below gives an example for average rates for malaria in children under 5 years of age at various levels of initial reductions. These are generally set at a maximum of 30% but for specific countries (e.g. Ethiopia, Zanzibar, Comores) have been allowed to take any level.

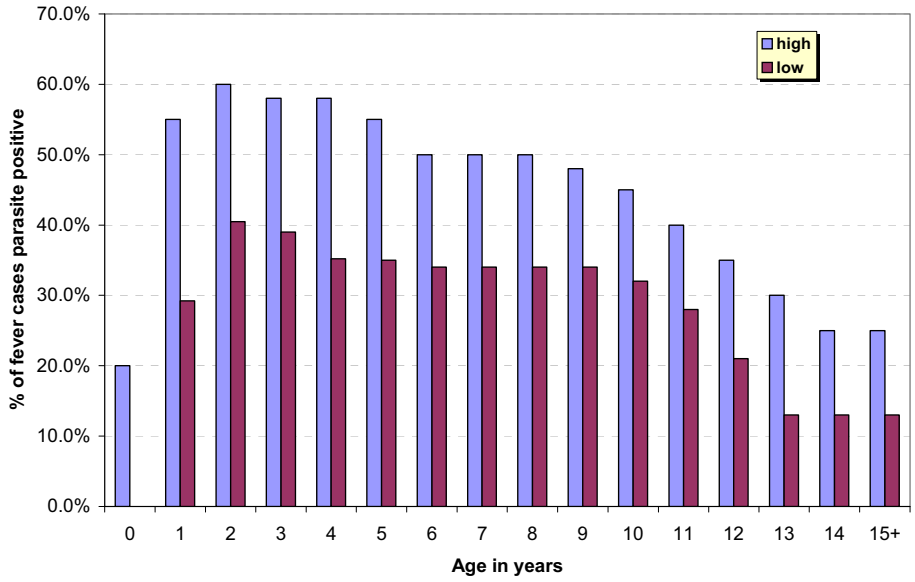
	Malaria rates <5	
% reduction	high	low
0	2.50	1.00
10	2.25	0.90
20	2.00	0.80
30	1.75	0.70

Malaria incidence rates (but not non-malaria fever incidence) are reduced as targets for 2010 are approached and met according to the table below. If initial reductions are set the reduction will be the same as the previous year if it is below the rate in the table below. These rates are currently subject to debate and will be adjusted in a new version of the tool as soon as a consensus is reached.

Year	% reduction from previous year
2008	0%
2009	10%
2010	35%
2011	75%
2012	80%
2013	80%

The resulting parasite rates (proportion of malaria cases among fever cases in each age category) are presented in the figure below and are in keeping with slide or RDT positivity rates that have been reported in various settings from health facilities. As the malaria incidence reductions are applied in later years the proportion of parasite positives decreases to a minimum of 0.1-0.5% which are the parasite rates currently observed e.g. in Ethiopia and Zanzibar.

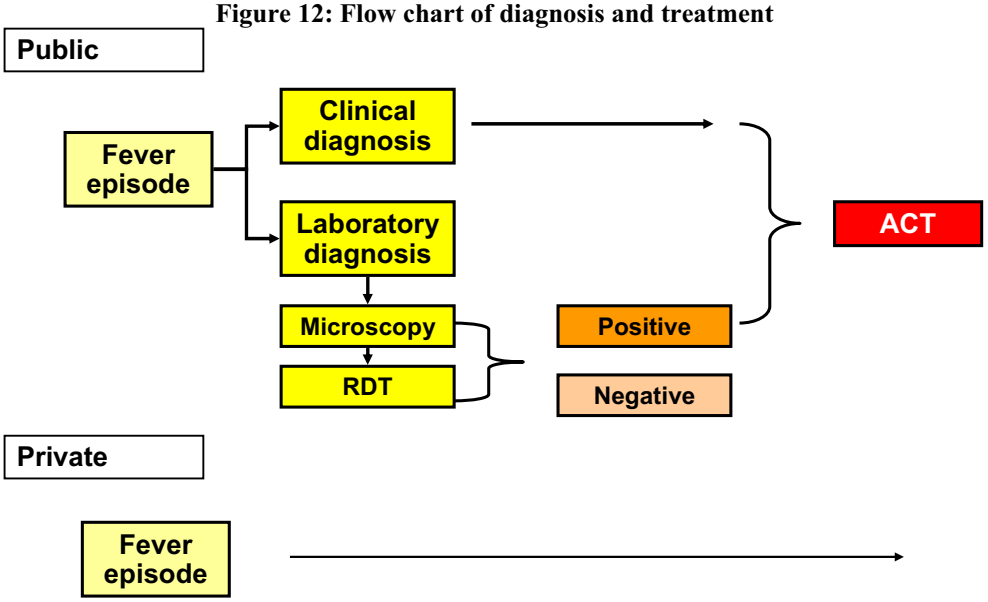
Figure 11: Proportion of fever cases being malaria positive by age group at baseline



3.2. Diagnosis and ACT treatment

Once the fever and malaria episodes for each age group and year are defined they are applied to the population at risk proportionate to endemicity strata and subjected to the health utilization and diagnostic settings. The figure below gives an overview whereby the process for the "private" sector is the same as for the public sector. It must be kept in mind that the total is always the total population at risk and hence the "private" sector includes everybody not attending the public sector.

Figure 12: Flow chart of diagnosis and treatment



Cases of non-falciparum malaria are calculated separately if a proportion is set for these.

The following assumptions are made in applying the diagnosis setting for falciparum cases

- A fever case is given an ACT if clinically diagnosed
- Diagnostic tests have 100% sensitivity and 100% specificity, i.e. the number positive is determined by the ratio of total malaria vs. fever cases in the age group and year in question.
- All cases tested positive are given an ACT
- No case negative is given an ACT

The number of doses of ACTs needed by sector is then summed up by age categories depending on which ACT is used as first line treatment and presented in the output table. Costs are calculated by multiplying the number of doses per age category with the price for that age group set in the data input page.

In the treatment & diagnostic calculations no additions are made for logistic add-ons.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