Malaria
Intervention framework for malaria control in Primary Health Care (PHC), Mother and Child Health Care (MCHC) and HIV/AIDS programs

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MDM- France
S2AP
Niklas Luhmann, MD, MscPH
62, rue Marcadet
75018 Paris
niklas.luhmann@medecinsdumonde.net
LIST OF ACRONYMS

ACT  Artemisinin Combination Therapy
ANC1  First Antenatal Contact
BCC  Behaviour Change Communication
CHW  Community Health Workers
CTX  Cotrimoxazole
CHMP  Centrale Humanitaire Médico-Pharmaceutique
DOI  Direction des Opérations Internationales
GF  Global Fund
HMM  Home-Based Management of Malaria
HRP  Histidin Rich Protein
IEC  Information Education Communication
IPTp  Intermittent Preventive Therapy for Pregnant woman
IRS  Indoor Residual Spraying
ITN  Insecticide Treated Bed Nets
LLIN  Long Lasting Insecticide Treated Nets
MCHC  Mother and Child Health Care
NHIS  National Health Information System
PHC  Primary Health Care
PLDH  Parasite Specific Lactase Dehydrogenase
PMTC  Prevention of Mother to Child Transmission
SP  Sulfadoxine-Pyrimethamine
STAO  Technical Support Unit
WHO  World Health Organization
TABLE OF CONTENTS

I. Introduction ............................................................................................................................................... 4

II. Minimal intervention package for integrated malaria control in PHC/MCHC /HIV programmes ......................... 5

1. Analysis of the epidemiological context of the intervention .5

2. Prevention ............................................................................................................................................ 6

2.1. ITNs/LLINs: .................................................................................................................................... 6

2.2. Intermittent Preventive Therapy of pregnant women (IPTp) ................................................................. 8

2.3. Health education in malaria control .................................................................................................. 10

3. Case management: early diagnosis and treatment ..........11

3.1. Diagnosis .......................................................................................................................................... 11

3.2. Treatment ......................................................................................................................................... 12

3.3. Procurement of quality antimalarials .......Erreur ! Signet non défini.13

3.4. Home based Management of Malaria (HMM) ............15

4. Analysis of socio-cultural and socio-economic determinants of access to malaria prevention, diagnosis and treatment ....15

5. Malaria epidemics .................................................................................................................................. 17

6. Monitoring and evaluation ..................................................................................................................... 18

7. Best practice and operational research ................................. 18

III. Annexes: ............................................................................................................................................. 19
I. Introduction

This intervention framework presents the essential guidelines for malaria control in the primary health care (PHC), mother-and-child health (MCHC) care and HIV/AIDS programmes of MDM. It has been developed after a thorough analysis of the reality in 13 different MDM programmes (in 2008) around the whole world in order to harmonise the different practices and in order to increase the quality of malaria control in current and future MDM PHC/MCHC/HIV-programmes. This document has been developed and written under the coordination of the technical support unit (STAO) in the Paris headquarters and in collaboration with other services and a number of associative members of MDM.

The framework outlines – most importantly - a ‘minimum intervention package’ for an integrated approach of malaria control in MDM PHC/MCHC/HIV programmes. The different interventions proposed in this package should be implemented in all MDM PHC/MCHC/HIV programmes - wherever this is possible and appropriate. According to the epidemiological reality in the intervention area, malaria may be one of the fundamental public health issues (e.g. in high transmission areas in Sub-Saharan Africa) and thus an integrated malaria control strategy needs to be at the heart of the programme, among other essential intervention components. In countries and areas where proportional morbidity in PHC-centres is between 20-40%, and where malaria is the primary cause of mortality in infants and U5 - children, malaria control should certainly be a priority in PHC/MCHC programming. In the context of moderate or low malaria transmission, control efforts remain important, even though they may not be an absolute priority. Furthermore this minimum package of care should also be useful in MDM programmes that focus on HIV control. This will also be covered below.

This framework should guide the implementation of the proposed ‘minimum intervention package’. The package itself is also summarised in the form of a table in Annex A of this document. The framework outlines, further more, types of interventions that are essential in malaria control, but not part of the MDM ‘minimum intervention package’. Those interventions therefore are not obligatory in PHC/MCHC programming in malaria endemic or epidemic settings.

It is important to note that according to the MDM general intervention strategy, all the outlined interventions should be related to and aligned with the existing governmental malaria control strategies and protocols. It is in this sense a core principal for the implementation of malaria control efforts to read the recommendations of this document in the light of existing national policy frameworks. In those cases where the governmental policy does not appear
appropriate or effective, MDM may consider an adapted strategy for advocating for policy change – ideally in collaboration with other stakeholders.

The framework presented hereby has been developed on the basis of the MDM-document ‘Malaria. Burden of disease, prevention, diagnosis and treatment. A review of the evidence and practice in international policy. Update December 2009.’

This overview was edited both in 2008 and in 2009 by the technical support unit (STAO) at the MDM headquarters and summarises the latest scientific evidence and policy recommendations regarding malaria control in the international context. The document itself is based on research findings, key WHO publications, and practical recommendations from other humanitarian stakeholders and includes operational research and field experiences from MDM programmes.

II. Minimal intervention package for integrated malaria control in PHC/MCHC programmes

The following framework outlines the different main points of a ‘minimum intervention package’ in order to implement high quality malaria control strategies in MDM’s PHC/MCHC programmes. It is valid for emergency programmes also as for post-crisis settings and development contexts - even though priorities, implementation strategies and funding mechanisms may be different.

1. Analysis of the epidemiological context of the intervention

A basic analysis of the endemic malaria species and the transmission pattern should be conducted as the foundation of every integrated malaria-intervention. Therefore, the following basic facts should be collected before starting to develop a response:

- What are the main malaria-species prevalent in the area of intervention? Is it a falciparum-only area? Are there other plasmodium species prevalent?
- What type of transmission pattern of malaria is the intervention set in? Is it an area of high/stable malaria-transmission? Is it an area of low/unstable malaria transmission? Are there important seasonal differences? What is the level of immunity of the population?
- Especially in areas of low transmission and in the case of emergencies/humanitarian crises, the potential for malaria epidemics should be taken into account. Are there significant movements especially by populations with a different immunity to the local/stable population?
- In the case of a potential risk for cyclic epidemics caused by changes in climate, try to get information on prior epidemics. What was their duration? How many people and what areas were affected?
- In the case of strong prevalence of *P. vivax* in the area of intervention, try to get reliable information on the reported potential severity (progression into severe malaria) of the vivax-disease.
- It is also recommended to take into account the basic epidemiological facts regarding HIV/AIDS in the country and region of work in order to develop the adapted strategies in terms of prevention and curative care.

This basic set of information is absolutely essential in order to define the curative, diagnostic and preventive strategy of the programme. It is important to note that some of these aspects may change according to microclimate and other factors influencing the malaria-related entomology within a country or even within a district or intervention zone. It is advised to get in contact with the national malaria control programme, the WHO and other competent stakeholders in the respective intervention context in order to collect the necessary information.

2. Prevention

Preventive efforts in MDM PHC/MCHC programmes should focus on three key components:

- Distribution of Insecticide Treated Bed Nets (ITN) (ideally of Long Lasting Insecticide Treated Nets [LLIN])
- Implementation and reinforcement of Intermittent Preventive Therapy for pregnant women (IPTp) in contexts of high transmission
- Adequate health education

Other measurements of vector control, such as Indoor Residual Spraying (IRS), may in certain contexts be supported by MDM after thorough analysis of its safety and the potential efficacy, but are not part of the minimum package for malaria control in PHC/MCHC/HIV-programmes.
2.1. ITNs/LLINs:

MDM ensures the distribution of ITNs/LLINs (as the most effective single preventive measure in malaria control) especially in moderate and high transmission areas through public health sector-based regular PHC/MCHC services such as antenatal care visits and immunization activities.

The distribution of bed nets should be integrated into the health care services and may even be a starting point for increasing the quality of those regular services. ITNs distributed through MDM programmes should be free of charge as are all other preventive measures supported by MDM.

In general, it is essential to guarantee distribution of bed nets to the most vulnerable populations and communities. Thus, the pattern of transmission in the area of intervention plays an important role in order to define the target population for the bed net distribution.

**In areas of high and moderate transmission** - where a certain amount of acquired immunity exists - pregnant women, children under 5 (U5) and HIV+ persons are the most important target groups for the distribution of bed nets, as they are at higher risk of developing clinical, symptomatic and severe malaria and of malaria-related, long-term consequences or death. The distribution to U5 children, pregnant women and HIV+ individuals should be done through routine health centre-based approaches:

- In the case of pregnant women, the bed net should be given out during the first antenatal contact (ANC1) in order to prevent possible malaria inoculations as soon as possible.

- In the case of newborns and U5 children, the bed net should be given to the mother after delivery, during a routine vaccination contact, during a postnatal visit or during a curative consultation. Since newborns and infants are protected until around the third or fourth month of life through maternal antibodies and are therefore not at immediate risk of clinical malaria, it is possible to use the bed net as an incentive to be distributed during a postnatal consultation or a vaccination follow-up.

- In the case of HIV+ individuals, bed nets should be given to those who are tested positive in the health centre, who report a positive HIV-status or who show clinical symptoms in terms of AIDS.
HIV programmes that are set in endemic malarious areas should distribute bed nets to the HIV+ persons (receiving ARV-treatment or not) and especially including pregnant HIV+ women.

According to research, mass distribution of ITNs have proven to be a clearly pro-poor distribution mechanism that allows reaching the most vulnerable communities and individuals who have the most difficult access to health care. Therefore, bed nets should ideally be distributed in addition to the distribution in the health care institutions through other distribution mechanisms that profit the poor and the communities with the most difficult access to health care. In this sense, ITNs may be distributed during immunization campaigns or through child health days/weeks that target U5 children with a package of interventions - including distribution of ITNs, vitamin A supplements and deworming. Distribution through such mechanisms and ITN mass distribution are not part of the ‘minimum intervention package’ even though they should be considered given their effectiveness and efficacy.

In areas of low transmission where proportional morbidity and mortality are rather low, where acquired immunity does not exist and the risk of malaria epidemics is potentially high, the whole general population is at risk of clinical malaria and the potential risk of progression to severe disease. Bed net distribution should target all those communities or populations that are at increased risk for epidemic outbreaks and those most remote from curative health care. In those programmes that are set in low transmission areas which focus on the reduction of maternal mortality, ITN distribution may also be considered for pregnant women and especially for HIV+ persons.

In addition to the listed interventions, ITN should be used in all MDM programmes in the health care centres that have a short stay unit and in all hospital wards and departments that are supported by MDM. Moreover, all expatriate and national staff should be using ITNs. It is the responsibility of the medical coordinator to assure the use of ITNs among all MDM team members.

With regards to the evidence concerning different types of bed nets, it is clear that those with long-lasting characteristics are the most effective and sustainable solution. Therefore, MDM ensures and supports the distribution of LLIN - rather than nets that have to be retreated or are even untreated - whenever affordable and possible. The LLINs that have been validated by WHO, such as Permanet 2.0, Duranet and Olyset, are the best choice in terms of quality and should be distributed wherever affordable and adapted. In the case of existing local productions, MDM should ensure the quality of the nets before starting their distribution through coordination and contact with knowledgeable stakeholders – such as WHO, UNICEF and MSF. Where those nets are not affordable or not available, the distribution of other Insecticide Treated Nets (ITN) or even of untreated nets remains both absolutely essential and effective.
The financing and supply of ITNs/LLINs can often be done through direct collaboration with partners, such as UNICEF (the largest supplier of LLINs worldwide) and others. Furthermore, the Global Fund to fight AIDS, Tuberculosis and Malaria (GF) is an essential financing body for malaria control in developing countries.

Moreover, before the implementation of bed net distribution mechanisms, a basic understanding of sleeping patterns in the affected communities should be acquired in order to allow the utilisation of adapted nets (colours, forms etc.); see also section 2.4.

It is generally very important to develop a simple and clear monitoring system in order to keep track of the bed net distribution. Generally, distributed nets should be noted on the immunisation card of children or the maternity card of mothers. Other monitoring systems should be put in place if these are not functional or adequate.

2.2. Intermittent Preventive Therapy for pregnant women (IPTp)

In order to reduce the impact of malaria related morbidity for pregnant women and for the unborn child, MDM ensures the distribution of sulfadoxine-pyrimethamine (SP) as Intermittent Preventive Therapy for pregnant women in all areas of moderate and high transmission and in areas of a generalized HIV epidemic.

In consideration of the growing resistance of the malaria parasites against SP and the overlapping disease distribution with HIV/AIDS, it is recommended to give three doses of SP to every pregnant woman (during their antenatal care visits) after the first trimester of the pregnancy or after quickening (first noted movements of the foetus) in all those MDM-programmes that are set in high transmission areas of malaria and at the same time in a region with a generalised HIV/AIDS epidemic (especially in Sub-Saharan Africa). This is particularly important in countries where the prevalence of HIV/AIDS in the general population is moderate or high. Just as with other malaria control interventions, reinforcing the mechanisms for distribution of IPTp during antenatal care visits should help improve the quality of these services in an integrated way.

In the same manner, HIV programmes that are implemented in malarious areas should consider IPTp treatment of pregnant women and thus the integration into their PMTCT activities.
In all those areas where HIV/AIDS prevalence is low and resistances to SP absent, 2 doses of SP during pregnancy are sufficient. Women with a known HIV+ status should still receive three doses of SP in these intervention areas. Two doses of SP for IPTp should always be given with a minimum of a 30-day interval between them.

For HIV-positive women on Cotrimoxazole (CTX) treatment for the prevention or treatment of opportunistic infections, it is recommended to continue CTX (without additional SP) which also prevents malaria and thus serves as IPTp.

As shown in different research trials, community-based distribution of IPTp may be helpful for the improvement of coverage of this measure, even though real conclusions cannot as yet be drawn. Thus, community-based delivery mechanisms may be an option for operational research in MDM programmes.

All developments in relation to changes to guidelines for IPTp will be regularly monitored at headquarters level.

2.3. Health education in malaria control

Health education is an essential part of an integrated malaria control strategy and should therefore be implemented in all programmes. In general, the success of the proposed interventions in terms of prevention, diagnosis and treatment of malaria relies also on an informed and participating population.

Health education is especially important in relation to the distribution of bed nets (Bed net distribution should always be associated with adapted educative messages in order to ensure proper use. All possible information with regards to possible obstacles based on cultural believes and practices should be analysed and taken into account for the development of the distribution strategy and the IEC/BCC messages), in relation to the use and the adherence to ACT and IPTp and in relation to the development of an integrated HMM approach and strategy. Malaria related health education should moreover focus on the importance of preventing and treating malaria in U5 children and pregnant women, on the risk of developing severe malaria and the importance of early diagnosis and treatment.

Apart from providing the appropriate information, it is strongly advised to hold demonstrations (for example in the proper use of ITN and vector control activities), and to use participatory methods any time a behaviour change is sought. With regards to the importance of informing the population, it is strongly advised to develop a communication strategy that can rely on different approaches and different tools. For more detailed information, please refer to the following documents:

Concerning malaria and other diseases, the main messages to pass on to the population can be found in Facts for life (UNICEF publication).

3. Case management: early diagnosis and treatment

3.1. Diagnosis

In order to reduce over-diagnosis of malaria and the under-diagnosis of other important diseases and in order to reduce the use of ACTs with their related costs and toxic effects, all MDM programmes in malaria-endemic areas should establish a malaria management strategy that is based on parasitological confirmation through light microscopy or rapid diagnostic testing (RDTs). MDM should implement a strategy that aims at reducing the prevalence of clinical, presumptive malaria diagnosis at all levels of the health care system through the development of adapted protocols and the training of health care providers and policy makers.

Because quality light microscopy relies on experienced and qualified laboratory staff and standard equipment, its use in peripheral PHC centres should be kept to a minimum. High quality microscopy remains of importance for the treatment of severe malaria and quality control at the hospital level. On the first level of care, in PHC centres, RDT are an important alternative to quality light microscopy. They have to be used systematically and in association with clear treatment algorithms in order to be of high added value for public and individual health. Thus, health care staffs have to be trained and supported in understanding the role of this diagnostic tool for increasing the quality of care for febrile disease. The main challenge is to increase health care workers’ confidence in the test results and to use the tests as a tool of the management of febrile disease rather than malaria alone. Training and clinical algorithms need to focus on the management of malaria as well as non-febrile illnesses.

RDT-based parasitological confirmation is especially valuable and effective in areas of low and moderate transmission and during periods of low seasonal transmission. In areas with high transmission and high malaria prevalence, the added value of rapid diagnostic testing may decrease a bit because of the high case load and the high prevalence of parasitemia.

MDM thus recommends the following use of RDTs:

- Systematic use of RDTs and/or microscopy in areas/periods of moderate and low transmission in case of clinical presentation of malaria
- Systematic parasitological diagnosis by microscopy and/or RDT in pregnant women in the case of clinical malaria regardless of the type of transmission

- **Update 2010**: In settings of intense, perennial transmission, malaria diagnosis should always be confirmed by parasitological means regardless of the age. Treatment of U5 children should not anymore be based on clinical criteria alone.

RDTs should be available in addition to this in the MDM pharmacy in all programmes in malaria endemic countries in order to allow prompt biological diagnosis among expatriate and national MDM staff.

MDM recommends the use of the following tests:

- in areas of only-falciparum transmission: Carestart HRP2 (Pf). This test is based on HRP2 antigens and detects only *falciparum* related parasitemias. Its performance has been clearly better than that of Paracheck in a large WHO evaluation of RDTs conducted between 2008 and 2009.

- In areas of mixed transmission and especially those areas with a relevant prevalence of *vivax* transmission: CareStart pLDH/HRP2 Combo (Pf/Pv). This test is based on the detection of two antigens, HRP2 and pLDH, and can detect falciparum infections and non-*falciparum* infections.

In those countries where problems for the importation of the adapted Carestart test exist, other RDTs with high performance characteristics have to be considered in collaboration with the headquarters.

In all programmes minimal quality assurance measures have to be planned in order to monitor the rapid diagnostic tests. Therefore a sample of 20 – 50 RDTs should go through simple quality insurance measurements every six months.

### 3.2. Treatment

MDM recommends the use of artemisinin-based combination therapy (ACT) as a first line treatment for uncomplicated falciparum-malaria in all those countries where resistance to monotherapies with chloroquine, sulfadoxine-pyrimethamine, mefloquine or other drugs are prevalent. MDM uses the ACT that is stipulated by the national protocol if this is in line with evidence and best practices. Similarly, MDM uses the best treatment option for *vivax* infections according to national protocols and evidence.

In countries where national malaria policies are nonexistent or not up to date but where the use of ACT is well adapted, MDM works with the most adapted ACT in
The choice of the ACT therefore depends on the costs of the different combinations, the resistance of the associated molecule and the history of mono-therapeutic use of one of the molecules.

The following ACTs are recommended for use in developing countries (in alphabetic order):

1. artemether/lumefantrine (gold standard, worldwide good efficacy, most expensive)
2. artemether plus amodiaquine (in areas where the cure rate of amodiaquine monotherapy is greater than 80%. Not really recommended in Asia)
3. artemether plus mefloquine (insufficient safety data to recommend its use in Africa. Possible use in Asia and Latin America)
4. artemether plus sulfadoxine/pyrimethamine (in areas where the cure rate of sulfadoxine/pyrimethamine is greater than 80%)

Artemether/lumefantrine is generally considered today as the ‘gold standard’ in terms of efficiency, side effects and resistance.

Artemether/lumefantrine has shown as well to be safe and very effective in malaria infections during pregnancy – at least in the treatment during the 2nd and 3rd trimesters.

All prescribing health care workers should be trained in the use of ACTs in order to guarantee their correct use. The use of ACTs should be regularly supervised. In order to increase adherence to ACTs, prescribers should be trained in how to give a clear and comprehensible explanation to their patients of how to use the medicines. Co-formulation or user-friendly packagings - such as blister packs – are recommended to encourage completion of the treatment course and correct dosing.

With regards to the treatment of complicated malaria, MDM programmes should develop a clear integrated strategy of the management of severe malaria on the primary and secondary health care levels in the context of intervention. Therefore, precise treatment and management protocols need to be put in place to start treatment and management on a primary health care level. In places where intravenous treatment of severe malaria is impossible on a PHC level, intra-muscular or intra-rectal pre-referral treatment options should be considered. Moreover, a referral system to a secondary treatment level (district hospital) where laboratory screening, blood transfusion and intensive care services are available needs to be set up in order to allow proper management of severe malaria as a medical emergency.

In addition, the improvement of the quality of care of severe malaria management on a secondary, hospital level may be considered in the framework of MDM interventions.
In general, malaria treatment should follow the national protocol of the country of intervention. For detailed information regarding scientific evidence on treatment of uncomplicated and severe *falciparum*-malaria in pregnant women, lactating women, infants and travellers of the most common complications in severe *falciparum*-malaria also as non-*falciparum*-malaria please refer to the WHO-treatment-guidelines:

WHO. Guidelines for the treatment of Malaria.
URL: http://www.who.int/malaria/docs/TreatmentGuidelines2006.pdf

Almost all national treatment protocols can be found at the following webpage: http://www.who.int/malaria/treatmentpolicies.html

3.3. Supply of quality antimalarial drugs.

Among the therapeutic classes subject to being counterfeited and substandard, antimalarial drugs occupy a significant place. The responsiveness and adaptability of Mafia networks now affect artemisinin for example, some counterfeits of which are circulating and have already been identified in Southeast Asia. Given the risks to individual health and public health, ensuring quality and reliability of supply sources is essential to avoid treatment failures, prevent the development of resistance, or even in some cases death. It is therefore critical to maintain the effectiveness of molecules available, in a context where the therapeutic arsenal remains limited.

The supply of antimalarial drugs will thus follow the procurement strategy for international missions defined by the DOI. In this policy, priority is given to international purchasing, and as a secondary approach, to local and regional purchases according to objective criteria.

*The international* procurement should be – according to this policy – in the international purchase centres selected among the humanitarian purchase centres approved by ECHO:

- in Europe: CHMP France, IDA and MSF Logistics

**These purchases are made**

- *by the headquarters* (logistics service) for the centres based in Europe. The purchasing procedure is then managed by this service (and not by the field teams) after receipt of an international order from the mission.

In the case of non-feasibility (based on objective criteria) of supply by the international purchasing centres (because of import bans, restrictions on clearing etc.), *recourse to domestic and regional purchases can be considered*. 
In this case, the purchases should be made only:
- From suppliers approved by one of the following organisations:
  - ECHO: humanitarian purchase centres authorised in Africa: ASRAMES (RDC), CHMP (Kenya)...
  - WHO: see, pre-qualification programme
  - UNICEF and MSF if access to the information is possible through the network

These purchases are made
- by the field (medical or general coordinator) including the centres based in Africa (or other regional areas of intervention where appropriate)

The purchase process is then managed by the mission, under the medical or general coordinator.

To identify qualified sources of antimalarials producers, WHO’s pre-qualification programme is a key resource in that it results in the development of a paired list of item/producer/production site properly validated for their compliance with norms and standards as defined by WHO.

The approved quality is thus linked to a specific production site. All orders placed with suppliers (purchase centre, distributor, manufacturer etc.) will thus need to then specify the name of the antimalarial, the name of the manufacturer and the production site, as demanded by the supplier.

The list of pre-qualified products and updates are available on the following website:

http://mednet3.who.int/prequal/

3.4. Home-based Management of Malaria (HMM)

MDM programmes - providing health care in areas of high Plasmodium falciparum transmission - should seriously consider developing a community based strategy to bring early malaria diagnosis and treatment closer to the beneficiaries and patients. Such a strategy should be based on the principles of community participation and on the approach of home based management of malaria (HMM).

In the case of MDM, the strategy should serve the purpose of increasing the number of diagnosed and treated malaria cases in a given area through the training of community health workers (CHW). Thus the most disadvantaged communities and their various members may profit from the positive effects of malaria diagnosis and case management. It may at the same time be a good opportunity to strengthen the involvement of the community in the treatment and care continuum.
Considering the existing experiences and strategies in HMM, the MDM HMM-strategy focuses on the training of community health workers (CHW) on diagnosis, treatment and referral of malaria. The HMM strategy should be part of a general strategy of community reinforcement and task shifting. It is essential to assure a clear position in the health care continuum to the CHW and to guarantee their support and supervision. Furthermore, it is essential to use blister or unit-dose packaging to increase patients’ adherence. This community-based intervention depends on a clear strategy of community-wide use of information, education, and communication for behavioural change (IEC/BCC).

Moreover, MDM may consider collaborating with mothers in order to guarantee community ownership and the regular and constant availability of drugs as well as with pharmacists in order to increase the quality of the diagnosis and treatment through this sector.

HMM is not part of the ‘minimum intervention package’ for the moment. It is nevertheless strongly recommended to take these mechanisms into account in order to increase access to early diagnosis and treatment and in order to improve community participation and ownership.

### 4. Analysis of socio-cultural and socio-economic determinants of access to malaria prevention, diagnosis and treatment

It is well known that socio-cultural and socio-economic determinants play a crucial role in the access to health care. Consequently, a basic analysis of those determinants should be undertaken in all those PHC and MCHC programmes that are set in high transmission areas where malaria morbidity and mortality is a main health care problem.

This basic analysis should focus on the following questions:

- **General:** Is malaria acknowledged as a disease? What is the local name for malaria? What different kinds of symptoms may be described by that local terminology? How do people think malaria is transmitted (i.e. natural vs. supernatural causes; breaking of taboos)? How much does it cost to cure an episode of simple or complicated malaria on average? Who does the community regard as most in need of protection against malaria?

- **Prevention:** What methods are used in the local context to prevent malaria? Do the people in the community use bed nets? From whom do they get the nets? Are there people who possess bed nets and who do not use them? Why do these people not use the nets? How are people’s homes organised for sleeping (type of housing and type of sleeping habits)?

- **Diagnosis and treatment:** How is malaria diagnosed and treated in the local context? Where do people normally go to first for the treatment of a febrile episode? What are the main barriers for the population to going to the health care centres for diagnosis and treatment in case of a febrile disease?
Having basic knowledge about these socio-cultural and socio-economical determinants is particularly critical for the development of BCC strategies or health education messages as well as for effective distribution of bed nets. Only health education that is based on knowledge of the contextualised local systems of interpretations and representations can be culturally appropriate and effective. Information of the community should therefore always include a basic analysis of these popular knowledge systems. The information messages developed for the population may and should therefore become rather complex – even though formulated in adapted lay language - in order to show the links with and the respect for the local production of knowledge. In addition to culturally sensitive health education messages, it is equally important to understand the basic economical reasons for the complex health care-seeking behaviour of the population and the perception of the services delivered in order to improve access to care and prevention.

This analysis should ideally be done through a comprehensive and structured use of qualitative methods, such as observation, focus group discussions and individual interviews. This may not be possible everywhere due to operational constraints. It is nevertheless part of the minimum package of care of MDM in the case of malaria control – especially in high transmission areas – for making a basic assessment of the questions listed above. This may be done through simple visits to the community and recurrent discussions with families and community leaders and with health care providers and community health workers.

A more exhaustive analysis would look more precisely into the construction of local knowledge systems and aspects of health care-seeking behaviours through the use of different qualitative methods and their exhaustive analysis. For ideas regarding a rather complete analysis of these determinants, please refer to the respective chapters and parts in the document ‘Malaria. Burden of disease, prevention, diagnosis and treatment. A review of the evidence and practice in international policy. Update Mai 2010’ developed also by MDM headquarters.

5. Malaria epidemics

In all areas where MDM intervenes, a thorough analysis of the epidemic potential should be done in order to prepare possible control measures and in particular plan for sufficient stocks of ITNs, RDT and treatment.

With regards to the different fields of intervention done by MDM, it seems especially important to understand the epidemic potential in complex emergencies and natural disasters.

In the case of complex emergencies – especially among displaced populations – analysis should focus on the immunity of the displaced community and the transmission pattern in the area of intervention (the refugee camp etc.). Conditions of overcrowding may increase the risk for an epidemic malaria outbreak.
In the case of natural disasters - such as floods - especially when followed by long periods of water stagnation, proportional morbidity may even decrease for several weeks after the incident. Malaria epidemics may then develop from around 6 weeks onwards after the floods.

In areas of rather low malaria transmission, analysis of the intervention context should focus on the history of past epidemic outbreaks caused by climate anomalies – for example excessive or prolonged rainfall or unusual increases in temperature, e.g. in highlands where malaria inoculation is normally absent or nearly absent. Those epidemics are usually cyclic and occur according to a certain pattern.

If epidemic potential is estimated to be high, MDM should ensure an appropriate preparation of control measures according to the affordability and the collaboration of funding mechanisms and in collaboration with the WHO and other UN agencies. MDM therefore focuses on the timely purchase and distribution of diagnostic and treatment supplies and ITNs.

6. Monitoring and evaluation

In all PHC/MCHC/HIV MDM programmes in which malaria control activities are in place, monitoring and evaluation of activities and indicators related to the malaria control efforts should be integrated into a comprehensive monitoring system and done through the follow-up of some (core) indicators. These indicators should be chosen in respect to the national malaria strategy and the National Health Information System (NHIS) in place – if possible and if such a strategy exists.

According to the importance of malaria control in a given context and the type of intervention package implemented, a reasonable number of indicators should be chosen from the indicator list that can be found in ANNEX B of this document. The indicators in this list have been included according to international standards. It is therefore important to use the indicators of this list as much as possible in MDM programmes to help harmonise malaria-related monitoring and evaluation for MDM at programme and at headquarters levels. Furthermore, the use of the indicators listed similarly allows for a harmonisation of monitoring and evaluation on a national and international level.

Please see ANNEX B for the indicators list.

7. Best practice and operational research

In order to increase the quality of an integrated malaria control strategy in PHC and MCHC, the different health care programmes in malaria-endemic or -epidemic countries should share their experiences and best practices in this field with the technical advisor at headquarters level: Niklas Luhmann (STAO, niklas.luhmann@medecinsdumonde.net)
In addition, the following topics would appear to be the most interesting areas of operational research for MDM:

• Improving access to early diagnosis and treatment through community participation and training of community health workers (CHW). What HMM strategy is adapted in an integrated, horizontal approach?

• ITN distribution and utilisation. Social and cultural determinants and the use of bed nets. How can we improve use of ITN among the most vulnerable? What mechanisms help to improve utilisation?

• Low uptake of second and third doses of IPTp. How can IPTp be improved through quality antenatal care? What community-based mechanisms may improve delivery of IPTp?

III. Annexes:
# ANNEX A: Minimum and complete malaria intervention packages in MDM PHC/MCHC programmes

<table>
<thead>
<tr>
<th>Type of intervention</th>
<th>Low malaria transmission</th>
<th>High malaria transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis of transmission patterns and endemicity in intervention area</td>
<td>In every malaria-endemic context, a basic analysis of the basic endemic, epidemic, and entomological facts must be collected in order to guide the intervention strategy. Please refer to the text for further details.</td>
<td></td>
</tr>
<tr>
<td>Distribution of ITNs in health care structures</td>
<td>To very vulnerable groups. Especially HIV+ individuals.</td>
<td>To most vulnerable communities/individuals, such as HIV+ individuals and pregnant women.</td>
</tr>
<tr>
<td>Mass distribution of ITN</td>
<td>No</td>
<td>To most vulnerable communities/individuals</td>
</tr>
<tr>
<td>ITN distribution during malaria epidemics</td>
<td>Depending on phenomenology of epidemic, ITN distribution to most vulnerable groups and communities is obligatory</td>
<td></td>
</tr>
</tbody>
</table>

**Minimum package** (obligatory) | | Complete package | Complete package

**High malaria transmission**
<table>
<thead>
<tr>
<th>Use of ITN in health care centres, hospital departments and among expatriate and national staff.</th>
<th>yes</th>
<th>yes</th>
<th>yes</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPTp</td>
<td>no</td>
<td>no</td>
<td>According to MDM guidelines in the text. Important in HIV programs</td>
<td>According to MDM guidelines in the text. Possibility of delivering IPTp through community based interventions.</td>
</tr>
<tr>
<td>IRS</td>
<td></td>
<td></td>
<td><strong>Collaboration on IRS is only considered in the case of epidemics</strong></td>
<td></td>
</tr>
<tr>
<td>Treatment of uncomplicated malaria</td>
<td>Appropriate early treatment according to national guidelines and evidence. ACT as a first line treatment for uncomplicated malaria in all countries where resistance to monotherapies with CQ, SP, MFQ or other drugs are prevalent. Training of health care workers in treatment protocols, especially in transition to ACT use.</td>
<td>Appropriate treatment according to national guidelines and evidence. ACT as a first line treatment for uncomplicated malaria in all those countries where resistance to monotherapies with CQ, SP, MFQ or other drugs are prevalent. Training of health care workers on treatment protocols, especially in transition to ACT use.</td>
<td>Appropriate treatment according to national guidelines and evidence. ACT as a first line treatment for uncomplicated malaria in all those countries where resistance to monotherapies with CQ, SP, MFQ or other drugs are prevalent. Training of health care workers on treatment protocols, especially in transition to ACT use.</td>
<td>Appropriate treatment according to national guidelines and evidence. (ACT) as a first line treatment for uncomplicated malaria in all those countries where resistance to monotherapies with CQ, SP, MFQ or other drugs are prevalent. Training of health care workers on treatment protocols, especially in transition to ACT use.</td>
</tr>
</tbody>
</table>
The guidelines for the supply of quality antimalarial drugs must be respected in all cases. See text for more details.

<table>
<thead>
<tr>
<th>Procurement of quality antimalarials</th>
<th>Treatment of complicated, severe malaria</th>
<th>HMM</th>
<th>Health education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of integrated strategy of management of severe malaria at primary and secondary health care level.</td>
<td>Development of integrated strategy of management of severe malaria at primary and secondary health care level.</td>
<td>None</td>
<td>Focusing on IEC/BCC in relation to ITN use, ACT + IPTp adherence and prevention/diagnosis/treatment of malaria in U5 children and pregnant women. Use of different tools and methods</td>
</tr>
</tbody>
</table>

Training, support and supervision of community health workers concerning malaria diagnosis (RDT), treatment and referral. Unit-dose/blister packaging. Coordination with IEC/BCC activities. Considering mother coordinators and pharmacists in the strategy. Option for operational research.
<table>
<thead>
<tr>
<th>Analysis of socio-cultural and socio-economic determinants</th>
<th>no</th>
<th>Basic or comprehensive analysis of socio-cultural and socio-economic determinants for prevention, diagnosis and treatment of malaria</th>
<th>Basic analysis of socio-cultural and socio-economic determinants for the development of adapted health education messages and an adapted approach for bed net distribution also as diagnosis and treatment</th>
<th>Comprehensive analysis of socio-cultural and socio-economic determinants for prevention, diagnosis and treatment of malaria.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidemic preparedness</td>
<td>Analysis of epidemic potential especially in complex crisis and natural disaster. Ensuring an appropriate preparation of control measures and in collaboration with the WHO and other UN agencies. MDM focuses therefore on the timely purchase and distribution of diagnostic and treatment supplies and ITNs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring and evaluation</td>
<td>Monitoring and evaluation in an integrated comprehensive PHC/MCHC monitoring system and done through the follow-up of some (core) indicators. Monitoring of epidemic potential important.</td>
<td>Monitoring and evaluation in an integrated comprehensive PHC/MCHC monitoring system and done through the follow-up of some (core) indicators. Monitoring of epidemic potential important.</td>
<td>Monitoring and evaluation of an integrated comprehensive PHC monitoring system and done through the follow-up of some (core) indicators.</td>
<td>Monitoring and evaluation of an integrated comprehensive PHC monitoring system and done through the follow-up of some (core) indicators. Evaluation of malaria specific outcomes and impact.</td>
</tr>
<tr>
<td>Best practice and operational research</td>
<td>All programmes implementing a comprehensive malaria control strategy in PHC/MCHC programming should exchange their experience and best practices with the technical advisor at HQ level. Operational research on core topics (listed in the text) is encouraged.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# ANNEX B: List of programme indicators in malaria control

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition</th>
<th>Calculation of indicator</th>
<th>Comments/Benchmarks</th>
<th>Remarks</th>
<th>Data source</th>
<th>Core indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General indicators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaria prevalence rate</td>
<td>Number of confirmed malaria cases per 1.000 population per time (\mu)</td>
<td>Numerator: Number of all confirmed malaria cases at a given time frame (\mu) Denominator: Total population at risk at the same time frame (\mu) Comment: Calculation per 1.000 persons</td>
<td>Breakdown possible by age, sex and other criteria. <strong>The indicator can be broken down as well by differentiating uncomplicated and severe malaria.</strong> Important: In order to have quality data on prevalence rates data from community level and other sources has to be included. Confirmation might be achieved through microscopy or RDTs according the health institution and the policies in place.</td>
<td>Important: It should be distinguished between health facility based case fatality rate and the complete case fatality rate that needs much more exhaustive data collection tools</td>
<td>Health care centre based statistics + community based statistics + private sector based statistics</td>
<td></td>
</tr>
<tr>
<td>Malaria health facility incidence rate</td>
<td>Number of new cases of confirmed malaria per persons per year</td>
<td>Numerator: Number of all confirmed malaria cases in one year Denominator: Total population living in the coverage area of the health facility</td>
<td>Breakdown possible by age, sex etc. The indicator can be broken down as well by differentiating uncomplicated and severe malaria. It can be calculated as well per months by multiplying the number of new confirmed cases - in the numerator - by 12.</td>
<td>Important: The target may change according to the epidemiological context and the transmission rates. In high transmission areas children may develop clinical malaria even up to 4 times per year.</td>
<td>Health care centre based statistics</td>
<td>Yes</td>
</tr>
<tr>
<td>Malaria case fatality rate</td>
<td>Number of deaths (through confirmed malaria cases) per 1.000 confirmed malaria cases per time (x)</td>
<td>Numerator: Number of all deaths due to confirmed malaria cases at a given time frame Denominator: Total of all confirmed malaria cases at the same time frame Comment: Calculation per 1.000 persons</td>
<td>Breakdown possible by sex, age etc. The indicator can be broken down as well by differentiating uncomplicated and severe malaria. It may actually be especially interesting to measure case fatality rates for cases of severe malaria.</td>
<td>Important: It should be distinguished between health facility based case fatality rate and the complete case fatality rate that needs much more exhaustive data collection tools</td>
<td>Most of the times weekly or monthly health statistics</td>
<td></td>
</tr>
</tbody>
</table>

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**Important**: In order to have quality data on prevalence rates data from community level and other sources has to be included. Confirmation might be achieved through microscopy or RDTs according the health institution and the policies in place.
<table>
<thead>
<tr>
<th>Malaria proportional morbidity</th>
<th>Numerator: Number of all confirmed new malaria cases per time period μ</th>
<th>Denominator: Total of new cases in that time period μ</th>
<th>Breakdown possible by age, sex etc. Regularly used time periods are weekly and monthly.</th>
<th>Health care centre based statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diagnosis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slide positive rate</td>
<td>% of malaria cases confirmed by blood smear</td>
<td>Numerator: Number of positive slides</td>
<td>Denominator: Number of total slides screened</td>
<td>Laboratory reports/ Weekly monthly health statistics</td>
</tr>
<tr>
<td>Rapid test positive rate</td>
<td>% of malaria cases confirmed by RDT</td>
<td>Numerator: Number of positive RDTs</td>
<td>Denominator: Number of total tests done</td>
<td>Laboratory reports/ Weekly monthly health statistics</td>
</tr>
<tr>
<td>Sensitivity of diagnosis by microscopy (quality control)</td>
<td>% of correctly positive tested slides (quality control through reference laboratory)</td>
<td>Numerator: Number of true positive slides</td>
<td>Denominator: Number of true positive slides + false negative slides</td>
<td>Benchmark: 90 % - 95%</td>
</tr>
<tr>
<td>Sensitivity of diagnosis by RDTs (quality control)</td>
<td>% of correctly positive tested RDTs (quality control through reference laboratory)</td>
<td>Numerator: Number of true positive RDTs</td>
<td>Denominator: Number of true positive RDTs + false negative RDTs</td>
<td>Benchmark: 90 % - 95%</td>
</tr>
<tr>
<td>Training of microscopists</td>
<td>Number of microscopists trained or undergone refresher training</td>
<td>Benchmark: often 2-3 microscopists per 10.000 persons</td>
<td>Training reports</td>
<td></td>
</tr>
<tr>
<td>Slides read per microscopist</td>
<td>Number of slides read on average per microscopist</td>
<td>Numerator: Number of slides read per day</td>
<td>Denominator: Number of microscopists present on that day μ</td>
<td>Benchmark: around 50-60 slides. Based on experience one slide should take around 8 - 10 minutes</td>
</tr>
<tr>
<td>Prevention</td>
<td>Numerator</td>
<td>Denominator</td>
<td>Benchmark</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
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<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>Bed net (LLIN, ITN) coverage of a specific population through mass campaigns</td>
<td>% of the sub-population (U5, pregnant women, HIV+) that have been given a bed net</td>
<td>Number of persons in the sub-population (U5, pregnant women etc.) that have been given a bed net</td>
<td>Estimated number of persons in that sub-population in the given area</td>
<td>Depending on the targeted coverage of the campaign: 60 - 90%</td>
</tr>
<tr>
<td>Mosquito net (LLIN, ITN) household possession rate</td>
<td>% of households in possession of at least one bed net</td>
<td>Number of households in possession of at least one mosquito net</td>
<td>Number of households (in the sample of a survey) in a specific area</td>
<td>International benchmark: 80%</td>
</tr>
<tr>
<td>Mosquito net (LLIN, ITN) use rate</td>
<td>% of a population group using a bed net (LLIN, ITN)</td>
<td>Number of population group (U5, pregnant women etc.) having slept under a bed net during the last night</td>
<td>Number of that population group (in the sample of a survey) in a specific area</td>
<td>International benchmark: 60 - 80%</td>
</tr>
<tr>
<td>Bed net distribution coverage in pregnant women during ANC1 visit</td>
<td>% of pregnant women coming to ANC1 who have been distributed a bed net</td>
<td>Number of bed nets distributed to pregnant women during ANC1</td>
<td>Number of pregnant women who have visited for ANC1</td>
<td>Benchmark: 90% (Normally every women should receive a LLIN/ITN during ANC1 including information on use)</td>
</tr>
</tbody>
</table>

Yes
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition</th>
<th>Numerator</th>
<th>Denominator</th>
<th>Benchmark</th>
<th>Notes</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bed net distribution coverage in children (DTP1)</strong></td>
<td>% of children coming to DTP1 who have been distributed a bed net</td>
<td><strong>Numerator:</strong> Number of bed nets distributed to children during DTP1 vaccination</td>
<td><strong>Denominator:</strong> Number of children attending DTP1 vaccination</td>
<td>Benchmark: 90% Bed nets can be distributed to children as well after the delivery of the women or during a post-natal visit. The indicator may be changed accordingly.</td>
<td>Applies in high transmission areas where distribution of bed nets to U5 children and pregnant women is essential.</td>
<td>Health care centre based statistics</td>
</tr>
<tr>
<td><strong>Bed net distribution volume</strong></td>
<td></td>
<td>Number of bed nets (LLIN, ITN) distributed in a specific area to a certain population</td>
<td></td>
<td>Give precise information on where and to whom (U5 children, pregnant women, general population) the bed nets have been distributed. Bed nets can be distributed through health care system based services (ANC, Vaccination etc.) and as well through mechanisms such as outreach or mass campaigns</td>
<td>Program statistics</td>
<td></td>
</tr>
<tr>
<td><strong>IPTp coverage</strong></td>
<td>% of pregnant women in a given area that have received IPTp3 (or IPTp2)</td>
<td><strong>Numerator:</strong> Number of pregnant women in a specific area having received 3 doses of IPTp (or 2 doses of IPTp2) according to the national protocol or the international guidelines</td>
<td><strong>Denominator:</strong> Estimated number of pregnant women in this area</td>
<td>Benchmark: depends on the approach of IPTp distribution.</td>
<td>This indicator is only valid in high transmission settings as the practice of IPTp is only applied there. The strategy of this preventive strategy varies according to the context and more specifically to the HIV prevalence</td>
<td>Health care centre based statistics</td>
</tr>
<tr>
<td><strong>IPTp uptake rate</strong></td>
<td>% of women in ANC-care taking IPTp according to national protocol</td>
<td><strong>Numerator:</strong> Number of pregnant women in a specific area having received 3 doses of IPTp (or 2 doses IPTp2) according to the national protocol or the international guidelines</td>
<td><strong>Denominator:</strong> Number of women having been seen in at least three (or two) ANC care visits (ANC3)</td>
<td>According to ANC coverage, the target may vary</td>
<td>Measures the quality/coverage of IPTp through ANC-care.</td>
<td>Health care centre based statistics</td>
</tr>
<tr>
<td>Treatment</td>
<td>% of patients with uncomplicated malaria getting correct treatment at health facility (and community levels) according to the national guidelines, within 24 hours of onset of symptoms</td>
<td>Numerator: Number of patients with uncomplicated malaria having been treated at health facility (and community levels) according to the national guidelines within 24h</td>
<td>Denominator: Number of patients with uncomplicated malaria having been treated</td>
<td>Benchmark: &gt; 80%</td>
<td>Health care centre based statistics. If community treatment mechanisms exist these statistics need to be added.</td>
<td>Yes</td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
</tr>
<tr>
<td>Early treatment coverage</td>
<td>Percentage of health facilities reporting no disruption of stock of antimalarial drugs (as specified in the national drug policy) for more than one week during the previous three months</td>
<td>Numerator: Number of health facilities reporting no disruption of stock of antimalarial drugs (as specified in the national drug policy) for more than one week during the previous three months</td>
<td>Denominator: Number of health facilities in the specific area</td>
<td>Benchmark: &gt; 90%</td>
<td>Health care centre based statistics</td>
<td>Yes</td>
</tr>
<tr>
<td>Stock rupture rate</td>
<td>% of confirmed malaria cases among the treated cases</td>
<td>Numerator: Number of cases with biological confirmation of malaria</td>
<td>Denominator: Number of cases treated for malaria</td>
<td>Benchmark: &gt; 90%</td>
<td>If good, high-quality biological confirmation is possible only in exceptional cases the patient should be treated for malaria even though biologically negative. Therefore the indicator should be around 100%. In the case of problems of availability of drugs the indicator may raise even over 100% which is as well not a good indication.</td>
<td></td>
</tr>
<tr>
<td><strong>Training of health care workers on malaria prevention and treatment protocols and strategies</strong></td>
<td>Number of health care providers trained in malaria prevention and treatment protocols and strategies</td>
<td>Training reports</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HMM and BCC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Malaria community incidence rate</strong></td>
<td>Number of new cases of confirmed malaria in the community per persons per year</td>
<td><strong>Numerator:</strong> Number of all new confirmed malaria cases in the community in one year <strong>Denominator:</strong> Total population living in the community covered by the CHW</td>
<td>Breakdown possible by age, sex etc. The indicator can be broken down as well by differentiating uncomplicated and severe malaria. It can be calculated as well per months by multiplying the number of new confirmed cases - in the numerator - by 12. This indicator is based on the strategy that CHW diagnose and treat malaria in addition to health care workers based mostly in the facilities. Thus the handling of new malaria cases through CHWs can be added to the health facility based attendance rate. The target may change according to the epidemiological context and the transmission rates. In high transmission areas children may develop clinical malaria even up to 4 times per year.</td>
<td>CHW statistics</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Training of community health workers (CHW) in use of RDT and/or the use of ACTs</strong></td>
<td>Number of community health care workers trained on use of RDTs and ACTs</td>
<td>According to the context and the coverage of the training activities. The indicator may be used as well for training of mothers or pharmacists according to HMM strategy.</td>
<td>Training reports</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Essential malaria knowledge | Proportion of survey participants knowing the mode of malaria transmission | Numerator: Number of persons participating in survey knowing the mode of malaria transmission  
Denominator: Number of participants | Indicator is collected through CAP survey. It is the best to chose the target according to the baseline assessed in a specific population | This indicator serves only as an example for a variety of possibilities to assess the increase and change of malaria related knowledge, attitude and practice. According to the main objectives the indicators has to be chosen and a baseline has to be assessed. Several indicators may thus refer to other topics in the survey, such as malaria misconceptions, malaria related attitudes and malaria related practice, such as use of preventive methods or health care seeking behaviour. The principle of such indicators is the same of the one outlined here. | CAP survey |
| Training in BCC/IEC strategies | Number of type of providers trained in malaria related BCC strategies and content | Breakdown possible by type of providers (health professionals, CHW, mothers etc.) | Training reports |
| Number of contacts sensibilised through BCC/IEC activity | Number of contacts made through different BCC methods | Breakdown possible by type of activity (sensibilisation through leaflets, group games etc.) | BCC activities reporting |

The number of total contacts is the addition of persons reached/contacted through different BCC activities. Hereby the indicator does not measure the number of different persons reached, but the number of contacts made, meaning one person can be counted several time, as being reached through different pr even the same BCC activity.